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A Discussion of the Impact of Political and Economic Forces on Equitable Access to Potable Water in Ecuador and Recommendations for Improvement through Better Watershed Management

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A Discussion of the Impact of Political and Economic Forces on Equitable
Access to Potable Water in Ecuador and Recommendations for
Improvement through Better Watershed Management

Eliza States

Submitted to Pitzer College in partial fulfillment of the degree of Bachelor of Arts in
Environmental Analysis and Political Studies

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Abstract:

This thesis will address the impact of political and economic forces on the equitable access to fresh water in Ecuador. Demographic factors such as the rural-to-urban migration and the political and economic forces have strongly influenced the debate over the privatization of the provision of potable water and sanitation services. Within the context of Ecuador, two different approaches by the largest cities, Quito and Guayaquil, are analyzed; in Guayaquil, the services were privatized, while in Quito, the public utility was corporatized, remaining under public control. It concludes arguing that in the face of political instability and a lack of regulatory enforcement, neither public nor private provision adequately supplies marginalized communities with water and sanitation services. Watershed management is therefore crucial to maintaining a sound city water-management plan. Its flexibility and openness to innovative alliances between various stakeholders creates great potential for this approach

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Acronyms

EMAAP-Q.....	Empresa Municipal de Alcantarillado y Agua Potable de Quito
FONAG.....	Fondo para la Conservación del Agua (Quito)
ECAPAG.....	Empresa Cantonal de Agua Potable y Alcantarillado de Guayaquil
IDB.....	Inter-American Development Bank
WB.....	World Bank
IFIs.....	International Financial Institutions
TNC.....	The Nature Conservancy
FUNAN.....	Fundación Antisana
FER.....	Fundación Ecología Rumicocha
EPAP.....	Empresa provincial de Agua Potable (Guayas)
UN.....	United Nations
CEDEGE.....	Comisión de estudios para el desarrollo de la Cuenca del río Guayas y la península de Santa Elena
CONAM.....	Consejo Nacional de Modernización del Estado

Chapter 1: An Introduction

1.1 Introduction

South America is one of the planet's most abundant regions of water sources. Despite the inevitable pockets of water scarcity, the continent as a whole does not suffer from insufficient physical water supplies. It contains 25% of the world's water, but is home to only 6% of the world's population. Conversely, while Asia has 60% of the world's population, it has only 33% of its water resources (El Ciudadano, 2010). Regardless, though, of a region's "richness" of this vital resource, there is the pressing issue of who has access, and who is excluded from access, to safe, affordable water. Close to 25% of the world's population live under conditions of economic water shortage (UN Water, 2014). According to the UN, "Water scarcity is both a natural and a human-made phenomenon. There is enough freshwater on the planet for seven billion people but it is distributed unevenly and too much of it is wasted, polluted and unsustainably managed" (UN Water, 2014). In Latin America and the Caribbean, approximately 30% of the urban population do not have access to clean water and sanitation services (Dudley & Stolton, 2003). Clean water, and access to it, is one of the most critical issues of the 21st century.

Even in a region like South America that has so much water; it has little potable water. Ecuador has more than enough water to provide all its inhabitants with what the UN has established as the minimum amount needed daily by an individual. However, this crucial resource is not evenly distributed, due to geography, social class, and proximity to urban areas.

As a country whose urban population has grown rapidly since the 1950s, Ecuador has had to contend with how to provide basic services. The majority of this growth was due to the migration to cities of rural *campesinos*. This rapid expansion has especially posed a problem for

local governments, who are not prepared for the rapid expansion its residents, particularly low-income populations. Most often these migrants settle on the outskirts of cities, joining informal settlements with precarious land tenures. These settlements have historically not been recognized by the government, even though some of them have been around for more than 20 years (El Comercio, 2004). Such uncertainty compounds the problem faced by low-income populations, as basic services do not exist in the neighborhoods, and chances for service expansion are further complicated by the lack of formal planning that went into the establishment of the neighborhoods. As informal settlements, they were developed without a clear sense of what the final outcome would be; and few made construction decisions based on the potential provision of basic services such as potable water (El Comercio, 2006).

Despite the unique challenges and advantages present in Ecuador's two largest cities, Quito and Guayaquil, they have both struggled with how to provide basic services to all sectors of the city. Both were grossly inefficient, and failed to deliver safe drinking water to large parts of the cities. The consequences of this, though, have played out in different ways in the two cities. Guayaquil's water was privatized, through a concession contract that gave the responsibility to distribute water in the city to a private company. Quito's public water utility went through a process of corporatization, meaning that it became more independent of politics and took on a more market-based model while remaining a public utility.

How is it then that there is still no universal access? I argue there are two prevailing reasons for non-universal coverage in urban areas; while I argue their relevance specific to Ecuador, the experience has been similar in many other countries, and the reasons can conceivably be expanded to encompass the region in general. First I argue that the tumultuous

politics that have rocked the stability and continuity of governance in Ecuador have hindered the ability to provide access to clean water to all of its citizens. These frequent political upheavals have resulted in a lack of sound urban planning, poor governance, including the misappropriation of funds and a lack of incentive to collect revenue, further degrading quality and expansion of the piped water network. Second, despite the large reserves of water tucked into the various ecosystems of Ecuador, the full extent of this beneficial and crucial resource cannot be tapped while it continues to be polluted and exploited. This second reason has further implications beyond the immediate question of access to potable water. The overall health of water ecosystems is important not only for its role in providing populations with water supplies; it provides many beneficial services that are often overlooked or underappreciated. Disparate stakeholders all rely on clean water for tourism, economic development, growing and harvesting food, and protecting natural resources such as forests. Watershed management is thus crucial to maintaining water quality in the face of ineffective and unstable governance. Providing potable water and sanitation services to urban populations does not need to be politicized, nor should it, because it detracts from the more important questions of how to get quality water to the places that need it, and how to solve some of the many other inequalities and disparities prevalent within society. This thesis will explore the issue of access to potable water in Ecuador using the backdrop and presence of political instability.

1.2 Background: A brief overview of Ecuador

“There is not one country, but many countries. There is not one project, just a disparity of fragmented needs, each trying to prevail over the other. There is a profound difficulty to think the country beyond at most, localism.” (Hoy, 2005)

There are a number of physical characteristics that have instilled a divisive sentiment in Ecuador. Ecuador, a small Andean country roughly the size of Colorado on the Pacific Coast of South America, and named for being located on 0° latitude, with the upper portion of the country falling in the northern hemisphere, with the rest in the southern hemisphere. Since the founding of Ecuador in 1830, there has been a consistent power struggle and ongoing rivalry between the liberal Guayaquileños of the costa and the conservative Quiteños of the sierra. This rivalry between the regions also manifests itself in the distinct accents of the two regions, and the struggle for power between the economic center and largest city (Guayaquil) and the political center (Quito) of Ecuador (Hanratty, 1991).

