

INSTITUTIONAL AND POLICY ANALYSIS OF RIVER BASIN MANAGEMENT

*The Tárcoles River Basin, Costa Rica*¹

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COSTA RICA TÁRCOLES RIVER BASIN

- SELECTED CITIES
- ★ NATIONAL CAPITAL
- MAJOR ROADS



0 5 10 15 20 Kilometers
0 5 10 15 20 Miles

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Acronyms

A y A	Costa Rica Institute for Aqueducts and Sewers
ABT	ABT Associates, Inc.
ALIDES	Alliance for Sustainable Development
ARESEP	Public Service Regulatory Authority
ASOTEM	Association for the Management of the Tempisque River Basin
CATIE	Center for Tropical Agronomic Research and Education
CCAD	Central American Environmental and Development Commission
CEDARENA	Center for Environmental Law and Natural Resources
CNFL	National Power and Light Company
CNP	National Production Council
COMCURE	Reventazón River Basin Management Commission
CRAC	Regional Committees for Conservation Areas
CRGT	Coordinating Commission for the Grande de Tárcoles River Basin
ESPH	Public Service Company of Heredia
FECON	Costa Rican Federation of Environmental Groups
FONAFIFO	National Fund for Forestry Financing
FUDEU	Foundation for Urban Development
FUNDECOR	Foundation for Development of the Central Volcanic Mountain Range
GDP	Gross Domestic Product
IADB	Inter-American Development Bank
ICE	Costa Rican Institute of Electricity
ICT	Costa Rican Tourism Institute
IFAM	Institute for Municipal Promotion and Advising
ITCR	Technological Institute of Costa Rica
INEC	National Statistics and Census Institute
INVU	National Housing and Urbanization Institute
JICA	Japanese International Cooperation Agency
MAG	Ministry of Agriculture and Livestock
MIDEPLAN	Ministry of Planning
MINAE	Ministry of Environment and Energy
MINSA	Ministry of Public Health
MIRENEM	Ministry of Natural Resources, Energy and Mines
NGO	Non-Governmental Organization
PLAMA VIRILLA	Improvement Plan for the Virilla River Basin
PLAMAGAM	Environmental Improvement Plan for the Greater Metropolitan Area
SENARA	National Underground Water, Irrigation and Drainage Service
SETENA	National Environmental Technical Service
SINAC	National System of Conservation Areas
SNE	National Electricity Service (defunct)
UCR	University of Costa Rica
UNA	National University of Costa Rica

1. Background and Introduction

Integrated water resources management (IWRM) and organizing it primarily at the river basin level are two of the most common and widely repeated recommendations in the water resources literature of the last decade if not longer (Allee 1988; Galloway 1997; McDonald and Kay 1988; World Bank 1993). Basin management is often associated with the concept of decentralization, of managing water resources at the “lowest appropriate level.” (See, e.g., International Conference on Water and the Environment 1992; Mody 2001). Several conceptual arguments have been presented in favor of decentralization in water resource management, and basin-level management in particular, including that the whole array of resources and use patterns in the basin will be taken into account, management decisions will be based on better knowledge of local conditions, and incentives for stakeholders to actively participate in management will be stronger.

Empirical studies of river basin management systems provide opportunities to examine the claims made for basin-level integrated water resources management, and to explore factors that appear to influence its implementation and outcomes. In this research project the project team has searched for those factors and their relationships to river basin management in two ways: with a survey of river basin organizations throughout the world, and with case studies of eight river basins analyzed in greater detail. Some of those eight cases have long histories of basin-scale institutions for water resource management, such as the Guadalquivir river basin in Spain and the Murray-Darling river basin in Australia. Others have emerged recently, as in the Tárcoles basin of Costa Rica where a river basin commission, the Coordinating Commission for the Río Grande de Tárcoles (CRGT), was established in the early 1990s.

This case has been extremely valuable because the formation of the basin commission was a locally-initiated action that occurred in the fairly recent memory of many individuals who are still actively involved in water and government, and whose perspectives on the origin, growth, and recent difficulties of the basin management effort are both fresh and rich. The Tárcoles basin therefore provided an opportunity to explore the early life cycle of a river basin organization and some of the factors that were linked to its origin, early growth, and recent stagnation.

This paper focuses on analysis of the effort to establish river basin management in the Tárcoles basin, and provides only brief descriptions of its physical characteristics, social and economic profile, and historical development. More detailed information about those important matters may be found in the appendices.

2. Analytical Framework

To analyze the data gathered for this project from the case studies and from the survey of river basin organizations, the project team has developed a framework that identifies a number of political and institutional factors which may be associated with the emergence, sustainability, and success or failure of decentralized approaches to integrated water resource management at the basin scale. These factors, and their hypothesized relationships with basin management in a country that has decentralized or is attempting to decentralize water resource management institutions, are derived from the institutional analysis literature relating to water or other natural resource management and to

decentralized systems (especially Ostrom 1990, 1992; also Agrawal 2000; Alaerts 1999; Blomquist and Schlager 1999; Bromley 1999; Easter and Hearne 1993; Wunsch 1991). Our information gathering and analysis focuses on the following sets of variables.

- Contextual factors and initial conditions
- Characteristics of the decentralization process
- Characteristics of central government/basin-level relationships and capacities
- The internal configuration of basin-level institutional arrangements
- Motivation of stakeholders

Variables considered within each set are listed in Appendix 1. The Tárcoles Basin case is discussed in terms of these categories and variables in Section 8.

3. Methodology

A case study approach was pursued for this project in order to examine closely the processes of institutional change as well as the current situation. An expert in water policy and management affairs in Costa Rica facilitated the site visit, arranging interviews and preparing a background paper on the basin prior to the visit (Ballesteros 2003). Background papers for all case study visits are based on a common outline. During the site visit, team members met with and interviewed a range of individuals, including basin-level stakeholders, past and current central and local government officials, past and current basin commission staff and members, and academic researchers with perspectives on governmental structure and water management in Costa Rica.² The semi-structured interviews were conducted with a view to understanding the processes of institutional origin and change within the Tárcoles basin, the incentives of different stakeholders related to such change, and the performance of water management institutions at sub-basin, basin, and national scales, matters that were closely within the knowledge of the interviewees. After the visit, team members combined their notes from the interviews, revisited and revised the basin background paper, reviewed other materials, and composed this summary and analysis of the river basin management situation in the Tárcoles basin.

The following analysis of the Tárcoles basin case is therefore based on a combination of sources—documentary materials on Costa Rica and the Tárcoles basin, the background paper prepared for the visit, and the interviews conducted during the site visit. The findings and conclusions therefore do not represent the point of view of a single individual or organization, but emerge from a composite of data collected and reviewed by the research project team.

² Organizations from which individuals were interviewed are the Tárcoles River Basin Commission, the Costa Rican National Assembly, the Costa Rican Ministry of Environment and Energy, Department of National Waters, Institute of Aqueducts and Sewers, the Institute of Electricity, National Power and Light Company, Institute for Municipal Promotion and Assistance, the National System of Conservation Areas, the State of the Nation Project, the Central American Commission for Environment and Development, the Inter-American Development Bank, the Center for Environment and Natural Resources, the Association of Private Electricity Companies, the National Chamber of Livestock Producers, the municipalities of San José and Belén, the University of Costa Rica, the National University of Costa Rica, and the Florida Bebidas corporation.

4. Tárcoles Basin Water Management Issues and Stakeholders

4.1 Physical Characteristics

With its mountainous spine and numerous valleys, Costa Rica contains 34 river basins. The Grande de Tárcoles river basin—the drainage area of the Río Grande de Tárcoles, called hereafter the Tárcoles basin—is located in the west-central portion of Costa Rica and extends from the mountain ranges in the middle of the country to the Pacific coast (Figure 1). The Río Grande de Tárcoles, a river of 111 km length that empties in the Pacific, is formed by the confluence of the Alajuela, Grande, and Virilla rivers toward the middle of the basin.

Costa Rica as a whole has abundant precipitation and runoff, ranging from 1,200 to 7,000 mm per year. The river basins on the Pacific side, such as the Tárcoles, tend to be somewhat drier with a noticeable reduction of river flow during the dry season of the year. Still, precipitation in the Tárcoles basin ranges from 948 mm to 5,409 mm per year, with an annual average of 2,364 mm. Flooding is a recurring problem in this basin as in most of the river basins of Costa Rica.

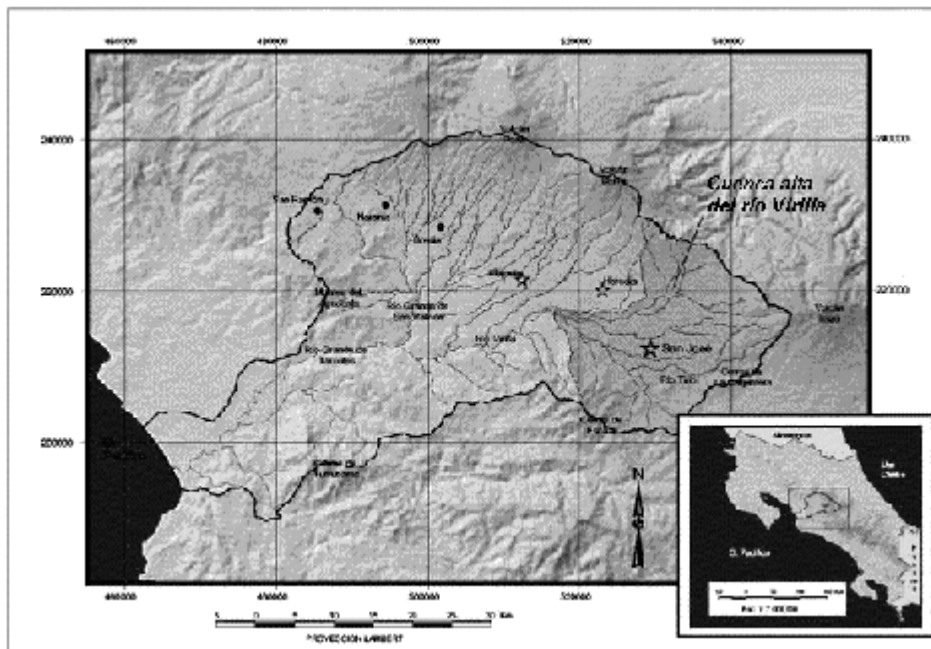


Figure 1: Location of the Tárcoles basin within Costa Rica

Source: Balletero (2003)

There are three distinct subareas within the Tárcoles basin—an upper area that corresponds with the watershed of the Virilla river and is about 40% of the total basin, a middle area that corresponds with the watershed of the Grande River and is about 34% of the total basin, and a lower area along the course of the Río Grande de Tárcoles below the confluence of the Virilla and Grande rivers, which is about 26% of the total basin area. The middle basin is semi-rural with some population centers, and the lower basin is mostly rural. The upper basin contains about 80% of the population in the basin, with large concentrations of both urban population and industry. It also contains the largest

aquifer systems in the basin—the Barva and Colima aquifers, which are layered aquifer systems that supply most of the groundwater used for industry and the urban population.

Relative to the rest of Costa Rica (and in light of the large number of river basins there), the Tárcoles basin is fairly large—at 2,155 km² total area, the basin represents 4.2% of the total land area, and the upper and middle areas (the Virilla and Grande watersheds) are two of the largest watersheds in the country. But these geographic dimensions do not capture the greater significance of the Tárcoles basin to Costa Rica. With only 1/25 of the land area, the Tárcoles basin is home to half the nation’s population (approximately 2 million of the 4 million in the country), contains 80% of the nation’s industry, 80% of all the vehicles, and more than half of all the registered wells.

