Assessing Access to Potable Water in Rural Communities in Costa Rica

by Kristen Welsh, MESc 2006

Introduction

Water is one of the earth's most vital resources and central to everyday life, yet poor management threatens its finite supply (UNESCO 2003). In many countries, rivers serve as the most accessible resource for water consumption, which highlights the need for proper watershed management (UNESCO 2003). Without appropriate plans for its sustainable usage, water is at risk of increased scarcity and decreased quality. Watershed degradation is of particular concern in Central America (Johnson and Baltodano 2004). Specifically, Costa Rica has recently faced many watershed issues due to a rising population growth and an increased demand for clean drinking water, combined with unsustainable land use practices (Sanchez-Azofeifa et al. 2002). While 97.5% of Costa Ricans have access to water in their households, 40% of the water provided by municipalities or communities is not potable (Segura Bonilla et al. 2004).

The government agency Aqueducts and Sewers (known by its Spanish acronym AyA) manages water provisions and services in Costa Rica. Municipality connections, overseen by AyA, are often implemented in large cities and towns, which are highly populated areas that benefit from these connections. However, since many remote towns in Costa Rica lack the resources to supply their residents with public water, I conducted a study in rural communities in the southwestern region of Costa Rica to assess household water usage and access to potable water. As a component of this research, I interviewed rural household members and representatives of several governmental agencies involved in water provision and legislation within Costa Rica. In addition, I sampled two local rivers and their tributaries to evaluate water quality, as people often access these for household consumption. This article will specifically address one aspect of my research: the information revealed about drinking water through interviews of government agencies and households.

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Management of Water Services in Costa Rica

The administration of water provision in Costa Rica is conducted through the Water Department, a subdivision of the National Meteorological Institute (IMN), which is part of the Ministry of the Environment and Energy (MINAE). MINAE, which is similar to the U.S. Environmental Protection Agency (USEPA), oversees environmental regulation throughout the country. Figure 1 illustrates the organizational structure of water administration in the country. According to MINAE representatives, no existing laws address the issue of sustainable water management in Costa Rica (Alvarado, pers. comm., June 1, 2005), since Water Law No. 276 of 1948 only grants MINAE the power to regulate concessions and water permits. New legislation that would address water issues and infrastructure throughout the country, the Hydrologic Resource Law, is currently under review by the country's legislature (Alvarado, pers. comm., June 1, 2005).

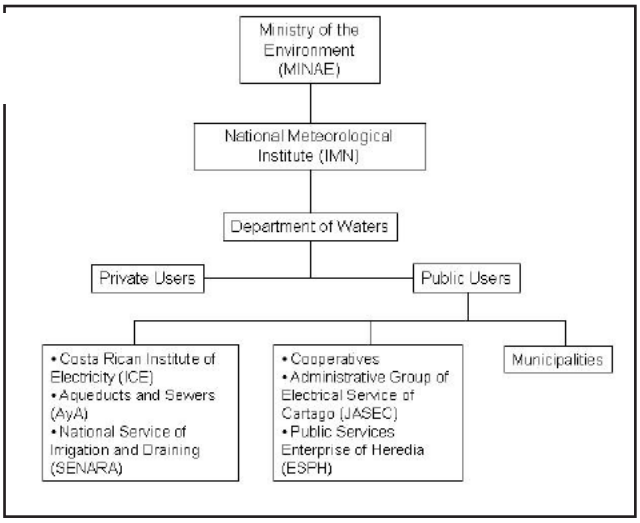


Figure 1. Organizational structure of water provision in Costa Rica

Source: MINEA, IMN, and the Department of Waters. El Recurso Hidrico en Costa Rica. Informational Pamphlet

AyA functions separate from MINAE to provide drinking water to the country. Many municipalities provide water services to residents by requesting the concession of a water source from MINAE and then distributing this water to households (Alvarado, pers. comm., June 1, 2005). For those municipalities without established water services, AyA controls water provision. Table 1 lists the organizations that provide water coverage throughout Costa Rica.