But it is not only in the regionalist attitudes of the country that divisions are visible. The country is also very much a victim of its rich cultural diversity; it is home to 14 distinct indigenous groups, the largest being Quichua, as well as the *mestizo*, *criollo*, and Afro-Ecuadorian. The state itself was recognized as plurinational in the most recent constitution (2008). While one may argue the extent to which this plays a role in the everyday lives of most Ecuadorians, it does provide a sharp contrast to the perception of nationality and identity, as it further weakens the country as a whole and instead promotes greater factionalism. There is much lacking in the country’s internal politics, and little, if anything that unites the people to the country, nor anything that unites the country (Hoy, 2005).

1.3 Methodology:

I predominantly relied upon scholarly research articles to inform the theoretical framework of this thesis, while using a variety of newspaper articles, opinion pieces, and other online posts to gain insight into the public debate, knowledge, and perceptions of issues surrounding access to potable water in Ecuador's two largest cities. When looking at newspaper articles, I focused on the most reputable domestic newspapers of Ecuador.

I utilized primary documents and briefs from the Ecuadorian government, as well as international institutions like the World Bank, the UN, and other actors who have played a role in the process and debate, including NGOs and water companies. This included the analysis of the text of the most recent Ecuadorian constitution (2008), as well as service contracts, loan proposals and official project overviews and evaluations. A critical resource has also been UN development reports, and other similar documents, which have connected theory, data, and up-to-date conditions. Ecuador's small size, as well as its historically uneven political history, does not have the same extensive databases of knowledge and information that have been catalogued and preserved in an organized way by the State, as compared with, for instance, the US. Thus these reports by the UN and other international institutions provide essential data.

Chapter 3 then begins with a discussion of the privatization debate. There has been substantial opposition to privatization of the provision of services, both in the community and in scholarly circles; however, as McDonald and Ruiters (2012) note, there has been little meaningful discussion to date of alternatives to privatization. In the book Alternatives to privatization, a collaboration with authors knowledgeable in the subject area, they attempt to fill this void by expanding upon alternatives that currently exist in the global south.

I thus seek to build upon their work by looking more closely at the interplay between water provision and politics, starting from a broader, more theoretical lens of the Latin American region as a whole, to a more in-depth analysis of the specific circumstances of Ecuador. I specifically look at the realities of service provision in the country's two largest cities, Quito and Guayaquil, and then offer an analysis of watershed management programs in Quito and Cuenca (Ecuador's third largest city) as a critical component of good water governance, while acknowledging its possibilities and limitations, specifically in its potential for implementation in managing the watershed that supplies Guayaquil with its water.

It is important to note that framing the debate as one between simply public and simply private fails to highlight the hybrid approaches that have been emerging around the world (McDonald & Ruiters, 2012). For the scope of this thesis, I will only be looking at single public utility providers contrasting with private concession contracts. I am considering concession contracts and privatizations to be interchangeable, although there are these different degrees of private sector involvement.

Chapter 2: The political environment in Ecuador

2.1 Population trends in Latin America and Ecuador in the second half of the 20th century

Latin America experienced rapid population growth in the second half of the 20th century. This trend was further exacerbated by extensive rural-to-urban migration, putting increased pressure on already crowded cities. Such rapid expansion has posed a difficult problem for many cities, as government officials contend with how to get basic services to the people who need them. Oftentimes, the population growth is concentrated in low-income populations, who settle on the outskirts of urban areas on abandoned or unoccupied land. As these are not formal arrangements, there is less pressure and incentives for the government to provide them with services. These communities often go for years, if not decades, without some, or all, of basic services, including potable water, sewerage, street lighting, and paved roads. Rapid population growth also poses an issue for future planning, as supplies of water and other provisions now must account for the larger population it now serves. Strains due to population growth have forced cities to find new sources of water as their old ones run out.

The region, unlike other developing regions in the world, has a higher percentage of citizens living in urban areas than in rural ones. Even in the mid-1980s, when 70 and 76 percent of the populations of South Asia and Africa, respectively, lived in rural areas, in Latin America, two-thirds lived in areas considered urban. This percentage has increased to now more than 80% (UNESCO press, 2012). While there has been substantial growth in the region, Latin American cities have seen faster growth than the region overall (Southgate, et al., 1995). Coupled with the rapid expansion of cities was the inability of urban planners to keep up with the pace of growth. Ecuador was no exception to this trend, and in the span of 40 years, its percentage of the

population living in urban areas drastically increased. In 1980, 47% of the population lived in cities; by 2014, this percentage had increased to almost 70% (Joint Monitoring Programme for Water Supply and Sanitation, 2014).

The poor are often excluded from receiving basic services for several reasons. First, the country still deals with issues of inadequate governance. While it has been making improvements in some sectors, there is still much that can be done. As people migrate from rural areas into urban centers, there is a corresponding increase in demand for goods and services provided by the local government. The influx of *campesinos*, who often settled in the outskirts of cities on marginal lands, worried officials in the country's urban areas. In an attempt to quell rural migration to the cities, municipal governments would refuse to adequately provide basic services to these informal settlements.

Due to overall poor management, and poor cost recovery, the poor are left out of the official networks. Government price subsidies, implemented as an effort to help offset the price of necessary services for those who couldn't afford it, rarely reached those who needed it most (Department of Sustainable Development, 2006). Those that actually benefitted the most from the water pricing subsidies were the ones most able to pay.

Lacking official recognition, these informal communities are not connected to the municipal water system, or to its sanitation and sewage systems. These same individuals who are barely making ends meet, must pay exorbitant prices for water, typically from water tanker trucks (Southgate, et al., 1995).

2.1.1 Informal land settlements

Quito and Guayaquil have both witnessed enormous growth of informal settlements.

These settlements were often formed by illegal squatting or by the purchase of land, unbeknownst to the buyer, from land traffickers. Land traffickers rarely own the land themselves, instead taking over land in uninhabitable areas and assuring the purchasers that there is no problem and that municipal services will be arriving soon to the neighborhood (Barrios ilegales de Quito están en riesgo, 2011) and creating false papers that have no legal standing. They seek to capitalize on the ignorance and desperation of these recent migrants for their own profit; they often disappear as soon as the purchasers have completely paid their debt.

More recently, however, the municipal governments have been working both to legalize these informal settlements and to eliminate land trafficking. According to the director of Terrenos y Servicios Parroquiales del Municipio of Guayaquil, Carlos Salmon, in the urban zone there are still between 20-30% of the lands to legalize, not including new settlements being formed to the northeast. The rural parishes of Guayaquil have yet to legalize 60% of the lands. The 1997 Ley 37 established limits within which land to be legalized must be located. While it mentions sectors in both the southern zone and the northeastern part of the city, the new settlements, that make up the majority of the land that have yet to be legalized, are not included in that law. Though the process, according to Salmon, is not simple. Despite this, in 2006 the Municipality granted 10,340 property titles in marginal urban and rural sectors. While in the past, new settlements were formed in the southern zone of the city, there is no longer space for new settlements, leaving the northeast as the zone where they are being established. The area of Guayaquil in 2007 was 50,000 hectares, of which 10,000 were part of new land invasions. These newer settlements are often carried out by land traffickers who claim that when the buyer finishes paying, then they will receive the property title; until then, they only received a receipt and a title of possession (El

Comercio, 2007).