The cities in the upper basin have grown into a large metropolis at the center of Costa Rica known as the Greater Metropolitan Area or GAM (*Gran Área Metropolitana*). This metropolitan area includes San José, the nation’s capital, and three other cities. The GAM is also the transportation center of the country, with the national highways that reach the other regions of Costa Rica converging and intersecting in the Tárcoles basin. The area is also crucial to Costa Rica’s important and growing tourism industry, as most tourists pass through the international airport in Alajuela and stay in the area for at least a portion of their time in the country.

Despite the growth of urban and industrial centers within the basin, 37% of the land use remains in crops and pasture. Coffee farming, other crops with and without irrigation, dairy farming and livestock ranching occur throughout the basin.

4.2 Water Resource Issues and Problems

Although precipitation is abundant, the concentration of people, industry, and agriculture in the Tárcoles basin translates into significant and growing water resource problems. Those problems are exacerbated by institutional arrangements governing water management at the national level, and by financial constraints that have kept infrastructure development within the basin from keeping pace with economic development and population growth. The 2001 “State of the Nation” report identified the vulnerability of water resources and water quality as Costa Rica’s biggest environmental concern, with the Tárcoles basin as the principal focus for that concern.

Sewage, Solid Waste and Water Pollution

Although one could start with any of a number of problems, the most striking is probably this—that the Tárcoles basin, with its 2 million inhabitants and its economic activity, lacks sewage treatment facilities. Nearly all of the domestic and industrial wastes collected in the basin are discharged without treatment; only 4% are treated. The streams and rivers of the Tárcoles basin receive untreated domestic and industrial wastewater on a massive scale all year long, year after year. The Virilla River alone receives an estimated 250,000 cubic meters of untreated wastewater every day.

Industrial wastes contribute contaminants in addition to the sewage that emanates from households in the basin. Agribusinesses, especially food and coffee processing industries, are prevalent throughout the upper and middle basin areas—more than half of all coffee processing in Costa Rica occurs in the Tárcoles basin. In addition, the upper basin contains 29 chemical and alcohol manufacturing facilities. Although national law requires treatment of industrial wastes, most industries still do not have facilities in place.

The surface waters of the basin are also the depository for rubbish. Due to inadequate solid waste collection and disposal, especially in the GAM in the upper basin area, trash is simply dumped into valleys and rivers. In addition to the obvious negative aesthetic impact, the accumulation of trash in the rivers aggravates flooding problems where it chokes off stream channels, and adds a significant nuisance and expense to the operation of hydroelectric power facilities located along the banks. The national power and light company (CNFL – *Compañía Nacional de Fuerza y Luz*) has estimated that it spends millions of dollars per year clearing out water intake facilities infiltrated with trash. Urban and agricultural runoff also proceeds relatively unimpeded to the rivers and streams of the Tárcoles basin, further worsening water quality.

Not surprisingly, surface waters in the basin exhibit high concentrations of coliforms, heavy metals, and suspended solids. By the time the Tárcoles reaches its mouth at the Gulf of Nicoya on the Pacific coast, pollution levels are so high that “red tide” conditions are observed from time to time, and the coastal tourism flourishing elsewhere in Costa Rica is very limited there.

Groundwater in the basin is vulnerable to quality degradation as well. Septic tanks serve 68.5% of households and businesses in the basin, so those that are not discharging to surface waters are discharging to the ground. The prevalence of septic systems represents a significant threat to groundwater quality, particularly in the upper basin area where groundwater is an important water source for industry and the population and where nitrate contamination associated with septic leaching is a rising concern. Agricultural activity in the basin has also negatively affected groundwater quality. Application of fertilizers, especially in high concentrations for intensive coffee farming, is associated with further nitrate contamination of groundwater in the upper and middle basin areas (Reynolds-Vargas and Richter 1995).

These water quality problems ultimately affect water availability for human uses. “If the pollution continues at the present rate, we estimate that in 10 years the availability of potable water in terms of both quantity and quality will be minimal,” said José Luis Salas in 2000, when he was Deputy to the Minister of Environment and also the CRGT coordinator. (Dulude 2000)

For industries and urban populations that rely on groundwater, contamination threatens to cut off what has been their best-quality water source. Although groundwater use is estimated to be only 6% of total water use in the Tárcoles basin, its importance is very high because of these sectors that rely most upon it. The polluted surface water, in contrast, already requires significant treatment prior to use. Even here there are gaps that raise concerns about public health—not every water supplier (especially smaller ones) has adequate water treatment facilities. Many smaller water systems lack the financial and technical capacity to provide better quality water for their customers. It is estimated that 31% of the population in the basin receives untreated water, and 42% receive water that (treated or not) is not subject to any regular quality control or monitoring. In fact, three of the provinces of Costa Rica with the lowest coverage of quality drinking water for the population—Alajuela, Cartago, and Puntarenas—lie wholly or partly within the Tárcoles basin.

Deforestation

Population growth and economic development in the Tárcoles basin have also changed the land surface, in ways that aggravate both water quality and quantity problems. Deforestation of the upper and middle basin areas continues despite serious national efforts to arrest it. From 1992 to 2000, the forested portion of the basin plunged from 66,096 ha to 38,384 ha. The same period saw a 15,000 ha reduction in farmland due to conversion of land from agricultural to urban uses. These processes have accelerated soil erosion, reducing the capacity of hillside and valley soils to absorb and retain water, thus aggravating both flooding problems and dry-season water scarcity.

Increasing Water Demand

Urbanization and industrialization in the Tárcoles basin has not entirely displaced agriculture, however. According to one expert in the Ministry of Environment and Energy (MINAE - *Ministerio del Ambiente y Energía*), 60% of consumptive water use is for irrigated agriculture. Urban and industrial water demands have grown on top of agricultural water use. This accumulation of water demands for urban, industrial, and agricultural needs has begun to be felt in shortages or uncertain availability of high-quality water supplies for newer, high-value sectors of the economy such as tourism, recreation, and fishing. Some water is even imported to the upper basin area from the neighboring Reventazón river basin, for use in the GAM.

Institutional Context

This litany of difficulties is not new, and is familiar to several individuals and organizations in the basin. Water policies in Costa Rica have contributed to the management challenges in the Tárcoles basin, however, more than they have alleviated them. There is no national water policy and no national water plan; there is not even a national water budget more recent than 1990. The existing national water law dates from 1942, and modified the first regulation of 1884; a proposed new water law has been under consideration in the Costa Rican legislature for about two years.

The system of water concessions in the country has significant gaps that contribute to uncertainty about water availability, since it is hard to tell what uses are occurring already in the basin and to what extent total water demand exceeds or is exceeded by available supply. The largest hydroelectric power producers (the national institute ICE and its subsidiary CNFL), which use the greatest quantities of surface water, are not included in the concession system. Also, the concession system provides little control over groundwater use. Tariffs on agricultural water use are based on land area rather than on the volume of water used, providing little incentive for farmers to replace or upgrade aging and inefficient gravity-fed systems. The entire system of water charges fails to provide enough revenue to maintain infrastructure within the basin, let alone support needed improvements such as water treatment plants. Needless to say, this situation does not correspond to Costa Rica's image of an ecologically-aware and active country.

Efforts to develop river basin management oriented toward integrated water resource management in the Tárcoles basin began in this institutional environment about 15 years ago. It was not a central-government initiative, but an effort begun by a small number of important basin stakeholders.

4.3 Major Stakeholders in the Tárcoles Basin

Appendix 2 provides an extensive presentation of the identities, authority, and functions of several important organizations in the Tárcoles Basin. Box 1 below condenses some of that information on the basin stakeholders that have been involved with the effort to create and sustain a Commission for the Río Grande de Tárcoles, some from its inception and others at times along the way. The section that follows describes the river basin commission's development.

Box 1: Major Stakeholders

Principal Water Providers

The Institute of Aqueducts and Sewers (AyA – Instituto Costarricense de Acueductos y Alcantarillados): AyA, a state institute with functional and budgetary autonomy, was created by law in 1961. It is authorized to design, finance, build and operate water supply systems created after that, and is responsible for water supply in the San José metropolitan area and several other locations. It is also able to intervene and assume the operation of inefficient or poorly performing water supply systems. AyA has a dual role as the country's foremost water supplier but also as the regulatory authority for water supply systems in Costa Rica. It is obliged to set policies, establish standards, conduct and promote planning, financing, administration and operation of water supply and sewerage systems, as well as regulations for stormwater drainage in the urban area. Furthermore, despite being the regulatory authority for water and sewerage systems, AyA is also one of the major polluters in the Tárcoles basin because of the lack of treatment for its sewerage system which discharges to the surface waters of the basin.

Municipalities

These local governments are responsible for operating the water supply systems under their authority that existed prior to the creation of AyA, as long as they maintain a minimum level of quality and efficient service and obtain a concession from the national government for their water use. In Costa Rica, many of the water supply systems that supply drinking water, especially in the outlying areas of the country, are in the hands of the municipality. However, there has been a tendency toward the centralization of the service in the AyA, because of the poor service provided by the municipalities, which became evident when there were serious contamination accidents, interruption in the service, leaks and little development in the infrastructure. The 1942 water law provides that municipalities will manage the water systems for their populations. It also authorized municipalities to supervise and control concessions for the exploitation of materials (sand, rock, gravel and others) from rivers, beaches and deposits of public domain, but this was changed by the Code of Mining adopted in 1982.

The Public Service Company of Heredia (ESPH - *Empresa de Servicios Públicos de Heredia*): The Public Service Company of Heredia (ESPH) was created in 1976 by a law that was modified in 1996. It is a private company that provides the public services of water and electricity. It has jurisdiction over the central canton of Heredia and neighboring cantons in the Province of Heredia. It must request a concession for water use.

Hydroelectric power producers

The Costa Rican Electricity Institute (ICE - Instituto Costarricense de Electricidad) and its subsidiary the National Power and Light Company (CNFL): ICE, an institute with budgetary and functional autonomy, was created in 1949 to plan and conduct the rational development of energy for the country, especially from water resources. ICE and CNFL have constructed a series of reservoirs for hydropower generation in various rivers in the basin, although ICE's largest power projects have been in other basins in Costa Rica. Currently, 71% of electricity produced in Costa Rica is generated as hydropower.

Private power producers

ICE and CNFL are the dominant electricity producers in the Tárcoles basin, but since 1992 Costa Rican law has allowed private companies to obtain permits and concessions to produce and sell electricity as well. Because some of these companies pay environmental services fees and because they have an interest in the preservation and quality of surface water flows, they are interested in river basin management generally even though their involvement in the Tárcoles basin per se is limited. The private power producers have an association (ACOPE - *Asociación Costarricense de Productores de Energía*) to represent their interests.

Other Major Water Use Sectors

Industry

As already noted, industrial water use and waste discharges are important factors in the current conditions and future prospects of the Tárcoles basin. Whether individually or through representation in the Chamber of Industries, businesses (especially manufacturing and food and beverage processing) are noteworthy stakeholders.