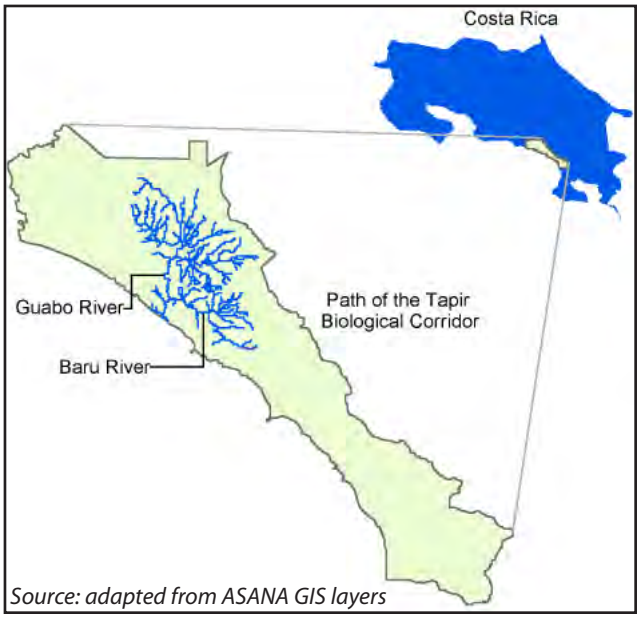
In general, rural communities do not have municipal government systems that can oversee water provision for households. Historically, rural households have collected water from nearby streams and rivers, but AyA recently initiated a program in 2000 to support rural communities that wanted to institute water provision in their area (AyA 2005). Communities are required to organize into community association groups called Administrative Associations for Sewers and Aqueducts (known by their Spanish acronym ASADAS) to be eligible to receive AyA support to build and operate their system. AyA generally supplies tubes, accessories, and engineered designs, while the communities provide the manual labor and construction materials. AyA also trains local leaders who manage the associations (Arrieta, pers. comm., May 31, 2005). Although management rests largely with community members who, at times, do not have specialized knowledge of water provision services, the associations supply water provision. These associations now provide almost one-fourth of water provision in the country (see Table 1).

Study Area

This study focused on rural communities within the Path of the Tapir Biological Corridor (PTBC) in the southwestern region of Costa Rica. The non-profit organization, Association of Friends of Nature of the Central

Table 1. Provision of water in Costa Rica by operator (*adapted from Segura et al. 2004)*

Operator	Percent Coverage	No. of Aqueducts
AyA	46.3	170
ASADAS	23.7	1648
Municipalities	16.4	245
Private Operators	6.2	-
ESPH	4.7	6
Total	97.3	2069



Source: adapted from ASANA GIS layers

Figure 2. Location of the Baru and Guabo Rivers within the Path of the Tapir Biological Corridor in Costa Rica

and South Pacific (ASANA), the collaborator for this project, has developed programs to preserve natural habitats in the PTBC. The corridor is recognized as part of the Mesoamerican Biological Corridor, which was established to link critical habitats from Mexico to Panama to preserve biodiversity (Miller et al. 2001). Migration of many people to the area and the resulting increase in agriculture has caused a rapid loss of forest cover and the local extinction of several species (Ewing 2000). To protect this area of the country, a group of landowners formed ASANA in 1987 and, subsequently, the PTBC in 1996 (Ewing 2000).

In the heart of the PTBC lie the Baru and Guabo Rivers, which stretch for miles before converging and flowing together for another two miles until they empty into the Pacific Ocean near the town of Dominical. This study focuses on these two rivers and their primary tributaries, the Barucito River and the Caña Blanca River. I interviewed a total of 79 residents of the 15 major communities within these watersheds. I also interviewed an additional 10 households in two communities outside these watersheds. Figure 2 is an illustration of the region where this research was conducted.

These rivers were selected due to their importance in the region, in addition to environmental concerns associated with them. In particular, the Guabo River has experienced significant deforestation compared to the Baru River. Agriculture has become an important land use in recent years, and agriculture fields and cattle populate the landscape where trees once stood. At the rivers' confluence, the Guabo waters taint the relatively clear waters of the Baru with murkiness and turbidity. Residents in the area expressed concern about this seemingly dirty water.