2.1.2 Urban growth and fragile ecosystems

The increasing percentage of the population living in urban areas has meant both positive and negative implications for the environment. A reduction in the number of the country's poor living in the *campo* compared to urban areas, although exacerbating urban environmental problems, has also had the unintended effect of easing some of the stresses on fragile ecosystems in the *campo*. Due to the scarce options available for the rural poor, they often end up occupying sensitive land areas and using the land in unsustainable manners; such sensitive land areas include the steep Andean hillsides that are highly susceptible to erosion, among other fragile ecosystems. In Guayaquil these settlements often were constructed on wetlands and other marginal lands, in Quito, they usually occurred on precarious mountainsides or otherwise unfit or degraded quality land. The poor *campesinos*, due to a lack of job possibilities in a weak rural labor market, then try to make land productive that is unsuitable for cultivation and settlement (Southgate, et al., 1995).

Others have also identified a negative correlation between urbanization and rates of deforestation, population growth, and per capita energy usage levels (Southgate, et al., 1995). Despite this relief felt by rural ecosystems, urban areas are conversely struggling against increasing environmental stresses aggravated by urban migration. So while there exist tangible environmental benefits when poor *campesinos* move to urban areas, it creates new environmental problems wherever they relocate. However, unlike stresses to rural ecosystems, environmental challenges facing cities can be tempered through effective management and

sound policy implementation. On the other side of the equation, it is of critical importance for households and private sector users to minimize waste production of water, energy, and other resources (Southgate, et al., 1995). The challenge must then be to innovate to find new solutions to some of today's most pressing problems.

2.2 Governance

Ecuador has a history of poor governance, with frequent turnover of Presidents and ministers, and other government officials (European Commission, 2007; Hurtado, 2009). Exemplary of the country's political uncertainty is its history of frequent changes in the management of hydraulic resources, and the overlapping of responsibilities among national, regional, and local institutions, while other aspects of management are overlooked (South American Technical Advisory Committee, 2003; European Commission, 2007). Ecuador has followed the path taken by other countries in regards to water management in devising agencies based on irrigation, potable water and hydroelectric generation sectors, among others.

2.2.1 Decentralization and local autonomy

The failings of the central government, as well as the belief that decentralization was necessary to modernize (Tilson), has led to marked improvements in governance at the provincial and municipal levels (European Commission, 2007).

The argument for local autonomy centers on the idea of local conditions, being more participatory in nature and better able to respond to the public. A centralized, top-down approach, has the risk of being too removed from the daily process to effectively govern local issues. This was the case from 1994-2007, while the central government was in charge of ECAPAG, which was the public water utility of Guayaquil until its water and sanitation services were privatized in 2001, and ECAPAG became a regulatory agency. Under the central

government's control, ECAPAG was an ineffective regulator, giving Interagua, the concessionaire, to not comply with its contractual obligations. Not until the Municipality took control of ECAPAG was Interagua held accountable to its required infrastructure investments and service expansion (El Comercio, 2005a; El Comercio, 2005b).

Guayaquil's status as the economic capital of the country has played a role in privatizing the city's water and sanitation services. According to an article by David Watts for The Times (UK), the city and its mayor Nebot sought greater autonomy to be able to make more decisions locally, because the central government was ineffective. Its so-called "degree of stability" as compared to the rest of the country, is what makes it such an attractive place to invest for foreign investors and for joint ventures like Interagua (Watts, 2005).

2.2.2 The Ecuadorian Constitution: *sumak kawsay*, *el buen vivir*

The constitution of Ecuador, approved in 2008, is the 20th since its independence following the dissolution of Gran Colombia in 1830. It takes a novel approach to rights. The constitution establishes the inherent rights of nature, as well as various guarantees of rights reserved for all citizens, under the umbrella concept "*sumak kawsay*", or good living. Included among these rights, which range from the right to nourishment to education and healthy environments, is the fundamental human right to water. In Article 12, it states "The human right to water is fundamental and absolute. Water constitutes a strategic national patrimony for public use, inalienable, imprescriptible, inembargable, and essential for life" (my translation p24 Constitution of Ecuador). It states to "recognize and guarantee for the people **[sic]**: the right to a dignified life that assures health, food and nutrition, potable water, housing, environmental

health, education, work, employment, rest, leisure, physical culture, dress, social security, and other necessary social services” (my translation p47, Art.66). Further, according to Article 264 the constitution, municipal governments are responsible for, among other things: “provide public services of potable water, sewerage, purification of wastewater, management of solid waste, actions for environmental health and others as established by law” (my translation, p130). In regards to land access and use, “it is prohibited large estates and land concentrations, as is stockpiling or privatizing water and its sources” (my translation, p139, Art. 282). In Article 318, this right is again reiterated,

“Water is a strategic national patrimony for public use, of inalienable and imprescriptible control of the State, and constitutes a vital element for nature and the existence of humans. It is prohibited in all forms the privatization of water./ The management of water will be exclusively public or communal.”

“The authorization of the state is required for the exploitation of water for production on the part of the public sector, the private sector, and that of the common and supportive economy, in agreement with the law” (my translation, p150).

It establishes many protections of the public. It also prohibits the disruption of public services provided to the people, asserting the guarantee that these services will function (Art. 326, section 15, p 153). As had been a big issue in Guayaquil with Interagua terminating water connections for individuals who are unable to pay, even if they are considered to be in extreme poverty, this constitution forgives all debt of water for human consumption of users in extreme poverty.

2.2.3 Correa, Indigenous groups, and water rights

Initial indications suggested that President Correa would bring a more open process to politics in Ecuador. He reached out to the different indigenous groups, the largest of which being

CONAIE and ECUARUNARI, and gained their support. He treated them as a legitimate political force, seeking their input and opinions, and even held the swearing-in ceremony in the Andean town of Zumbahua while wearing a shirt embroidered in the traditional style of highland indigenous groups (Caselli, 2011). He offered an alternative vision of development to the neoliberal model promoted by prior administrations. This alliance, however, did not last long, as it became increasingly clear that his rhetoric did not match his actions. Despite his initial popularity amongst indigenous groups, he has increasingly come under fire over his actions, including the exclusion of key stakeholders from the political debate, the exploitation of the country's natural resources, and the implementation of neoliberal policies (Dangl, 2010).