Agriculture

Similarly, irrigated agriculture is a major water use sector in the Tárcoles basin, and agricultural practices such as fertilizer use and runoff have impacts on water quality. The agriculture sector participates in water policy matters primarily through the Costa Rica Chamber of Agriculture and Agribusiness and chambers or federations of particular agricultural sectors, such as the Federation of Livestock Chambers.

Regulatory Bodies and Nongovernmental Organizations

Ministry of Environment and Energy (MINAE): In 1996 in connection with a number of reforms of public services and reorganization of government agencies, it was decided that matters relating to water resources should be transferred to MINAE. This reorganization at the central government level did not signal any significant decentralization of water management responsibilities. As the central government agency with principal responsibility for environmental and natural resource management, including water, MINAE has considerable interest in the Tárcoles basin.

National System of Conservation Areas (SINAC - *Sistema Nacional de Areas de*

Conservación): Costa Rica contains a number of protected areas that are designated on the basis of their ecological significance and/or vulnerability. SINAC is the agency charged with the management of these protected areas, many of which are located around the periphery of the Tárcoles basin, mainly in the upstream basin area.

Other ministries and agencies

Either because water resources are part of their portfolio or because they regulate or support other basin stakeholders, a number of other governmental ministries and agencies should also be regarded as Tárcoles basin stakeholders. They include the Ministry of Health (MINSA - *Ministerio de Salud Pública*), the Ministry of Agriculture and Livestock (MAG - *Ministerio de Agricultura y Ganadería*), the Ministry of Planning (MIDEPLAN - *Ministerio de Planificación Nacional y Política Económica*), the Public Service Regulatory Agency (ARESEP - *Autoridad Reguladora de Servicios Públicos*), and the Institute for Municipal Promotion and Advising (IFAM - *El Instituto de Fomento y Asesoría Municipal*).

Environmental and other NGOs

There are several nongovernmental organizations oriented toward natural resource protection, sustainable urban development, or both. Some have had representatives on the Tárcoles basin commission. They include the Center for Environmental Law and Natural Resources (CEDERENA - *Centro de Derecho Ambiental y de los Recursos Naturales*), the Foundation for Urban Development (FUDEU - *Fundación para el Desarrollo Urbano*), and the Federation of Environmental Groups (FECON - *Federación Costarricense de Conservación del Ambiente*).

5. The Tárcoles River Basin Commission

Costa Rica has had a highly centralized form of government. Decentralization efforts with regard to a number of public services have been isolated, and sometimes only temporary. River basin management has followed the same pattern; there has been no overall, nationwide effort to decentralize water resource management to the river basin level in Costa Rica. The creation of the Coordinating Commission for the Río Grande de Tárcoles was the first effort in Costa Rica to establish a structure for river basin management. Interestingly, it represented more of a “bottom up” than a “top down” approach to establishing a river basin organization.³ Since then, basin organizations have been created in a few other river basins in the country.

5.1 Origin and Emergence of the Basin Commission, 1991-1994

In 1991, the Municipality of the Central Canton of San José—the most influential municipality in Costa Rica—began to pay attention to serious environmental problems that were apparent in the capital city, especially water pollution, the dumping of solid and

³ Although the expression “bottom-up” is often used to refer to actions initiated by grassroots or other civil-society entities, we use it here somewhat more broadly, as the CRGT was initiated by local government officials and civic organizations together. This use of the term “bottom-up” still contrasts accurately with a “top-down” decentralization initiative of the central government; CRGT was the former, not the latter.

liquid waste in the rivers, and the recurring problem of rivers and streams overflowing their banks, which has often caused serious tragedies. When the municipality decided to tackle these issues, there was no organized opposition but also no organized support for it doing so. It was unusual for municipalities to take action on such matters, so while San José's efforts did not violate any formal restrictions on its authority, they did run against stereotypical views of municipal responsibilities.

To pursue its interest in these environmental quality-of-life issues, the municipality of San José initiated a series of activities in 1991 and 1992, of which the following four stand out:

In 1991 it proposed a Project for the Recuperation of the Río Torres. This project focused on controlling the disposal of solid and liquid wastes in the Río Torres, a major upper-basin river and one of the most polluted rivers in the Tárcoles basin. The Río Torres project was assisted with funding from France as part of the CIUDAGUA program.

Also in 1991, in another unusual action for a municipality, San José issued a municipal policy directive giving industries located in the canton 24 months to begin treating their liquid waste. As a result of that directive, a pilot plan was launched by the Municipality and the Chamber of Industry involving a group of businesses that were major polluters according to data from AyA. When the pilot program ended in 1994, there had been a significant reduction in industrial waste (Rodríguez, 1997).

In 1992, the Municipality of San José adopted an Urban Control Plan to regulate land use and urban growth, which included a series of environmental provisions to protect surface water, aquifers, and recharge areas.

By this time, though, officials and staff of the Municipality had come to recognize that these environmental matters could not be resolved by actions in only one canton. The situation would have to be approached with a broader view, one that included the entire Tárcoles basin. Visits were made to each of the other 35 municipalities in the river basin area to promote their participation and to set priorities. In August 1992, the Municipality of San José organized a seminar titled, "The Río Grande de Tárcoles River Basin: Looking Toward the Future," in which a large audience participated in discussions and defined some basic guidelines for coordination to confront the immense task of recuperating the river basin.

The August 1992 seminar's most important achievement was its involvement of many basin stakeholders, including many of the municipalities, private businesses, and civil-society institutions. After the seminar, with continued leadership and support from the Municipality of San José, negotiations began to form the Coordinating Commission for the Río Grande de Tárcoles, the CRGT.

The original members of the commission were:

- A representative from each of the following municipalities: San José, Heredia, San Rafael de Heredia, Orotina, Alajuela, and Curridabat.
- A representative from each of the following ministries: Environment and Energy, National Planning and Economic Policy, Health, and Science and Technology.
- A representative from each of the following state institutes: National Power and Light Company (CNFL), ICE, and AyA.
- A university representative.

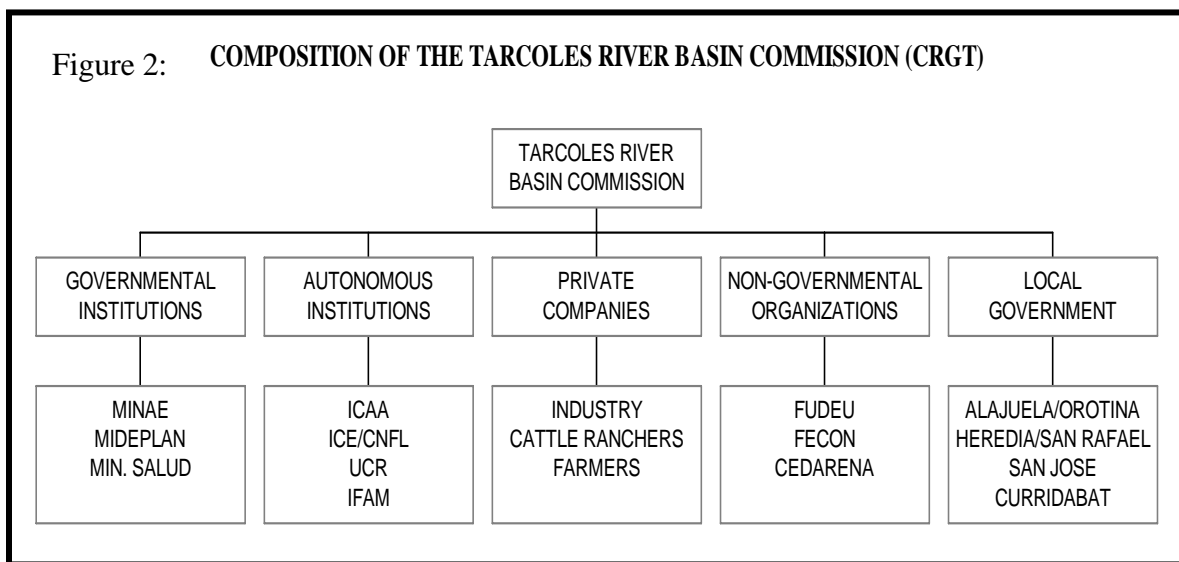
- Private-sector representatives from the following organizations: the Chamber of Industry, Costa Rica Chamber of Agriculture and Agribusiness, and the Federation of Livestock Chambers.

From its beginning, then, the CRGT had a participatory structure that was both inter-organizational and inter-disciplinary, attempting to connect the most important actors in water resource matters. The structure was nevertheless imperfect, and some of its deficiencies are discussed later.

With this original composition, the stakeholders sought official recognition of the CRGT by the national government. Rather than proceed through the more time-consuming and politically difficult process of obtaining recognition through a law passed by the Costa Rican legislature, the stakeholders and the office of the Minister of the Environment agreed to use the swifter action of a ministerial decree recognizing the commission. Although this choice expedited official recognition of the commission, it later proved somewhat regrettable, since ministerial decrees are more easily altered or disregarded by subsequent administrations than are national laws.

The CRGT was officially recognized on April 29, 1993 by Executive Decree No. 22156-MIRENEM (MIRINEM being the previous acronym for what is now MINAE, the Ministry of Environment and Energy). Although the decree recognized the CRGT's legitimate existence as a collaborative body for information development and sharing, communication, and planning, it did not transfer to the CRGT any formal responsibility or capacity for undertaking water management projects.

In December 1993, a follow-up decree, Decree No. 22712-MIRENEM, was published adding representatives from the Municipal Institute for Promotion and Consultancy (IFAM) and the Foundation for Urban Development (FUDEU) as permanent members of the CRGT. With these additions, the commission had 19 members, of which five were nongovernmental organizations and six were municipalities (Figure 2).



Source: Daneshgiri (2003)

During 1993 and 1994, the CRGT conducted an awareness-raising campaign about river basin management. There were motivational activities in the municipalities and with

businesses in order to involve them in the process. A series of events were organized (seminars, workshops, meetings) that guaranteed a substantial participation by municipalities, NGOs, and private and public sectors. These were held to create a framework for debate about common themes and were an endeavor to give clear information to all the actors. More action-oriented seminars held during 1993 were titled, “Towards Integrated Management in the Río Grande de Tárcoles River Basin,” and “Institutional Tasks in the Río Grande de Tárcoles Basin.”

Throughout these first two years of the CRGT’s existence, the Municipality of San José continued to provide its principal leadership and support. The CRGT had space in the offices of the municipality, and the municipality provided it with staff support to become operational as a commission. The CRGT members and staff participated in training activities.

5.2 Peak Activity, 1994-1998

By 1994, the CRGT was operational and began conducting activities in the river basin. This was its most productive phase, during which there was substantial support from MINAE for the CRGT and for the creation of similar structures in other river basins. MINAE provided logistical and economic support for the CRGT, and devolved to it some basin planning and study functions (including contracting with the Inter-American Development Bank for a large-scale basin study) that would otherwise have been performed by MINAE personnel. The headquarters of CRGT were transferred to space offered by MINAE, which was shared by other MINAE departments.

MINAE during this period also expressed support for the creation of similar structures in other river basins. Executive Decree No. 26635-MINAE divided the country into five watersheds, created a favorable atmosphere for the deconcentration of services in them, and established authority to form organizations in the Tempisque, Bananito and Savegre rivers. Also, in 1995 by Executive Decree 30077-MINAE, the River Basin Program was created as part of the National System of Conservation Areas for the purpose of determining guidelines for MINAE regulations regarding river basins and to formulate national policies for river basins. Another objective of the decree was to elaborate a Master Plan for River Basins and to approve an order of priorities by river basin region for water use by public sector organizations, which was orientated to the integrated and rational utilization of the resource.