Interviews

At each household, I asked questions that addressed water usage, water access, water quality, and potential impacts residents may have on local rivers, addressing the following topics:

Water Usage: type of personal water use, level of river water use

Water Access: type of service connection, access to potable water, water rationing, limitations of current system

Water Quality: aesthetics of household water, water-related illnesses, perception of household water quality

Impacts on Rivers: land use practices within watersheds, potential pollution of rivers

River Health: changes in conditions over the years, perception of river water quality

Results of Household Interviews and Discussions

Community members proved to be a valuable resource in identifying water quality problems. Interviews revealed that the majority of these rural residents receive their water by public means, either through municipal service or through local ASADAS, but nearly one in five people obtain water independently, directly from streams and rivers. In these households, the family typically places a tube in the nearest spring or stream and pipes the water to their home. For systems built by ASADASs, water is piped from springs to a holding tank (Figure 3), where it sits for many days to allow sediment to settle and chlorine to disinfect it.

Most household users, whether they have public or individual sources, perceive their water as clean, as 82% confirmed when asked if their water was potable. Considering that 40% of Costa Ricans do not have access to potable water, both in rural and municipal settings (Segura Bonilla et al. 2004), this number indicates that residents think their water is safe to drink, even if it may be of poor quality. The majority of people—83% of those interviewed—did not treat their water, but those who did obtained their water both publicly and independently.

I asked each interviewee to rank the quality of their drinking water. After they spoke about unpleasant taste or color and bad service connections, it was surprising how highly people rated their drinking water. Approximately 84% ranked it positively (excellent, very good, or good), 11% ranked it regular, and only 3% ranked it negatively (bad, very bad, or worst). Of the 84% that ranked their water positively, 80% had at least one complaint. These numbers indicate that the majority of residents think their water is safe to drink, even if it may be of poor quality. One woman revealed that the nearest spring where she obtained her family's water was located alongside a pasture, but when asked whether she had concerns about the cattle that grazed nearby, she responded that the water was still clean. Minutes later, I met a man who was informing the neighborhood that this water source was in fact contaminated. This woman, and many others, either trust their sources or do not see room for improvement.

Figure 3. A storage tank built by one community's local ASADA. Water from a nearby stream is piped to this holding tank where chlorine is used to disinfect the water before it is distributed to households

Source: Kristen Welsh, 2005

After receiving information that a nearby town, Hatillo, was experiencing problems with their water supply, I interviewed several households in the community even though it was outside my original study area. The community's ASADAS provided households with water from a nearby spring, but many people had contracted stomach aches and other related illnesses. One family explained how they "tested" their household water themselves one time by leaving a glass of water on the counter. After a few days, sediment had settled at the bottom of the glass, and bugs that were once miniscule had grown larger in the water. They now treat their water with a purifier, but they said that if they forget to use it, the children get very sick. Another mother reported concern for her three children because of the water supply. "I buy bottled water, but it doesn't matter. They give the children community water in school. The doctor said that they all have parasites in their stomachs because of the water."

Recommendations

While these interviews only represent issues faced by communities within the study area, the problems identified indicate that basic water provision is not succeeding in some rural regions of the country. Based on information provided by government agencies, regulation provided by the outdated Water Law No. 276 is lacking. As indicated by MINAE Water Department representatives, no other water legislation exists in the country, and this is a major failure between government and communities. An updated law, the Hydrologic Resource Law, is awaiting approval by the Legislative Assembly.

The establishment of ASADAS arose from the need to provide water to rural communities, but more government support is necessary to ensure success. ASADASs require construction, operation, and maintenance of the system to be performed by community members who often lack the appropriate knowledge and expertise. Through interviews with ASADAS representatives, I discovered that many people in charge of maintenance and water supply also hold full-time jobs. Although these individuals receive a small stipend for the work they perform, the system may be more effective if operated by full-time employees.

Twenty-one percent of families interviewed access water directly from local streams, and a small percentage of respondents (6%) with water connections said they access water directly from streams when they experience service disruptions. This illustrates the need to expand connections in rural communities and prevent lapses in services, which would discourage people from taking water directly from streams. Otherwise, river water quality needs to be improved or people need to start treating their water.

In a country with abundant water resources, a significant number of people are receiving poor quality water. In this region of Costa Rica, many households identified poor aesthetics, poor service, and family illnesses related to their water supply. This situation can be improved by giving AyA the responsibility for providing all households, both urban and rural, with water services and by requiring improved water treatment and more rigorous water quality testing by the ASADAS, which currently are required to submit only two water samples a year.

Finally, community members could be more proactive, by voicing their concerns to ASADAS when they experience service problems, and by otherwise getting involved in their local association. Such a change would require public education.

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