While he touted bringing in a new way of governing, with input from all sectors of society, in fact he criticizes anybody who differs in opinion from him in any way (Burbach, 2010) (Caselli, 2011). Despite promises to include indigenous groups in the discussion and debate around laws, they did not feel consulted in the making of the country's new water law, which led to country-wide protests and a delay in the bill's passage (Moore, 2009).

Dividing policies, such as the debate over the new water law set to be adopted following the new constitution, incited anger in indigenous groups across the nation (Constante, 2013). While the constitution calls for respect of indigenous community control of water sources, the new legislation does not uphold this same language.

2.3 Different Approaches to development

2.3.1 Statist

Government is seen as the necessary remedy to inherent market failures of underproviding goods that benefit the public as a whole, for instance national defense,

infrastructure, and health services. The decades following WWII were met with high levels of government involvement in development projects, including in sectors not generally owned by the government like airlines and fertilizer (Anderson, 2000). During this time period, there were many state owned enterprises (SOEs), whether they were always public, established for development purposes; private businesses taken over by the government to prevent liquidation for “critical industries”; or the formation of SOEs for providing goods or services that were natural monopolies (Anderson, 2000). Under the policy of import substitution industrialization, the region attempted to achieve economic growth and development comparable to that of the United States and Europe by focusing on expanding domestic industries and drastically reducing imports. While many countries in the region saw significant economic growth during these years, it was not sustainable (Franko, 2003). By the early 1980s, the private sector took on a more active role, as the state stepped back.

2.3.2 Neoliberal

While the statist-centered development of the prior decades had generally been considered as a response to market failure, during the 1980s the discussion largely switched to one focused on government failure. It was recognized the need for market involvement to achieve economic development, as the development from the 1950s to the 1980s was marked by SOEs and government decisions that consolidated power, money, and resources among the wealthy to the detriment of “efficiency and economic development needs” (Anderson, 2000, p. 582).

In line with the adoption of neoliberal policies that emphasized the retreat of the state, international development actors, in particular international financial institutions (IFIs) such as the World Bank (WB) and the Inter-American Development Bank (IDB), viewed governments as

inhibiting, instead of helping, growth and development. Thus, essentially, development policy in the region went from one of large public investments to help further economic growth, to one in which government involvement was viewed as impeding growth. No longer were market failures seen as sufficient cause to have states dominate the development process.

During this time, the limitations of the private sector were often overlooked or forgotten. But, just as the statist model risks too much government investment at the expense of private entrepreneurship, there were very real challenges of the neoliberal approach. Moreover, the argument for neoliberal policies was not based on concrete evidence, only the fact that statist policies had recently stumbled. Still, “no one has yet shown that the failure of government intervention *necessarily* outweighs market failure” (Fishlow, 1990, p. 66). The development model in the region went from one monopolized by the public sector to one in which the private sector was brought in as a way to expand service coverage and increase quality while relegating the public sector to responsibilities of regulation, monitoring, and oversight (Inter-American Development Bank, 1995).

Chapter 3: Water

The push towards privatization of public sectors in the 1990s was a natural progression for the larger ideological shift of the late 1970s and 1980s that increasingly followed neoliberal policies as opposed to statist approaches. Such was it that the neoliberal doctrine influenced the international community and global politics of the decade that there was widespread belief that “social functions and economic development should be undertaken by business within free markets, with the state playing a facilitating and regulatory role without direct engagement” (Budds & McGranahan, 2003, p. 91).

Due to missteps and mismanagement with little results of many developing countries, both specifically within the water sector as well as governance overall, IFIs and other potential sources of financial investment and loans became increasingly wary of lending to these governments. Moreover, they used their leverage over indebted developing countries to pressure, and even force, countries, regions, or localities to privatize their water and sanitation sectors. In the following sections I will explore in more depth the reasons and justifications behind the debate over public or private water and sanitation provision.

The President of Ecuador from 1992-1996, Duran-Ballén, heavily pushed a privatization program that intended to sell 80% of state-owned companies (Tilson, 1999). This agenda was deeply unpopular in the country. The Administration, though, argued that privatization was necessary to modernize the state. A 1993 Modernization law permitted “foreign concessions in public sectors” (Tilson, 1999, p. 84) and established the advisory body CONAM (Consejo Nacional de Modernización del Estado) that was to help implement the administration’s privatization agenda despite strong public opposition (Tilson, 1999).

3.1 The debate over privatization and its alternatives

3.1.1 Water: an economic good, or a human right?

Can it be provided by the private sector, or should it be provided by the government? This question implicitly refers to how water is viewed. One of the most critical junctures in the discussion of the provision of water and sanitation services is whether water should be considered an economic good (and human need) or a human right. The treatment of water as an economic good is a source of high contention, with NGOs and the left being particularly opposed to charging for water. The argument is that this only causes a rise in price for the poor while the global conglomerates receive even higher profits, while those in favor of commodifying water argue that in order to achieve universal access, it is necessary to accurately calculate and charge the price of providing water and sewerage services (Bakker, 2003; Budds and McGranahan, 2003). Often, this treatment of water as an economic good is linked with privatization, the argument being that market-based incentives will lead higher efficiency can be achieved, and unlike in publicly-run companies, is more likely to reflect the true cost of the good. This has several implications. Some point to the necessity to value water as a scarce good that people pay full price for, to reduce overconsumption. Conversely, increased efficiency is not guaranteed by the introduction of the private sector, as there may be little incentive for them to achieve this. The cost-based pricing approach also “ignores the public benefits of water, sanitation and drainage” (Budds & McGranahan, 2003, p. 96). This view is countered with one viewing access to water as a fundamental human right, and access to which must be guaranteed by the government.

3.1.2 Why privatization?

If public utilities are not supplying the poor, why would privatization be any worse? (Estache, Gomez-Lobo, & Leipziger, 2001). The 1980s represented a fundamental shift in theory of development and advancement in the Global South, primarily by international actors. This shift marked a movement away from government being viewed as the necessary arbitrator of development, to one where it increasingly was seen as an impediment. The IFIs began strongly “recommending” or obliging the adoption of measures in developing countries to privatize water (Goldman, 2007). This push led to concession projects in various countries, typically to US and European corporations (Ortiz, 2011).

3.1.2.1 Indebtedness: The lost decade

Concurrent with the ideological shift towards neoliberalism was the rising indebtedness of Latin American countries to foreign lenders, including a debt crisis in 1982.

International financial institutions used this debt as leverage to heavily push privatization policies. The massive debt amassed by so many countries in the region was also a consequence of the recent wave of dictatorships that had plagued the region, who borrowed extensively from foreign lenders, leaving in their wake large debts to be paid back by subsequent administrations. This debt was used as a tool to manipulate policy and help further advance the neoliberal agenda, meanwhile removing the debate and decision from the local or national political discussion and imposing upon them what they perceived to be the best solution (Goldman, 2007).