During 1994-1998, the CRGT was very active and demonstrated leadership on the national and international (regional) levels; it became a management “model” to be reproduced. The CRGT was incorporated as a founding member of the International Network of River Basin Organizations in France in 1994, and into the Latin American Network of River Basin Organizations in Brazil in 1997. With the support of the IDB and French Cooperation, the First Meeting on River Basin Organizations in Central America and the Caribbean was organized on May 1, 1997. The information and communication functions of the CRGT continued through this phase. CRGT members and staff compiled and systematized information on water quality and pollution sources in the basin, studies on river basin characteristics, and institutional and legal analyses. A number of other workshops and seminars were held during this period and brought stakeholders together.

The CRGT also implemented four major action programs during this period, which are described in Box 2. A volunteer plan program was devised for businesses to

incorporate waste treatment, and an ecological flag program was created to recognize these and other efforts to protect and conserve water resources. Reforestation programs were initiated to promote watershed protection. Lastly, the CRGT developed an ambitious program for the integrated management of natural resources at the basin scale.

Box 2: Major Action Programs

The Volunteer Plan Program

It was formed after the passage of the Wildlife Conservation Law in October 1992, particularly Article 132, which prohibited discharging contaminated substances into bodies of water and set a 24-month deadline (December 1994) for compliance. Seeking business cooperation through agreements with business sectors, the government invited businesses to present voluntary plans to establish waste treatment systems. The Volunteer Plan Program originated by the CRGT grew beyond its expectations: about 100 businesses joined the program. The biggest successes were with coffee processors, sugar cane mills and pig farms. Later, Executive Decree No. 24156 MIRENEM-SALUD, a joint decree of the ministries of Environment and Health, established Costa Rica's first maximum and minimum parameters for disposal of contaminated substances into water bodies. That decree was revised and updated, and a new version presented on June 19, 1997 (Executive Decree No. 26042 SALUD-MINAE). Because of the extent and national potential, the volunteer plan program was taken up again by MINAE in 1998, this time to be implemented by the ministry. However, the ministry was not able to maintain the initial interest, and the program now operates at its lowest level of participation.

The Ecological Flag Program

The CRGT established the Ecological Flag Program in 1994 as a reward or recognition for business and civil-society organizations that had developed and implemented resource protection and recovery activities in the river basin. The CRGT awarded the first Ecological Flags in February 1995 to companies that had successfully completed the pilot Volunteer Plan Program. The initiative quickly gained nationwide attention. Although it was paralyzed for a while in 1996 because of a lack of resources and technical equipment, the flag program returned in 1997 with support from the Dutch government and was renamed the "seal of environmental quality." In 2001, the program was transferred to the Office of Civil Society of MINAE, which is currently in charge of its administration for the entire country.

Reforestation

Reforestation programs were initiated to protect riverbanks, streams, springs, and forest lands threatened by landslides or erosion. The CRGT conducted awareness-raising programs in elementary and high schools, in community organizations and with environmentalists in the different cantons of the Tárcoles basin. As originally conceived, the program had three stages: cleanup, reforestation and maintenance. Reforestation has been a readily measurable success, resulting in more than 150,000 trees being planted. Starting with the Municipality of San José, the CRGT implemented a practice of giving the mother of each newborn in the basin a tree seedling upon the birth of her child. The program has used native species produced in a tree nursery that belongs to ICE, which donated the trees for the program under an agreement with the CRGT. Currently, that

program is continued by the Municipality of San José, and other CRGT members—a few other municipalities and ICE and CNFL—have developed and maintained reforestation programs in various watersheds of the basin.

Program for Integrated Management of Natural Resources

The CRGT elaborated and requested funding from the Inter-American Development Bank (IDB) for a program for Integrated Management of Natural Resources in the Río Grande de Tárcoles River Basin. This proposal represented the pinnacle of CRGT activity in attempting to achieve a basin-scale coordinated program of protection and recovery for water and other natural resources. Although the proposal was endorsed by MINAE and the Ministry of Planning, it was presented to the IDB in 1994 by the CRGT rather than by a government agency. In the nearly three-year process of negotiation, the CRGT was selected to be the national counterpart, the first time that IDB in Costa Rica worked with an organization of this kind. IDB gave CRGT the responsibility to supervise and use \$1,000,000 to design the program concept and to fund the development of feasibility studies. Those studies, which began in October 1997 and concluded at the end of 1998, were performed by a North American company, ABT Associates, Inc., with local partners the Center for Tropical Research (CATIE), the Neotropical Foundation, and the COSESA Group.

5.3 Diminution of Functions and Visibility, 1999-present

At the beginning of 1999, a number of factors converged that began to make the normal operation of the Commission difficult. A change of government occurred as the result of the national elections in 1998, and the new government took a more cautious and less generous approach to the support of the CRGT and its activities. The new MINAE minister adopted the perspective that the ministry's responsibility was to enforce and implement national laws, not to go beyond the scope of existing laws by decreeing or supporting projects and initiatives of its own. On this score, the vulnerability of the CRGT as an initiative established by decree rather than by law became apparent. The new MINAE minister began to rein in the CRGT by taking a more active and direct role in its governance and operations, in what several interviewees described as the “centralizing” or “re-centralizing” of the Commission. A newly-appointed MINAE representative to the CRGT was named by the minister as the Commission's president, without consultation of the rest of the CRGT members and even though he had no previous involvement in the CRGT or other river basin management efforts.

Not only did this change reflect a new relationship between the central government and the CRGT, it also demonstrated to the rest of the commission members the importance of the skills and role of the CRGT's first and only previous president. He had been a town councillor in the Municipality of San José who had spearheaded the development of the municipality's efforts to attend to environmental issues and the development of the CRGT, had substantial entrepreneurial skills, and had been able to mobilize and combine people and resources to make the CRGT an active body despite its multi-organizational structure and its somewhat uncertain status as a kind of institution recognized by the national government but lacking formal governmental powers. The first president also had and used an extensive network of contacts with people at the top decision-making levels of

other key institutions such as MINAE. CRGT had come into existence and flourished under those conditions, but it diminished quickly after he ceased to be its leader.

The new MINAE representative's tenure as CRGT president was short-lived, and he left the post in 2000. The presidency was assumed at that time by the representative of the Union of Local Governments, who had been providing some leadership in CRGT activities. He had been openly critical of the CRGT's changed direction and changed relationship with MINAE, being quoted as follows in the press on his disappointment with a CRGT seminar held in 2000: "After 10 years, all they did was tell us that the river is polluted, that there's deforestation, that we have a sewage problem.... I was expecting something concrete with a series of local and regional projects." This local government representative had also observed that since MINAE had assumed direction of the CRGT they had failed to keep it active and progressing, and participation in the commission by local governments was dwindling (Dulude 2000).

In late 2001, MINAE reasserted control and replaced the Union of Local Governments representative as CRGT president with a MINAE official. This designation again occurred without consultation of the rest of the CRGT. The MINAE official remains at this time the CRGT coordinator, and is also the MINAE's Director of National Environmental Programs, a very busy post that consumes considerable time and energy. The additional duty as CRGT president is on top of those other functions and without any additional resources. With considerable effort, the MINAE representative has kept the CRGT alive, but it is clearly functioning at a quite minimal level. It is not clear how much participation in the CRGT is still committed by the member organizations and agencies. Indeed, in interviews with several individuals who are currently designated as representatives to the CRGT, there was a startling difference of views on even the most mundane of questions such as how often the Commission meets and when it last met. Some interviewees said the Commission continues to meet regularly on a bimonthly basis, but others said the Commission has not met in over a year and perhaps nearly two years.

This recent MINAE CRGT president's office has undertaken some activities in the name of the CRGT, e.g., some research and actions intending to implement economic instruments to promote pollution control, but even some CRGT members were not aware that these were CRGT actions. Moreover, there appears to have been little or no interest on MINAE's part in following up on the Integrated Natural Resources Management Program for the basin, despite the Interamerican Development Bank's investment of \$1,000,000 in the 1997-98 study mentioned above.

6. Participants' Motivations and Incentives

One of the most intriguing questions about the Tárcoles basin case is what motivated the creation of the river basin commission in the first place. The municipality of San José, and one official therein, Hubert Mendez, took the lead in convening the initial meetings and workshops that led to the formation of the CRGT. Based on the background paper (Ballesteros 2003) and interviews conducted for this project, there appear to be at least three elements of motivation that spurred the municipal government and Mr. Mendez to take these steps. One is Mr. Mendez' own commitment to the issue of environmentally sustainable urban development, which apparently led him to the issue of maintaining or restoring urban rivers such as those that flow through the upper basin and form the Rio Grande de Tárcoles. Even after leaving his post with the municipality he has continued to

work with and for non-governmental organizations involved with this issue, so it is fair to infer that it is a topic of genuine personal significance to him. A second element is the interest of Mr. Mendez and other San José area officials to turn attention toward quality-of-life issues after the metropolitan population surpassed a million people and further growth became intertwined with issues of housing, sanitation, congestion, and so on—water quality and reliable water availability are among those quality of life issues. A third element was the need and desire of San José officials to reach beyond the jurisdictional borders of their own municipality. Trash, sewage, agricultural runoff, and industrial waste in the rivers affect the quality of life in San José but do not all originate in San José there. Creating a cross-jurisdictional entity such as a river basin commission was a means of raising awareness and influencing actions in neighboring jurisdictions and in the private sector and civil society.

The other jurisdictions and private sector or civil society organizations that participated in the formation and early years of the CRGT appear to have done so partly because of Mr. Mendez' entrepreneurial skills. Other motivations include concerns about sustaining growth in the basin outside of San José (e.g., industries hoping to expand their operations in the valley needed to have assurances of reliable water supplies of usable quality), and a desire to have some influence in regulatory decision making and programs concerning the basin. Without a basin commission, local government officials and private sector or civil society organizations would most likely be on the receiving end of central government policy rather than helping to shape it, as is evident in the period of the CRGT's decline.

This motivation of influencing policy making is particularly visible in the participation of the institutes AyA and ICE, the two largest stakeholders in the Tárcoles basin in terms of water use and water policymaking. Both have been represented in the Tárcoles commission and participated regularly in it. These are nationwide entities with considerable political as well as economic clout, so it is not intuitively obvious why they would participate in a modestly-resourced consortium such as CRGT. Furthermore, they would understandably have some misgivings about having to deal with a number of river basin commissions throughout the country, and thus may not fully embrace a decentralization effort. Both AyA and ICE are extremely important at the national level and quite politically influential, so a basin commission such as the one in Tárcoles is unlikely to proceed rapidly toward autonomy and authority unless AyA and ICE acquiesce, or unless their reluctance is overwhelmed by central-government commitment to decentralization, neither of which is currently the case.

AyA has a great deal of regulatory and operational responsibility, which could weaken if a river basin commission were to be developed. AyA understandably wants to maintain its dual role as Costa Rica's principal water/wastewater service provider and regulator. Doing so would mean participating in a river basin commission effort rather than allowing a commission to develop without AyA involvement and possibly obtain or gradually accumulate one of those roles. Furthermore, since AyA is also a huge source of sewage discharges to the surface waters of the Tárcoles basin, it has incentives to participate in river basin management efforts that might lead to measures such as penalties for sewage dumping or subsidies for sewage treatment. This combination of motives on AyA's part helps to explain why AyA would want to participate in the CRGT when it was

new and as it grew, but did not object strongly when the CRGT declined and was folded into MINAE.

ICE, which manages not only hydropower but Costa Rica's telecommunications sector, also has a stake in participating in river basin management to have their interests clearly represented. ICE established a watershed unit for the Reventazón basin to promote regular flows. Their interest in alleviating sediment buildup through preventive measures suggests why the Tárcoles basin commission, which was primarily interested in water quality, has not been a similar priority for them. Private hydropower producers represented by ACOPE, and the Public Service Company of Heredia, would like to see the larger public hydroelectric producers (ICE and CNFL) brought into the system of water use concessions and tariffs. ICE and CNFL would prefer to avoid this, and have argued persuasively that concessions would negatively impact investments and that tariffs would increase costs to customers. They cannot be too obstructionist, though, because ICE and CNFL have to maintain enough political support to keep their special position in national law and policy compared with the private producers. National policy makers might well prefer to have the revenue and control that would follow from bringing ICE and CNFL into the water tariff and concession systems—after all, national policy makers did require concessions and tariffs from the private producers as conditions of letting them into the market.

Finally there is the question of MINAE's motivations. MINAE officials want to maintain control of the water resource “pillar” of national environmental policy, for at least two discernible reasons. One is the obvious bureaucratic reason of seeking to maintain control over an important policy topic and the governmental resources that are devoted to it. The other is more subtle. At least some MINAE officials accept that integrated water resource management on some sort of regional scale (river basin or otherwise) is desirable, but would prefer to develop and implement such policies and practices for the nation as a whole rather than piecemeal. The Tárcoles basin in particular is much too important a basin for MINAE to leave autonomous—rather, whatever MINAE officials want to replicate elsewhere in the country needs to be the case in the Tárcoles basin, and vice versa.

7. Performance Assessment

As already noted in Section 5.2, the Tárcoles basin commission was for a period in the 1990s able to initiate and lead important basin improvement activities. Agribusiness contamination of water, especially from coffee processing operations, was reduced through the Voluntary Plan Program. Although forest and farm land are still being lost to urbanization—aggravating erosion, flooding, runoff and contamination problems—reforestation efforts championed by the basin commission certainly helped slow the degradation by as many as 150,000 trees.

As described in Section 5.3, changes of leadership at the CRGT and its changed relationship with MINAE—a change that resulted in more central government control but less central government support—are associated with a decline of CRGT activity, visibility, and stakeholder participation. A number of basin management issues remain unaddressed and unresolved in the aftermath of that change.

The Tárcoles river basin still lacks sewage treatment, and river water quality conditions therefore continue to worsen as the basin population grows. Septic tanks used

by many households and businesses in the basin are not being replaced with a sewage collection and treatment system, and groundwater quality is increasingly threatened as a result of septic systems as well as agricultural and industrial water and land uses. Industrial waste treatment occurs in some locations in the basin, but coverage remains incomplete.

The water rights system in Costa Rica inhibits effective demand management. The current concession system does not cover groundwater use, or surface water use by public hydroelectric suppliers. ICE, as noted, has been outside the surface-water concession system despite being the largest surface water user. This is explained on the basis of ICE's status as a state institute, but also on the grounds that hydropower use is non-consumptive. Both rationales are defensible, but the exemption creates political difficulty in getting other surface water users to accept registration, limitations, and tariffs on their water use. The tariff system for agricultural water use continues to impose fees based on cultivated area rather than metered water use, providing no economic incentive in favor of efficient water use. Furthermore, groundwater use appears to be subject to no control whatsoever though there is evidence of overdraft in the San José area.

The shortcomings in the preceding paragraph are of course national policy problems in Costa Rica, not limited to the Tárcoles basin. They contribute nevertheless to the delay in improving basin conditions, regardless of the tenuous status and institutional position of the river basin commission.

Finally, though, it needs to be pointed out that the Tárcoles basin experience has led to greater participation of a number of segments of society in water-related issues. This in itself is an achievement in a traditionally centralized country. It also has had a certain influence on the strides made towards the new Costa Rican water law and towards basin management approaches in other basins.

8. Application of the Analytical Framework to the Tárcoles Case

As noted at the beginning of this paper, the Tárcoles basin case has been extremely valuable to this research project, because the formation of the basin commission occurred in the fairly recent memory of many individuals who are still actively involved in water and government. This distinguishes the Tárcoles case from those of older basin organizations such as the Guadalquivir and Murray-Darling basins. Furthermore, formation of the river basin commission in the Tárcoles case appears to have occurred as a result of local-level efforts rather than a nationwide decentralization or basin management initiative of the central government. Central government support of the Tárcoles commission was essential to its emergence, but the Tárcoles case nevertheless stands apart from cases such as the Warta basin in Poland where the central government decided to create a set of basin management authorities throughout the country in a single initiative. Noting these differences, we turn now to our analytical framework to highlight some key variables that appear to be associated with the CRGT's trajectory thus far.

8.1 Initial Conditions and Contextual Factors

Costa Rica would have to be characterized as a country that is still developing, but which has proceeded on a very successful path. Even with a 500% increase in population over the past half-century, gains have been made in household income, education levels, etc.

Literacy rates and life expectancy are at developed-nation levels, and Costa Rica has developed a sizable middle class. Economic growth has been accompanied by a stable political system for the past half-century. Thus, economic development of the nation does not place integrated water resource management and the development of active river basin management entirely out of reach, but financial resources are still quite limited compared with the tasks at hand.

Within Costa Rica the Tárcoles basin is by far the most economically developed in the country, and one might well say that if successful river basin management were to be implemented in Costa Rica, the Tárcoles would have been as promising a site as any. Nor do there appear to be substantial cultural or religious differences across groups of basin stakeholders that would dramatically inhibit prospects for cooperation. On the other hand, the Tárcoles is also the basin with the most extreme problems in the country, and where the financial resources necessary to really fix the problems are beyond the reach not only of the basin organization but of the country at present. Moreover, the Tárcoles basin is politically important for the country and how it is managed reflects upon national policy, which is inconclusive to date. Some interlocutors for the study pointed out that there are forces in Costa Rica that try to push for decentralization of decision making in a variety of realms, but the centralized culture is as yet too strong for this to succeed. This overall reluctance towards decentralization to lower levels of decision making is also reflected in the Tárcoles basin. Nevertheless, more recent river basin organization efforts within Costa Rica, specifically in the Reventazón and Tempisque basins, appear to be making more headway than the Tárcoles. These, however, are smaller and less important and incentives to keep things as they are may be less strong.

8.2 Decentralization Process

The origins of the CRGT fit closer to the locally initiated effort and mutually desired devolution categories than a shedding or abandonment of central-government responsibilities. Officials at the municipality of San José understood that their water quality problems were related to other municipalities, making a river basin approach most appropriate. They took the initiative to create the CRGT, and they founded FUDEU to be able to receive funds and apply them to water resource management issues on behalf of the commission. Local leadership initiated the efforts to address basin problems, and central government officials were supportive and provided some help initially and substantial support during the years of peak CRGT activity.

Central government recognition of the local-level basin governance effort turned out to be problematic, however. This was not because of central-government reluctance to recognize and support basin-level efforts, but a tactical choice by basin stakeholders and central government officials that later proved unfortunate. Recognition of the basin commission by ministerial decree (rather than by a law enacted by the Costa Rica legislature) was simpler and quicker—a tactical choice of a path of lesser resistance. However, after the change of control of government in 1998, the new government's ministry balked at carrying out activities not formally authorized by law, which placed the central government's support for the Tárcoles commission in doubt.

There are also a number of weaknesses and incongruities in the decree that created the CRGT and its operating regulations, which became a burden to the commission later. The most important of these are:

The decree, by being an instrument of lower rank than a law, cannot confer management responsibilities to the CRGT. This created a gap between the objectives for which the CRGT was created and the structure that was set up to reach those objectives. Since the CRGT lacks legal capacity, it cannot officiate at any kind of legal ceremony or sign contracts in its own name, and it cannot directly manage its resources. This reduces its autonomy, as well as its operational capability, and seriously limits its scope as a river basin organization. To resolve these deficiencies, CRGT has had to count on an “executive arm” that gives it greater operational capability, such as the search for and channeling of resources and the execution of projects. Two NGOs close to the commission have given that support. The first is ASOCUENCAS, an association consisting of members of the commission and, since 1996, FUDEU. This arrangement has been functional, but suboptimal. In practice, the CRGT constitutes a space for meeting and discussion to coordinate the actions that different institutions and social sectors are conducting in the river basin.

The decree does not set a budget for the commission’s operations and does not define any other method of funding or of providing resources. This becomes a major obstacle to assuming a leading role in river basin management. The responsibilities and roles of the agencies that compose the CRGT were not defined. What resulted was irregular support by public and private officials, and to a large measure the commission depended on their good will. Likewise, the representatives of the public sector did not have decision-making power and could not make major commitments.

The representation, although it may have made sense initially, proved later to be less appropriate and was not able to adapt well to redress those gaps. For example, by determining that one of the permanent positions from the NGO sector would always be occupied by FUDEU, and by deciding that six representatives (always the same municipalities) would represent all 36 municipalities in the basin without any rotation or election of those representatives, a lack of interest and some levels of distrust and criticism arose over time from the other municipalities and NGOs. A rotating membership that would have allowed other NGOs and other municipalities to have representatives on the CRGT for certain periods might have encouraged a greater level of commitment from them and a better degree of coordination with their activities. A municipality such as San Antonio de Belén, for instance, which has been a pioneer in environmental actions especially with water, did not know about projects that were being conducted by the CRGT, and instead developed water related programs of its own that could have been included in the program of the Commission.

In addition, according to the ABT evaluation (1998), there were no and are no channels for feedback or adequate coordination with the municipalities and NGOs that lacked representation, even though the Tárcoles basin contains the largest number of such organizations in Costa Rica. A number of entities that were aware that there was a commission nevertheless did not become a part of the process.

The ineffectiveness of creating this kind of structure without a solid legal basis and financial support was assessed, and consequently in 2000 a law was issued creating Costa Rica’s first legally recognized river basin organization: the Commission for the Regulation and Management of the Río Reventazón River Basin.

An important variable is the stability of central government policy commitment to basin management through transitions in central government control. The central

government's support of the CRGT's development and activities was not continued by the government that took office after the 1998 elections. This appears to have been a major factor in stalling the progress of the basin commission in the Tárcoles since 1998.

It has even been contended that the central government since 1999 has taken actions with respect to river basin management that have undermined the work of previously established groups such as CRGT. A National River Basin Network was created by MINAE decree in November 2000, with the following objectives: provide policy guidelines within the framework of river basin management; identify the needs for cooperation according to priority levels; promote the creation of a data base and information exchange at the national and regional levels; and encourage activities directed to raising awareness in civil society about the importance of conservation and the protection of river basins, among other things. This network is integrated by representatives from the following agencies: CATIE, CEDARENA, CNFL, Costa Rican Federation of Environmental Groups (FECON), AyA, ICE, IFAM, ITCR, MAG, MINAE, MIDEPLAN, MINSA, SENARA, UCR and UNA. Despite the overlap between these organizations in the National River Basin Network and the CRGT, the CRGT is not itself part of the Network. The absence from the national network of the commission for the country's most important river basin is puzzling, at the very least.