Moreover, it was evident that most public utilities were not successfully expanding covering to low-income communities, and without a considerable influx of funds to finance these new connections, it was unlikely to happen. However, the hope and expectation that bringing in

the private sector to help provide water and sanitation services would also mean a large amount of private finance to fund service expansion to poor communities, was never met. With the rapid expansion of urban areas and the migration of many poor *campesinos* who settled on the outskirts of cities, the issue of the dearth of potable water and sanitation services in poor settlements was becoming ever more acute. The naïve viewpoint that the private sector would succeed where the public sector by failing to consider what, if any incentives the private sector had to invest its own funds in bringing service coverage to poor communities which were also the areas least attractive in which private companies could invest; instead, they have predominantly focused on providing services in areas the wealthier areas, while avoiding or excluding low-income areas (Budds & McGranahan, 2003).

3.2 The provision of water and sanitation services in Latin America

3.2.1 Challenges in the public provision of water to urban areas:

With the rapid growth of urban areas in the global South during the second half of the twentieth century, the challenges facing the provision of water and sanitation services were accentuated. Bakker (2003) refers to these difficulties as technical ones, institutional ones, and government negligence and/or unwillingness. Technical difficulties include those challenges inherent in establishing and maintain an urban water network, like their high inflexibility and requirement of high capital investment, as well as implications of expanding coverage to areas where little or no urban planning existed, and thus there are poses challenged by geographical features, spatial orientation and housing distribution. There are also often institutional factors that hinder the process, usually regarding a lack of secure land tenure, as well as poor

information and lack of formal organization of neighborhoods that increase the difficulty in demonstrating a potential customer base. Finally, governance factors like inefficiency due to patronage, poor management, or urban planning policies attempting to curb rural-to-urban migration on top of “lost” water (Bakker, 2003).

The overall tendency of governments to highly undercharge for water supplies has itself several consequences. These include overconsumption and inefficient use of the resource, as well as a lack of investment in updating maintaining, and expanding water infrastructure and network. Besides the failure of governments to charge prices that cover the full economic costs of supplying the water, finances have been impeded by the lack of institutional and infrastructural cohesion to ensure compliance of payment (both on the part of the collector and the user), minimize leaks, waste, illegal connections, and “a high proportion of unaccounted-for water” (Winpenny, 1994, p. 7) (Bakker, 2003).

These challenges, coupled with the unstable political environment in Latin America forced international development actors to find alternate solutions to some of the most pressing problems of the global South. This coincided with the global ideological shift towards neoliberalism, and away from the previously held contention of the State being the most frequent, or best, solution.

3.3 Water in Ecuador

Despite Ecuador not being a “water poor” country, it has frequently been characterized as one unable to utilize the resource efficiently, with an abundance of its use and abuse (Southgate, et al., 1995) It is also not distributed evenly around the country, with the drier climate of the *costa* having annually 5,200 cubic meters available per person, the Amazon has more than ten times that, with an availability of 82,000 cubic meters (El Telegrafo, 2013). According to the same article, the two cities with concessionaires, Machala and Guayaquil, have the worst water quality in the country, with ratings of 2.46% and 3.53% (out of 5), respectively. Quito received a rating of 3.99%, Ambato 4.10%, and Cuenca, with the highest, of 4.63% (according to household surveys, El Telegrafo, 2013). Just over 40% say they boil their water, 35.48% drink the water as it arrives at their home, 21.94% buy purified water, 2.96% add chlorine, and 1.29% filtrate it. In the same survey, it was found that 30.21% of households in Ecuador consume bottled water. Approximately seventy-six percent of households have access to potable water services, though this conceals the fact that percentage with access to potable water is 92.7% in urban areas, but drops to 49.3% for rural areas.

While the two largest cities faced similar issues of coverage, water quality, and efficiency in the 1990s, they took diverging paths to remedy it. Principally, Guayaquil, the largest city and the economic powerhouse, has always had issues of providing basic services to its citizens. The city, a known stronghold of opposition politicians, had very poor water service coverage in the 1990s. The city overall had a water service coverage 64%, and one of sewerage of 46%. Even the 64% that were fortunate enough to be connected, oftentimes huge swaths would receive water for several hours a day at low pressure (Constance, A fair price, 2003b). The water they did

manage to distribute essentially went to the wealthiest, most powerful sectors, and a majority of the city's water was lost due to leaks and illegal pressure. There was no way to improve the existing infrastructure, or expand into some of the quickly forming neighborhoods that came from the *campo*. On top of infrastructure issues (piping) and governance issues (inefficiencies and failures of the public utility), and issues regarding the collection of payments, was the fact that in an effort to help low-income households afford water, the government heavily subsidized the price of water, even though many of the poorest populations were not even connected to the network. Ironically, those that benefitted most were the high-income areas who actually received piped water, while those who needed the help the most were not only not benefitting from this subsidy, but weren't even benefitting from being connected to the water network (Zehnder, Yang, & Schertenleib, 2003). There are two more factors that enhance these effects: the subsidies were structured so that essentially everybody could benefit, as well as the fact that the poor first need to be connected to the system, before worrying about payments.

Though it carried out similar reforms to Quito's company to its own water provision utility, the publicly owned utility, with its history of poor governance, corruption, inefficiency, and of especial importance, high indebtedness and a poor history of repayment, international lenders would not provide loans to finance the maintenance and expansion of the city's water delivery infrastructure without clear inclusion of the private sector, with the overall goal ultimate goal privatizing the utility (Carrillo, Bellettini, & Coombs, 2007). In Quito, the public water service provider faced many issues as well, however through the implementation of business-model type reform, was able to increase its efficiency and responsiveness to the population (Carrillo, Bellettini, & Coombs, 2007)

According to a report by the Director of Planning for the Ministry of the Environment, the two biggest challenges facing the potable water and sanitation sector are the lack of coverage and lack of efficiency. These are of particular concern, and a common reality, in the poorer urban areas, creating “poverty belts” of marginalized populations where there exist neither potable water systems nor integrated sewer systems (Bermeo Noboa, 2005). These marginalized communities, those who need government aid the most, are often the ones who least receive it. While in the past the government has provided pricing subsidies to make water more affordable, these reduced prices often end up primarily benefiting the wealthiest citizens. The pricing of water does not reflect the actual values or expenses of the sector, thereby only covering a portion of the costs. This not only has led to an ever compounding situation of debt, but also means that they don't have funds to expand, improve, or fix the present system (Organization of American States, 2006).