River basin management in Costa Rica is now widely perceived to be an issue under MINAE's authority and direction. This perception, in addition to the current government's lack of commitment to the issue, has served to marginalize the past efforts of the CRGT.

8.3 Central-Local Relationships and Capacities

The CRGT was essentially a municipal initiative and took on a bold leadership role. The central government partially devolved authority, and was supportive of the CRGT's efforts, but there was never a full recognition of the CRGT's authority to manage the basin. Since 1998 the central government has neither pushed the devolution forward nor terminated the commission. It has kept the commission alive while rethinking and shifting focus concerning environmental and natural resource policy aspects. Thus, neither a complete handover nor a complete abandonment has resulted.

Financial resources for the basin management effort have always been limited, and CRGT has never had its own revenue stream. As such, CRGT has always had to rely upon the kindness of friends if not strangers. This has severely limited the commission's ability to evolve into something more than a meeting place.

With regard to basin participants' authority to create/modify institutional arrangements, there seems to be a problem that may be related to a larger issue of the difference between a common-law framework and a canon-law framework. Several of the individuals we spoke with, from all kinds of government, business, and civil-society sectors, seemed to be trying to figure out what they are allowed to do, or who is allowed to take what actions, as though action is frozen in place until a clear signal is provided from above about how to proceed.

Cantons and municipalities do perform a number of functions, so there appears to be local-level experience with self-governance and service provision, rather than an excessive centralization of public services. According to Article 169 of the Constitution, municipalities are autonomous and have complete authority to administer their territory.

However, they are limited in their exercise of authority. Municipalities have neither the fiscal autonomy nor the funding from the central government to carry out their responsibilities very effectively. Up to and including 2002, the revenue of municipalities represented less than 1% of the GDP and less than 2% of the total public expenditure, despite the importance they are given by the legal ordinances. This lack of resources and capacity at the local level, with no authority in an intermediate level of governance, reflects the generally high level of centralization in Costa Rica.

Before 1950, the municipality law specifically stated the activities of municipalities. That was replaced with a new municipality law in 1986 that takes basically a home-rule approach, which is that municipalities may do anything the law does not forbid. This also meant that they could relinquish responsibilities to the state. In the area of water management and water quality protection (perhaps because they are regarded as relating to the larger area of ecological protection, requiring coordination across local boundaries), there has been central government and national institute dominance in the recent past, leaving local level governments less well acquainted with this portfolio. In the past five years, AyA has assumed many of the planning and water supply functions of municipalities.

Discussion of how to strengthen local government and decentralize Costa Rica's system has been under way in earnest for more than 20 years, with various legislative proposals introduced in the national legislature. Recently, these efforts have begun to bear fruit, with the establishment of a new Municipal Code in 1998 that among other things provides for the direct election of mayors (which occurred for the first time in December 2002), and the approval in 2001 of a constitutional amendment assigning 10% of the revenue of the regular budget to the municipalities.

The ability of any river basin commission in Costa Rica to develop and implement effective water supply management policies is likely to be hampered by the weak framework of water rights allocation. There is a consensus now that it is necessary to have a legal framework to regulate water, and in 1998 a process was initiated, promoted by diverse sectors, to approve a new General Water Law. Different actors (MINAE, Ombudsman's Office and others) presented various proposals to the Costa Rican legislature. All of these included, to varying degrees and with various approaches, the decentralization of water administration and the formation of local structures. At the time of this study, there was a single text in discussion by the national legislature.

The Tárcoles basin commission has existed for more than a decade, which should have given it adequate time for implementation and adaptation. However, the central government's treatment of it changed substantially about halfway through that period, and uncertainty and lack of resources have plagued it since. Thus, the basin commission has been unable to make significant changes to its own internal structure and operations to improve basin management over time.

8.4 Internal Basin-Level Institutional Arrangements

Because the CRGT's development changed paths so substantially between its first five years and the most recent five years, it is not clear how to apply all the variables identified in the analytical framework concerning the basin-scale institutional arrangements, but some of them do have applicability in this case study. Structural matters, such as the mistakes made when creating the internal structure of the CRGT, which led to its

exhaustion and its loss of credibility, are clearly of this type. Once it lost its central government support and its dynamic initial leadership, the CRGT's status and composition left it vulnerable to becoming more of a discussion forum than a governing body.

Efforts to match the basin boundaries appear to have proceeded fairly well. The real difficulty lies in identifying who is responsible for what in the Tárcoles basin. The prevailing and traditional view that water has to be managed by its uses (drinking, irrigation, hydropower, etc) rather than in an integrated fashion has been reflected and reinforced by Costa Rican laws. There is considerable fragmentation and territorialism among agencies and institutes at the central government level. Likewise, at the local level, there is little interjurisdictional cooperation and coordination among municipalities, which have been gaining interest in entering water planning and water service business activities.

That there was little recognition of sub-watershed communities of interest has been one of the few criticisms directed at the basin commission by those who were and are sympathetic to it. One interviewee mentioned that the upper, middle, and lower basin areas entail "three different realities" with very different interests. This is a well-recognized issue among stakeholders, and a bone of contention for how water resource management should be organized. One of the principal recommendations being considered by the ministry about how to proceed and how to restructure the basin commission was to establish upper, middle, and lower basin groups (mini-commissions) within the overall commission.

The basin commission's greatest strength was to serve as a forum for information sharing and communication, but this appears to have waned substantially since its time of peak activity. Some individuals who had been active participants in the commission indicated that they would welcome its revival but that they have stopped attending for now either because they are unaware of meetings or because they do not see much point in going. Instead, basin stakeholders seem to have sector-based fora for information sharing (e.g., union of municipalities, chamber of industries, chamber of agriculture, etc.), which may serve operational purposes, but are not conducive to development of an agenda of basin activities.

Given Costa Rica's size and the centrality of the Tárcoles basin, national entities (ministries and institutes) do most of the monitoring, as evidenced in the State of the Nation project which compiles data from these sources into comprehensive reports. There was not much evidence of institutionalized monitoring of the Tárcoles basin per se. The 1997-98 study paid for by IDB and led by ABT Associates remains the most recent effort at a comprehensive picture of the basin and its conditions.

8.5 Other Factors

In each case study, there have been important factors relating to the emergence and success of basin management that were not envisioned in our analytical framework. This is in the nature of research on institutions, which are always shaped by particular contexts and therefore exhibit unanticipated or idiosyncratic features. In this case, at least two additional factors in Costa Rica have shaped the outcomes in the Tárcoles basin so far.

One factor is the relatively large number of separately identifiable river basins in a relatively small (geographically speaking) country. The Tárcoles basin is only one of 34 identified river basins in Costa Rica. In light of the country's modest size, there is substantial difference of opinion about the appropriate scale on which to try to organize

integrated water resource management. Several individuals we interviewed expressed skepticism about the feasibility and sustainability of crafting basin management arrangements for each river basin in the country—i.e., whether it made sense for a country like Costa Rica to have 34 river basin management systems. On the other hand, these individuals did not agree with one another about what would be a better regional basis for organizing river basin management.

Furthermore, the Costa Rican government has been trying to determine whether and how to coordinate integrated water resource management with other ecological and natural resource policies that are organized on different territorial bases. Apart from the general jurisdictions of provinces, cantons, and municipalities, Costa Rica has systems of national parks and protected areas, which have recently been organized into a national system of conservation areas. The country has been divided into the eleven Conservation Areas managed by SINAC, and these do not coincide with the river basin boundaries or with the provincial divisions. In the late 1990s when MINAE was restructured and the Conservation Areas were defined, the possibility of setting the borders of those areas based on the borders of the main river basins was suggested, but that did not happen because of a lack of consensus among the political actors at that time.

The relevance of this point to the Tárcoles case is simply that the inconsistent and hesitant nature of central government support for basin management in the Tárcoles basin may not end until some clear view emerges among national-level policy makers about how to proceed with river basin management organization. This raises once again the question of the “lowest appropriate level” for water resource management. We heard people advocate organizing management around the 34 river basins in the country, consolidating the 34 basins into four or five hydrographic regions, strengthening the water management responsibilities and powers of the 81 municipalities (or 88 including the 7 semi-municipalities), and working at subbasin levels to address specific shared problems.

The other factor is a cultural dimension shaped by Costa Rica’s physical circumstances and historical evolution. In a humid setting with abundant precipitation, combined with (until recently) a small population and economy to sustain, Costa Rica developed a mostly unwritten but nevertheless widely understood and shared view of water as essentially free and plentiful. Several interviewees recalled growing up in a country that was understood (even in school curricula) to be blessed with an essentially limitless supply of water. Many have tolerated the poor water quality of the Tárcoles and have not considered addressing this problem as a particularly urgent matter in the face of other pressing priorities. Only recently has it become clear that water can be a limiting factor in Costa Rica’s future economic development and quality of life, but only a subset of the population sees it this way. The cultural perception of water abundance and the lack of a sense of crisis place invisible but nonetheless significant political constraints on policy makers’ ability and willingness to embrace more restrictive water rights laws and higher water tariffs, both of which may be essential institutional steps toward more sustainable water policy in Costa Rica, whether organized at the river basin scale or otherwise. In the Tárcoles case in particular, this perception contributes to weak controls on water uses and inadequate revenue with which to address the pollution problems in the basin. A considerable public education effort will be necessary as part of any attempt to promote more responsible use of water as a resource of limited quantity and quality.

9. Conclusions

The Tárcoles basin case provides a useful example of the vulnerabilities of bottom-up initiatives for river basin management. Such initiatives often lack a well-defined legal role and mandate. They may be dependent upon higher levels of government for funding and technical support, and thus become vulnerable to political changes that shift governmental control and policy direction. They also may lack the authority to undertake cross-boundary efforts to resolve basinwide problems and conflicts. The CRGT's experience exhibited all of these characteristics.

More specifically, important features associated with the Tárcoles case appear to be:

- The start-up of the commission in a bottom-up format initiated by some of the large stakeholders was initially very successful and quickly showed a number of results, indicating the possibilities for basin management. Nevertheless, it was heavily reliant on high-level support.
- The central government's commitment to river basin management generally, and in the Tárcoles basin in particular, has been uneven and inconsistent. This was especially evident with a change in government and is not unusual, especially in developing countries.
- The basin management approach had a strong champion. Once the champion left (and the above-mentioned political changes took place) the still young and fragile institutional set-up got stalled and relatively ineffectual.
- The severity of problems in the basin, and the difficulty of marshaling the financial resources to address them, stretch the management challenges beyond the capabilities of local action without sustained commitment of central government or external support.
- Flaws in the basin organization structure and authority kept it from exercising autonomous authority to govern basin management, and diminished the commitment of some important local actors to it.
- The past and current water rights established in the water law have been notably unhelpful to integrated water resource management in the Tárcoles or other basins and it is not clear if the Tárcoles experience has helped reshape these laws. However, other basins have learned from the Tárcoles basin and adopted different approaches.
- The biggest water interests are national-scale and have their own agenda. They either must have incentives to participate (which they currently do not have) or Government must act more forcefully if it wants to promote better riverbasin management.
- Pollution may not be perceived as acutely as a problem as water scarcity in other contexts, so that the political pressure to deal with the issue is relatively low.

The current situation in the administration of water resources in Costa Rica remains characterized by fragmentation and dispersion of responsibilities in a large number of institutions, several of which operate on a national scale. At least 15 agencies are involved in local and national water administration. As a result, there are serious problems in the distribution of responsibilities, with overlaps in some areas and vacuums

in others. There is no coordination between these institutions, and their systems of administration differ. They were created to fulfill specific functions (irrigation, drinking water supply, hydroelectric generation, sanitation, etc.) and lack an outlook that envisions an integral approach to water resource management. Contributing to this fragmentation are the absence of a supervisory agency and a national water resource policy. Even though the law designates the supervision of this resource to MINAE, that ministry has limited its responsibility to granting concessions, giving permits to exploit superficial and underground water and to establishing and collecting fees for such use.

Despite the fact that MINAE is responsible for supervising water resources, in 2002 the National Water Council was formed by Executive Decree No. 30653-S-MAG-MINAE-MEIC, and charged with the “harmonization of water legislation and the coordination of research, uses, development, utilization and conservation of water in the different departments and institutions of the state.” The Ministry of Public Health, an agency with responsibilities for water quality, pollution and health, was appointed to coordinate this Council, which has created distortions and overlapping roles for both ministries. The formation of this Council is a product of the leadership vacuum created by MINAE as the supervisory agency, is a temporary measure, and is no substitute for an adequate institutional framework for integrated water resource management.

There is hope, nonetheless, for a reversal of these processes. There is an ongoing process to reform the legal and institutional water framework in the country. The weaknesses and strengths of the CRGT have become fairly known, as are their failures and successes. And through the past decade, the different actors have accumulated experience in water resource management and can encourage a process of integrated management in this river basin.

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Appendix: Variables in the Analytical Framework

As noted in Section 2, the analytical framework used for this research project entails several variables hypothesized to be related to the success or failure of river basin management institutions, grouped into four categories.

Contextual factors and initial conditions

The literature on decentralized water resource management indicates that successful decentralization is at least partly a function of the initial conditions that prevail at the time a decentralization initiative is attempted. These initial conditions are elements of the social context of the decentralization effort. They include

- Economic development of the nation;
- Economic development of the basin area;
- Initial distribution of resources among basin stakeholders; and
- Class, religious, or other social/cultural distinctions among basin stakeholders.

Characteristics of the decentralization process

In countries that have attempted to decentralize water resource management to the basin level, characteristics of the decentralization process itself will affect the prospects for successful implementation. Two necessary conditions of a decentralization initiative are (a) devolution of authority and responsibility from the center, and (b) acceptance of that authority and responsibility by the local or regional units. Whether (a) and (b) occur will depend in part upon why and how the decentralization takes place. Important factors include:

- Whether basin-level management was a local initiative to assume management responsibilities, a devolution that was mutually desired by local stakeholders and central government officials, or a decision by central government officials to shed water resource management responsibilities regardless of whether basin stakeholders wanted to assume them;
- The extent of central-government recognition of local-level basin governance; and,
- Whether central government officials maintained a policy commitment to decentralization and basin management through transitions in central government administration.

Characteristics of central government/basin-level relationships and capacities

Because successful decentralization requires complementary actions at the central government and local levels, other aspects of the central-local relationship can be expected to condition that success. Political and institutional variables should be explored that relate to the respective capacities of the central government and the basin-level stakeholders, and the relationship between them. Key factors include:

- The extent to which devolution of water management responsibilities from central government to basin institutions has been real or merely rhetorical, and whether

- devolution has been handled as a supportive transition to basin management or as an abrupt abandonment of central government authority;
- The financial resources available to basin-level institutions, and the extent of their financial autonomy;
 - Basin management participants' ability to create and modify institutional arrangements that are tailored to their needs and circumstances;
 - The extent of other experience at the local or regional level within the country with self-governance and service provision;
 - The distribution (particularly asymmetries) of national-level political influence among basin stakeholders;
 - Characteristics of the water rights system in the country which facilitate or hinder basin management efforts; and
 - Whether basin-level institutions have had adequate time for implementation and adaptation of basin management activities.

The internal configuration of basin-level institutional arrangements

Successful implementation of decentralized water resource management will also depend on features of the basin-level arrangements created by stakeholders and/or central government officials. Important ones include:

- The presence of basin-level governance institutions;
- The extent of clarity of institutional boundaries, and their match with basin boundaries;
- Whether and to what extent basin-level institutional arrangements recognize sub-watershed communities of interest;
- The availability of forums for information sharing and communication among basin stakeholders;
- The ability to make, monitor, and enforce contingent contracts whereby basin stakeholders can agree to contribute to improvements in basin conditions;
- The institutionalization of regular monitoring of basin conditions by means that are trusted by water users; and
- The availability of forums for conflict resolution.

Certainly, these factors will not all apply with equal significance in all cases. In each case, the emergence and path of river basin management will be affected profoundly by some of these variables, affected slightly by others, and not at all by some. Institutional analysis in a case-study setting consists largely in determining which institutional factors in what combination appear to have been linked to outcomes. Furthermore, many of the variables listed above have subjective components, and will be assessed differently by different participants and observers. It is therefore essential in these case studies that team members interview individuals with a variety of perspectives.

Appendix 2. MATRIX OF LAWS AND ORGANIZATIONS ACCORDING TO DIFFERENT WATER USES

Domestic-Residential Use

RESPONSIBLE AGENCY	RESPONSIBILITIES	SPECIFIC POWERS	REQUIREMENTS	SANCTIONS	REGULATIONS	CO-REQUIREMENTS AGREEMENTS
MINAE WATER DEPARTMENT	<p>Define policies and administer the water resources in all the national territory.</p> <p>Grant Concessions and authorizations for utilization and discharge.</p>	<p>Grant concessions and use permits to individuals, users associations and rural associations.</p> <p>Grant authorizations for utilization to public agencies; SENARA, ESPH and Municipalities.</p> <p>Process and authorize permits to drill wells and permits for discharge of water from human consumption in rivers under public domain.</p>	<p>Fill out application, indicate rivers to be used, pay utilization tax.</p> <p>Environmental Impact Study when determined by SETENA.</p>	<p>- Concession can be revoked for noncompliance or dishonesty.</p> <p>- Expiration of the Concession granted according to Article 26 of the Water Law.</p>	<p>Water Law No. 276, of 1942.</p> <p>Organic Environmental Law, Article 50,51,64-67, of the 1995.</p> <p>Internal Regulations of MINAE., 1997</p>	<p>See Proposed Law for Water Resources of MINAE.</p> <p>Law of Soils, Article 22, of 1998</p> <p>Law of ARESEP, Article 16, 1996.</p>
MUNICIPALITIES	Administration of municipal water supply systems and municipal sewer systems.	- Billing and collection for water service.	By meter or by presumption of volume, some municipalities	Can begin an embargo process for noncompliance;	<p>- Water Law, Art. 41, of 1942</p> <p>- Law No.1634</p>	<p>- Water Law, Articles 176, 177</p> <p>- See regulatory</p>

		<ul style="list-style-type: none"> - Maintenance of the service and its infrastructure. - By means of regulatory plans they are in charge of protecting the aquifer layers. - Nominate the water inspector of the canton by means of a nominating list presented to ARESEP. 	<p>administer their own water supply systems.</p> <p>Some have drainage and sewer systems and charge for those services on the municipal billing.</p> <p>Adapt to dispositions of ARESEP and the Health Ministry.</p> <p>Concession from the Water Department for a municipal water supply system.</p>	<p>cut off the water supply.</p> <p>Can prohibit certain human activities in protected areas.</p>	<p>General Drinking Water Law of 1953 and following,</p> <ul style="list-style-type: none"> - Municipal Code, of 1982, Articles 4, 6, 13, 79 and 81 - Internal Regulations 	<p>plans if they exist.</p>
COSTA RICA INSTITUTE AQUEDUCTSS AND SEWERS	Direct and set policies, establish and apply norms, conduct and promote planning, funding and development, and resolve everything related to the provision	<p>Approval of all construction projects, reform, expansion of water supply systems, both public and private.</p> <p>Administration and</p>	<p>Presentation of projects related to water supply systems and sewers to the Institute for approval before being sent to the Water Department of MINAE.</p>	<p>AyA can cancel permits, set fines and begin embargo processes for noncompliance, and can cut off the</p>	<ul style="list-style-type: none"> - Law to Create the Costa Rican Institute of Aqueducts and Sewers of 1961. - Water Law. Of 	<ul style="list-style-type: none"> - See General Health Law, 1973, Article 289. - Law of ARESEP, of 1996, Article 16.

	<p>of drinking water.</p> <p>Use, take advantage of, govern or supervise, depending on the situation, all the water under public domain that is related to the provision of drinking water; collection and disposal of waste water, the same as the normative aspects of rain drainage.</p>	<p>operation of water supply systems and sewers in the entire country.</p> <p>Make agreements with local organizations for the administration of these services, with the exception of those located in the metropolitan area, or for those that AyA has financial responsibility.</p> <p>Elaboration of rates and tariffs.</p>	<p>All tariff and rate projects must be presented to AyA, which it will approve or modify before the project is published in the congressional record.</p>	<p>water supply.</p>	<p>1942</p> <p>- Law No.1634 General Drinking Water</p>	
<p>MINISTRY OF HEALTH</p>	<p>Quality control of drinking water for human consumption.</p> <p>Control de actividades that pollute.</p>	<p>- Monitor the water quality for human consumption, that it is in conformity with established regulations for drinking water quality.</p>	<p>- Adapt to the dispositions on structure and operation of water supply systems that are set by specific techniques dictated by the Executive Branch and</p>	<p>The Ministry will dictate special measures for anything from prevention to orders for closure.</p>	<p>General Health Law, 1973, Article 266.</p> <p>Regulation for Quality of Drinking Water, 1953, Articles 7</p>	<p>Organic Environmental Law., 1995.</p>

		<ul style="list-style-type: none"> - Intervene in drinking water supply systems if it presents any danger to human health. - Set quality standards for water. - Issue norms for waste dumping. 	by AyA.		and 8.	
ARESEP	Regulation of water supply system and sewer services in harmony with the interests of users and supplies.	<ul style="list-style-type: none"> - Fix tariffs after consulting with the interested parties. - Quality control of the service, establishing norms for quality. - Expert opinions, processing complaints, correct anomalies. 	<ul style="list-style-type: none"> - Submit to the needs and dispositions established by regulations. - Adapt to the dispositions of Article 14 of the Law of ARESEP regarding the obligations of those who provide services. 	Fines of up to five to ten times the value of the damage caused, fines for late payment, revoking the concession or permit (Articles 38 and following of Law 7593 of ARESEP)	Article 29 of Law 7593 of the Regulatory Authority for Public Services (ARESEP), 1996 Law No. 7593 of ARESEP, 1996	Organic Environmental Law, Articles.17-24.