3.3.1 Instability in water management

The reliance on external financing also limited possibilities available, and the historically bad record of debt repayment by the country meant that international loans were more difficult to obtain. As demonstrative of the poor management and lack of internal financing for water projects by Latin American countries, from the 1970s to the 1980s, the amount of international financing for urban water projects grew from 30.2% to 43.5%, much of which came from the IDB WB (Swyngedouw, 1995). A loan by the WB for Guayaquil's water system in the late 1980s was put on hold as EPAP was unable to meet the conditions set by the Bank, including the reduction

of water loss caused by damage and theft, streamlining administration (and reducing the number of employees), and increasing the price charged for water (Swyngedouw, 1995). The inclusion of such provisions were becoming an increasingly common practice by international institutions. However, these demands were expected rapidly, and in systems where such s traditions of quid pro quo for political support are so ingrained in the local politics, the failure to comply is near inevitable without abrupt, drastic changes.

3.3.2 Maintaining the status quo

Moreover, many actors have vested interests in maintaining the status quo. Those that benefit the most are often those who have the most political power, while those who are disproportionately negatively affected have little voice or recourse. Politicians, urban upper-income residents, and private water distributors, or 'water speculators', all of whom profit either from large subsidies and lack of regulation in service delivered to the city center (and wealthier communities), or from the lack of water delivered to the outlying, marginalized communities. Tovey (1999) mentions this dichotomy of “the monopolies of private water speculators [that] remain unchallenged by the municipal authorities due to the weak socio-political powers of squatters” (p264). This inequity was enhanced by policy measures intended to help the poor pay for water by implementing highly subsidized pricing so that users who could not afford it would only have to pay a portion of the cost. The way they were set up, though, meant that in practice, the subsidies did little to help the poorer populations, with wealthier neighborhoods gaining the most benefits from the subsidization policy. These growing contradictions had several consequences for Ecuador’s largest cities and their respective public water utilities.

Highly subsidized pricing also meant increasing debt, and the lack of funds to finance expansion of the network. Such undercharging and consequent built-up of deficits created a reality of lack of investment in expanding and maintaining the network. Thus, the very populations the subsidized prices are supposed to benefit, the urban poor, were then systematically excluded from receiving services because they were never connected to the network in the first place. As a consequence, those deemed least able to afford high prices (the poor), were forced to buy water from private providers such as *tanqueros*, at prices up to 400 times greater than what consumers connected to the public water utility network paid (Swyngedouw, 1995).

3.3.3 Alternative sources of water

Many residents in Ecuador avoid drinking tap water, choosing instead to boil it, drink filtered water, or buy bottled water. This perception that bottled water is safer, however, is misplaced. In theory it is filtered like the municipal water; this, though, is not guaranteed. Moreover, there exist many illegal bottled water companies who often do not comply with the processes necessary to make the water suitable to drink. In 2011, the Commission of Health for Guayas closed over 12 bottled water manufacturers for failure to comply with hygienic procedures (Hoy, 2011)

According to Othón Zevallos, manager of Municipal water utility of Quito , the need for alternative sources of safe drinking water is created by the market that insinuates bottled, filtered, purified, or ozoned water, is of higher quality than that of the city, and that the city's

water complies with all technical parameters (Hoy, 2011). The challenges that faced the country were met with two different methods to improve water distribution in the major cities in Ecuador

3.4 Guayaquil

3.4.1 The city's political environment

The inefficiencies of Guayaquil's public water providers were largely contributed to the city's political environment, and thus the politicized nature of water-service providers. In 1995, national law established the consolidation of EMAP-G and EMAG into state-run ECAPAG. Part of this consolidation process included improving efficiency in the management and distribution of potable water and sewerage services. Only in 1995 did national law establish ECAPAG, then separate it from local politics and give it the power and authority to provide water and sewage services in a more technical, apolitical way. This, however, was not done as a solution, but rather as an intermediary step to prepare for privatization. It instituted numerous administrative and organizational reforms, and reduced staffing. Since then, ECAPAG has remained mostly insulated from politics, with only a representative elected by the mayor sitting on its board.

3.4.2 System inefficiencies

The system inefficiencies is also seen in the amount of unaccounted water, reaching 65% in Guayaquil, caused by leaks in the system, lack of charging and collection of payment for much of the water delivered, or when did charge, underestimated water use, and illegal connections (Swyngedouw, 1995) . And, while it is often assumed that the level of unpaid water use is higher in peripheral, low-income settlements, it is in fact much higher in the city center of higher-income residents, also in part due to the nonexistence of the network in lower-income areas. The

long-established culture of patronage in Guayaquil, like many Latin American cities, combined with low labor costs lead to the low productivity observed in the cities' water companies. The clientelist, or patronage, reality also created an inflated bureaucracy within the utility, as many hires are political favors, with as many as 8 employees per 1000 connections while the UN has estimated an efficient system would have approximately 3 employees per 1000 connections (Swyngedouw, 1995).

3.4.3 Marginalized communities in Guayaquil

A neighborhood that has been around for more than 25 years, el Guasmo still didn't have a sewerage system as of 2004. Residents thus marched in Guayaquil, ending at the Palacio Municipal to meet with Jaime Nebot, the mayor of Guayaquil. The residents collected more than 900 signatures requesting the establishment of sewerage services; the neighborhood still also lacked sufficient levels of coverage and efficiency for other services, including potable water. They asked the mayor to step in so that Interagua and Ecapag would start carrying out work in their neighborhood. Nebot told them that in a few months, Interagua would be starting the construction of a sewerage system in el Guasmo, and that it should be completed by August 2005 (El Comercio, 2004). The issue and difficulty of providing basic services to Guayaquil residents can also be attributed to lack of organization of public administration, which has led to unplanned growth and expansion of the city, and complications providing road, potable water, and sewerage services. By early January of 2005, Interagua had installed 38% of the total of new connections set forth for to be completed in the first five years (21,000 new connections); for sewerage, this percentage was 36 (20,000 new connections). In complying with the focus of northern, densely populated sectors, Interagua focused on areas most in need; sewerage services were extended to

various sectors of el Guasmo (cooperatives Santa Monica, Siete Lagos, Libertad y Conciencia). In the first five years of the concession, which was granted to Interagua in 2001, they are supposed to have established 55,238 new potable water and sewerage connections (El Comercio, 2005a).

Part of Guasmo still didn't have sewerage services until 2010; and even then, the sewerage network constructed in sector D of Guasmo, was only made possible by penalizing Interagua for not complying with contractual agreements. The fines imposed by ECAPAG covered the complete cost of the project, which involved connecting 3,000 new homes and 26,000m of sewerage piping at a cost of \$3.5 million (Business News Americas, 2010)

3.4.4 Privatization

In Guayaquil, improvements to the water service, including the combination of the separate water and sewerage utilities that formed ECAPAG, was carried out to increase attractiveness of the system to private investors. Throughout the 1990s, this process of consolidation included the shifting of the ECAPAG's role to a regulatory one, meant insulating it from the political arena. Once exemplary of clientelism, after the 2002 presidential elections when the winning coalition attempted to force out EMAPAG management to put in place party loyalists with little expertise, before this was implemented the president elect stepped in and stopped this move (Constance, A fair price, 2003b).