Agribusiness And Industrial Use

RESPONSIBLE AGENCY	RESPONSIBILITIES	SPECIFIC POWERS	REQUIREMENTS	SANCTIONS	REGULATIONS	CO-REQUIREMENTS AGREEMENTS
MINAE WATER DEPARTMENT	<p>Define policies and administer water resources in the entire national territory.</p> <p>Grant Concessions and authorize permits for water use or discharge in rivers of public domain.</p>	<p>Process and authorize permits for wells for water extraction, conduct works in rivers under public domain.</p> <p>Process and authorize the discharge from agricultural and industrial drainage in rivers under public domain.</p> <p>Collect taxes.</p>	<p>Fill out application.</p> <p>Pay use tax.</p> <p>Environmental Impact Study when required by laws or regulations.</p>	<p>- Can revoke the concession in case of incompliance or dishonesty.</p> <p>- Charge for harming the environment according to Article 98 of the Organic Environmental Law.</p>	<p>Water Law No. 276, 1942, Articles 16, 29</p> <p>Organic Environmental Law, 1995, Articles 50, 51, 64-65-66-67-69.</p> <p>Internal Regulations of MINAE</p>	<p>See Law Project for Water Resources of MINAE.</p> <p>Conservation, Management and Use of Soil Law, 1998, Article 22.</p>

MUNICIPALITIES	<p>Management and administration of the resource.</p> <p>Authorization, control and regulation of activities conducted in the area of its jurisdiction.</p>	<p>- Control of activities that cause pollution in the canton by granting business licenses.</p> <p>- Has authority through regulatory plans to protect certain areas considered as protected areas.</p>	<p>Present application for license and patents to the Council.</p>	<p>Fines and closing of businesses or of the respective activity.</p> <p>Deny or cancel business license.</p> <p>Can obstruct certain human activities in zones declared as protected areas.</p>	<p>Water Law, 1942</p> <p>Municipal Code, 1982</p> <p>Regulatory Plans</p> <p>Law of Urban Planning, 1968</p>	<p>Organic Environmental Law, 1995, Articles 50 and 99.</p>
MINISTRY OF HEALTH	<p>Control of water pollution</p> <p>Quality control of water for industrial or agribusiness use.</p>	<p>Supervision of the prevention and control of dumping solid and liquid waste into national water (in coordination with SINAC and others).</p>	<p>Application for Permit from the Ministry of Health, Department for the Protection of Human Environment.</p> <p>Adapt to the dispositions, techniques and regulations issued by</p>	<p>Cancellation of authorizations and/or permits.</p> <p>The Ministry dictates special measures that can range from prevention to orders for</p>	<p>General Health Law, 1973, Articles 275, 276, 277, 283, 284, 285, 291-292, 298-307.</p> <p>Water Law, 1942, Article 33.</p> <p>Regulation for</p>	<p>Law for Wildlife Conservation, 1994, Article 132.</p> <p>Organic Environmental Law, 1995, Articles 51-52, 60, 64.</p>

		<p>Authorize drainage or discharge of solid and liquid waste that could pollute superficial, underground or marine waters.</p> <p>Authorize reutilization of wastewater.</p> <p>Approve systems of disposal for excrement and wastewater.</p> <p>Approve installations for the purification of wastewater and industrial waste.</p>	the Ministry.	closure.	<p>Dumping Waste and Reutilization of Wastewater, Decree 21518 of August 1991.</p> <p>Regulation for the Management of Dangerous Industrial Waste, No. 27001 and Regulation for the characteristics listed in the Dangerous Industrial Wastes, No. 27000.</p>	
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		<p>Authorize treatment plants for wastewater.</p> <p>Approve use of techniques for sewage disposal in the ocean.</p>				
MINISTRY OF AGRICULTURE	Aspects related to soil conservation and recuperation.	<p>Issue criteria about the impact of water concessions for agricultural use on soil resources..</p> <p>Dictate measures for the management of residues of fertilizers and toxic agrochemicals.</p> <p>Design soil management plans for river</p>	<p>Elaborate Management Plan for River Basins.</p> <p>Application for registry and permit to use toxic agrochemicals.</p>	<p>Art. 52 establishes payment for environmental and social damage and injury.</p> <p>Art. 51 Refers to criminal legislation.</p>	<p>Law for Soil Use, Management and Conservation. 1998, Articles 6, 19, 21, 28, 31</p> <p>Articles 15, 16, 34.</p>	<p>Coordinate with MINAE, according to Article 7 of the Law for Soil Use, Management and Conservation, and with the Ministry of Health, according to Articles 28 y 33 of the Health Ministry's Regulations. 1973.</p> <p>Article 4, SENARA creation Law. 1983</p> <p>Organic Environmental Law,</p>

		basins together with MINAE and civil society. Control of dangerous agrochemical products.				1995, Article 6.
AQUEDUCTS AND SEWERS	Management of wastewater dumped in water bodies or in sewer systems.	Receive and approve reports from generating agencies. Establish physiochemical and bacteriological parameters for wastewater. Establish minimum sample frequency. Establish average maximum	Presentation of projects for dumping waste in sewage systems. Presentation of operational reports. Adapt to the technical dispositions of AyA and the Ministry of Health.	Fines of between five and 10 times the value of the damage caused, fines for late payment, revocation of the concession or permit according to Article 26 de Law 2726 for the creation of AyA.	- Law for Creation of AyA,1961, Articles 21, 26 - Regulation for dumping waste and reusing wastewater, 26042-S-MINAE, Articles 3, 7, 10, 32, 33.	General Health Law 1973, and the Law 132 for Wildlife Conservation Law of 1994.

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Agricultural And Irrigation Use

<i>RESPONSIBLE AGENCY</i>	RESPONSIBILITIES	SPECIFIC POWERS	REQUIREMENTS	SANCTIONS	REGULATIONS	CO-REQUIREMENTS AGREEMENTS
MINAE WATER DEPARTMENT	Concession for utilization for irrigation	Grant concession to utilize water for irrigation.	Fill out application, indicate river, pay use tax, indicate techniques for soil conservation.	Revocation of concession in case of noncompliance.	Water Law, 1942, Articles 17-29 Organic Environmental Law, 1995, Articles 50 y 51. Law for Soil Use, Management and Conservation, 1998, Articles 22 and 63	Law for Creation of SENARA, No.6877, of 18-07-83, Article 4. Law of ARESEP, 1996, Article 5 (paragraph included in Article 63 of the Law for Soil).
MAG	Regulate aspects relative	Issue criteria	Elaborate a	Art.52,	Law for Soil Use,	Article 4, Law for

DEPARTMENT OF SOILS	to conservation and recuperation of soil.	about impact of utilization of water on soil. Make soil management plans according to river basin together with MINAE and civil society.	management plan for river basins.	Establishes payment for environmental and social damage and injury. Art.51, Refers to criminal legislation.	Management and Conservation, 1998, Article 6, clause (g), Article 19, clauses (c) and (g) Article 21 Articles 15 and 16,34	Creation of SENARA, 1983 Organic Environmental Law,1995, Article 6.
SENARA	Administers supply of water by Irrigation Districts in coordination with MAG. Elaborate Irrigation Plan.	Elaborate plans for irrigation districts.	Must coordinate management, conservation and recuperation of soil activities with MAG. Need MINAE water concession.	Cancellation of the authorization.	Law for creation of SENARA, 1983, Article 4, clauses (a) and (g).	Water Law of 1942, Organic Environmental Law, 1995, Articles.51, 64-67 See: MINAE Project for Law for Water Resources. Law for Soil Use, Management and Conservation,1998, Articles 21 and 62.
MINISTRY OF HEALTH	Quality of water for irrigation.	Oversee that the water used for irrigation	There are no specific requirements.	Activity can be closed.	General Health Law, 1973, Articles 275, 266.	Organic Environmental Law, 1995, Articles 25, 50,

		meets established quality standards.		Initiate punitive action.		51, 64-67 Regulation of Quality Standards
ARESEP	<p>Know irrigation plans of SENARA</p> <p>Approve tariffs to be charged by SENARA for its service.</p> <p>Listen to complaints and claims.</p>	<p>Fix tariffs and approve irrigation plans, through prior consultation with the interested parties.</p> <p>Process complaints about the service.</p> <p>Establish irrigation and drainage as a Public Service when it is provided by a public agency or by means of a concession</p>	Demand an environmental impact study for concessions of public services granted by the responsible agency.	<p>Close the companies that do not provide services as agreed.</p> <p>Revoke permits or concessions of those who provide services that do not comply with environmental law or environmental impact studies.</p>	<p>Law of ARESEP, 1996, Article 5, clause (e)</p> <p>Article 44.</p> <p>Article 41, clauses (j), (k) and (l)</p> <p>Article 5, clause (e)</p>	<p>Law for creation of SENARA, 1983, Article 63.</p> <p>Organic Environmental Law, 1995, Articles 17-24.</p>

		or permit.				
MUNICIPALITIES	Local government that is responsible for regulation of interests and services in the canton.	Propose nomination for the Water Inspector of the canton of ARESEP. Design plan for distribution of water uses. Do a census of uses. Resolve conflicts for use.	Process information before ARESEP Propose utilization plans.	None directly established for irrigation or agricultural use.	Water Law, 1942, Articles 186-198.	Municipal Code, 1982, Article 3.

Hydroelectric And Hydraulic Use

RESPONSIBLE AGENCY	RESPONSIBILITIES	SPECIFIC POWERS	REQUIREMENTS	SANCTIONS	REGULATIONS	CO-REQUIREMENTS AGREEMENTS
MINAE WATER	Concession to utilize water when it is for	Grant concession to	In the case of hydroelectricity:	Cancellation of concession in the	Articles 227 and 226 Penal Code	See: MINAE Project of Law for Water

DEPARTAMENT	private operators to generate hydroelectricity or hydraulic power.	utilize water that is indispensable to generate hydroelectric energy or to utilize the hydraulic power of water.	Request declaration of eligibility from ICE. Process authorization with the Energy Sector of MINAE. Process Water with Water Department. Request concession from ARESEP to generate.	case of noncompliance.	Law of ARESEP, 1996	Resources. Private generation is currently on hold in the Constitutional Court, claiming the absence of a framework law. Electrical Co generation Laws #7200 and #5008 (1990 and 1996)
MINAE SECTORIAL DE ENERGÍA	National energy planning.	Permit for operation.	Must present environmental impact study and ICE eligibility.	Without authorization from the Energy Sector it is impossible to continue with processing the permit/concession.	Decree 24652-MIRENEM And Decree 14434-MIRENEM	Laws #7200 of 1990, and Law #5008 of 1996
MINAE SETENA	Environmental Impact Studies.	Request environmental impact studies.	Issue specific regulations with requirement of environmental impact study and require a declaration for eligibility from ICE.	Not having the environmental impact study will obstruct following through with the process.	Regulation of Evaluation Environmental Impact	Organic Environmental Law, 1995, Articles 17-24.

MUNICIPALITIES	Municipal license for private operators.	Charge for municipal license. Give license. Give certificate for agreed use.	If there is a Regulatory Plan in force, must observe the zoning and regulations of that.	No license issued. Revocation of Business License.	Organic Environmental Law, 1995, Articles 28-31. Municipal Code, 1982	Law for Urban Planning 1968
ICE	National Energy Plan	Does not require water concession since it has one by law. Has power to reserve rivers. Issue declarations of eligibility. Required to buy private electricity.	Issues declaration of eligibility when requested by private parties.	Impossible to operate legally.	Law # 7200 of 1990, Organic Law of ICE #5961 Law #7508 of 1996	Law of ARESEP, 1996, Article 5.
ARESEP	Regulate aspects related to tariffs and conditions for providing service.	Fix tariffs. Receive complaints.	Issue specific regulations for conditions of		Law of ARESEP, 1996, Article 5, clause (a)	

		Establish conditions for providing service.	providing service. Request Environmental Impact Studies.	Revocation of concession of permit.	Law of ARESEP, 1996, Article 41, clauses (j), (k) and (l) Article 16	Organic Environmental Law, 1995, Articles 17-24.
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