Privatization hasn't solved Guayaquil's coverage or quality issues or access; instead, it has just transferred the responsibility to an outside party. Negligence by the central government and encouragement by IFIs led to Guayaquil selling the rights to its water sector to Interagua for 30 years (Anderson, 2000). In fact, analysis of coverage from before and after the concession has suggested that the likelihood of the poorest households receiving water services actually

decreased in the years following the concession (Carrillo, Bellettini, & Coombs, 2007)

What seemed like an attractive solution to the woes that dragged down the ability of the public sector to effectively and efficiently provide services, in particular appealing to foreign investors and loan providers, like the World Bank and the IDB, in fact was not this hugely successful program they anticipated. The companies that did get involved, did not account for some of the costs of investments, or didn't see profits if they complied with contract, including price increase restrictions and network expansion that led those that did venture into this arena to sometimes backtrack, or find it not worth the trouble (Gilbert, 2007). Telling of this is the fact that in 2008, the majority shareholders Betchel and Monte Edison sold off their shares in Interagua (Hoy, 2012).

The privatization of Guayaquil's water and sanitation services followed the neoliberal trend of the end of the 20th century and the beginning of 21st century. In particular, international agencies and foreign bodies largely stressed the benefits of neoliberal policies, and in particular a multi-pronged approach to management in developing countries: decentralization, strengthening of regulation and oversight, and increased competition and participation by the private sector (Department of Sustainable Development, 2006). One approach that has been taken as an alternative to privatization has been transforming public utilities to operate much like corporate entities, which establishes greater independence, increases profit while minimizing debt, and overall a more efficient system; at the same time, it also has been unable to find solutions to getting poor and marginalized communities, usually on the edges of the cities, quality water. As they operate very similar to corporations, they are still weak on areas such as public ethos, participation, and quality of the workplace (Carrillo, Bellettini, & Coombs, 2007).

3.5 Quito: An example of an alternative to privatization

3.5.1 Corporatization

An example of such a corporatized public utility is EMAAPQ, the water provider for the city of Quito. Much like the poorly performing state of Guayaquil's public water and sanitation utilities in the late 1980s and early 1990s, for Quito's public water utility, poor performance was the rule, not the exception. In 1988, thirty-five percent of the population lacked any service, while another 10 percent had service considered deficient. To improve efficiency and service, the separate water and sewerage utilities were merged in part of a larger effort to reduce inefficiencies. Unlike Guayaquil, however, Quito received its assistance USAID, who offered technical assistance to the public utility; this is a contrast to the loan with conditional obligations received by Guayaquil's water and sanitation services utility. It increased coverage in poorer neighborhoods by reducing costs through policy reforms. By 1993, it was determined that 80 percent of the municipality received adequate service, a great improvement from the 55 percent of adequate coverage that existed five years prior. As part of its reforms to improve service and inefficiency the public water utility for Quito underwent a process called corporatization, in which the utility became more autonomous and acted with an emphasis on many of the principles that motivate private companies. In the 1990s EMAAP-Q underwent significant changes in its structure and management while also using a loan from the IDB to expand service to low-income neighborhoods in southern Quito. It also laid pipes in land further south that was still undeveloped, in anticipation of future city expansion. This was a departure from the historical practices of most water engineering systems, including Guayaquil, that follow urbanization patterns, instead of guide them. This is especially true when it comes to lands often settled by

poorer populations, as they tend to be those with unfavorable topographical conditions, and thus make providing water to these communities more difficult and costly (Constance, Water for the future, 2003c).

3.5.2 Development and expansion

EMAAP-Q oversaw concrete changes that significantly improved the institution and investment program. Such actions included streamlining operations and administration, and EMAAP-Q saw its employee to connections ratio decrease from 10 employees per 1000 connections to 6 employees, in part because of a voluntary retirement program. While this ratio remains higher than the recommended proportion by the UN, and that of private water companies, it still marks a significant improvement, and a proportion lower than many public utilities. It also outsourced technical and engineering services to firms who could provide the services more cost-effectively, and managed to reduce water loss from leaks and theft from roughly 50% in the early 1990s to approximately 34% in 2003 (Constance, Water for the future, 2003c). The majority of the water for southern Quito came from a new water system established that was supplied by water from within the Antisana Ecological Reserve. This 120,000-hectare reserve was created through successful lobbying by the NGO Fundacion Antisana, and served to protect the fragile ecosystems it encompassed. Despite the prevalence of private owners within the protected areas, through consensus building, education, and communication, the various parties reached agreement. The implications of this were many: with the establishment of the Reserve, Fundacion Antisana and EMAAP-Q paid for park rangers, and the two signed a contract allowing the foundation to monitor the utility's fieldwork within the reserve.

It also created the Monitoring Commission for the La Mica-Quito Sur Project whose members included Fundacion Antisana, IDB, EMAAP-Q, and other government entities, and served as a monitoring mechanism and a way to consensually resolve disputes. This improved monitoring and control, as well as access restrictions implemented by EMAAP-Q and the continual presence of park rangers, helped reduce squatter settlements and illegal hunting and fishing within the reserve, and provides the possibility to landowners within the reserve to generate revenue from tourism and the visitors attracted by the recovering ecosystems and its wildlife populations (Constance, A clean source, forever, 2003a). This Reserve encompasses a critical ecosystem for Ecuador and other Andean countries: the *páramo*. The *páramo* is highland plains with a large water holding capacity, the “wetland” of higher altitudes. Besides the *páramos*, much of Quito's (and Ecuador's) water comes from the glacial Andes.

3.5.3 Quito's Limitations

Due to the corporatization of Quito's public utility of potable water and sanitation in the 1990s, service and efficiency greatly improved. Unlike Guayaquil, Quito's utility did not undergo a process of privatization in the 90s, despite the resolution of international actors and the administration of Duran-Ballén. The administration saw private sector involvement in the provision of services and infrastructure as the necessary method by which to modernize the state. The high priority of this modernization could also be seen in its establishment of CONAM, an institution created for the sole purpose of helping to implement modernization (and privatization) reforms.

Such corporatized utilities, while successful at addressing issues of efficiency, cost recovery, and independence from the political sphere, often “are weak on a number of important

indicators, including public ethos, participation and quality of the workplace” (Spronk, Crespo, & Olivera, 2012, p. 442).

And while it was shielded from the wave of privatization in the 90s, it was revealed in 2005 that since 2002, EMAAP-Q had been carrying out studies of the privatization process. This shows how influential privatization still was, in spite of its observed failures in the region, for instance the Water Wars of Cochabamba, Bolivia or the cancellation of the contract in Buenos Aires, Argentina (BBC News, 2006).

In 2002, CONAM and EMAAP-Q, with the support of the IDB, began a process of quietly studying the viability of a concession contract for Quito’s water utility. When, in 2004, the public heard of the plans to privatize Quito’s water, a coalition for the defense of water (Coalición por la Defensa del Agua), was created to offer a united front against the process, including an open letter written to the Municipality and the Mayor to denounce it. Finally, after several years of public opposition and activism fighting the privatization of Quito’s water, in 2007, the concession process was definitively suspended (Buitrón, 2008). The public opposition came as discontent in Guayaquil with Interagua mounted and its failure to comply with contractual obligations and its poor customer relations.

3.6 Which is better—public or private provision of water and sanitation services?

The weak democratic institution and government entities established an environment in which little progress could be made. That is why IDB pushed Guayaquil in the 90s to privatize, like they did for many other cities in the region. If the government was viewed as incapable of providing basic and essential services to its citizens, why did only two cities, Guayaquil and

Machala, in the country privatize? Because it has been a failed experiment. It was neither very popular among the people, nor among potential private sector suppliers, as demonstrated by the low number of bids received in concession projects across the region.

As demonstrated by the exorbitant rates for water the poor are sometimes left with no option but to pay. These are also the populations most often overlooked by politicians and the government, because they lack the power needed to demand more attention. The expectation that privatization would considerably reduce the barriers that impeded expanding coverage and greater efficiency in the provision of water and sanitation services, mistakenly attributed their occurrence as exclusively a result of public sector; indeed, “these often have little to do with whether the water and sanitation networks are owned or operated by private companies. Barriers to provision, such as land tenure, still impede service provision in informal settlements, even when these are officially within the service area of the private sector” (Budds & McGranahan, 2003, p. 112). The success of a concession contract, much like the success of a public utility, is its ability to act independently under sound management practices. This requires significant regulatory power and oversight, especially when the private sector becomes involved, as “the very array of powerful private interests celebrated by the rent-seeking and related literature requires a strong state to manage successful reform. In the absence of state capacity, concentrated market and political power and other imperfections may make laissez-faire an *n*th-best choice” (Fishlow, 1990, p. 66) Thus, weak governance should not necessitate public sector involvement in the provision of basic services; in fact, it would seem that in such instances, it is even more important to keep services publically provided. Without effective regulatory oversight, the likelihood increases that the private provider will focus almost exclusively on ways to

maximize profits rather than ways to improve service and expand coverage. The impact of the presence of a strong regulatory environment cannot be stressed enough, and has been highlighted as a necessary requisite by the same agencies that pushed for privatization (Estache, Gomez-Lobo, & Leipziger, 2001), as well as various scholars studying the question of privatization (McKenzie, Mookherjee, Castanada, & Saavedra, 2003).

Chapter 4: Watershed Management

“Until recently, the main focus of efforts to improve urban water sanitation and supply have focused within the cities themselves, on better distribution systems, treatment plant, and sewage disposal. However, throughout the world, municipal authorities are now increasingly looking up into the hills towards the forested watersheds that supply their precious drinking water and at ways in which improvements can be made at the source” (Dudley & Stolton, 2003, p. 10).

A big issue in Ecuador is the usage of channels, estuaries and lakes as recipients of all wastewater, without any treatment before being dumped. This issue is especially critical near the largest cities, Guayaquil, Quito, and Cuenca. The problem is further aggravated by “accelerated and chaotic urban growth, a result of internal migration flows, and the proliferation of marginal areas characterized by few, if any, services of sewerage and piped potable water, leads to the free disposal of waste water near dwellings, the formation of infectious foci, and the usage of water not always suitable for human consumption” (Da Ros, 1995, p. 26, my translation).

4.1 Payment for Watershed Services

In recent years, more policy makers, urban planners, and scholars have been realizing the potential of paying for watershed management, a subset of Payment for Ecosystem Services (PES). Most often, this takes the form of designating, or identifying, protected areas that are critical to preserving the watershed. Forest protected areas are especially important in its relationship to downstream drinking water. Besides providing downstream urban areas with higher quality water, protected areas already serve key roles in conserving biodiversity, providing recreational uses, among others. Protected areas can serve as a bridge between more diverse groups of stakeholders, for example the benefits for biodiversity and water supply. There is also a

much greater potential for innovation and participation by NGOs or other private entities in managing protected forests (for instance, FONAG), and as a PES scheme, can help pay for the management of the protected areas through the charging of water coming from the protected areas. As well as having water companies (in the case of Quito, EMAAP-Q) pay for the management of the protected areas. It is also an important potential alternate option for governments that do not have sufficient funds to manage the protected areas, may look to market mechanisms as a possible remedy, with either, for instance, transfers between different levels of governments, or possibly the introduction of private buyers.

Watershed management relies on the evolving view of the possibilities and limitations of technology. It has become the mentality in most cities that it does not matter how badly polluted the raw water is before they treat it, because they have the capacity and capability to do so. This is a misguided notion that fails to consider the added costs of this approach. Cities have been overlooking these two principles, which more and more water providers are turning to as potential alternatives: “(1) The public’s water supply should be reasonably clean to begin with.(2) Forests and natural lands are critical to the quantity and quality of water supplies” (Ernst, Gullick, & Nixon, 2004, p. 2). Watershed management can also reduce treatment costs, thus providing concrete savings to municipalities in their quest to deliver high-quality water to its residents (Bernard, 2013). Not only is watershed management a more practical solution, it also is far less costly. The money that would be directed to purifying water for drinking could then instead be used to treat wastewater (Plan Ecuador, n.d.).

The purpose of watershed management is to protect and maintain the quality of water as it travels through the watershed to where it will be distributed and consumed. The idea of

watershed management speaks to the concept of prevention versus control, or treatment after the fact. The principle is based on the fact that taking preemptive measures to prevent a problem from occurring in the first place is much more cost-effective and an overall sounder policy. The control approach, meanwhile, aims to minimize the negative effects of pollution after it already exists. It is easier to deal with something that was never there in the first place, than try to clean it up after the fact. In regards to watershed management, this means preventing the pollution from occurring in the first place, as opposed to just dealing with it afterwards and making it (hopefully) safe to drink by employing different treatments to filter and purify the water. The benefits of the preventative method cannot be overemphasized: preservation and health of the ecosystems (and all those who live and interact with it) the water passes through; cheaper production costs to make the water suitable for drinking; reduction in energy consumption associated with water treatment, among others. Ecological services provided include water filtration, flow regulation, flood control, erosion control, among others.

The services provided by watersheds are unfortunately often overlooked by commercial markets. In particular, the loss of (healthy) watersheds from land use changes means a quantifiable decrease in the services they provide, namely purification of water supplies and flow regulation. This leads to increases in water prices and the need for more treatment of the water before it can be safe for drinking (Budds & McGranahan, 2003).

4.2 Water Funds

Water Funds have been initiated in Latin America as a way to protect the watersheds that supply cities with their water. Water Funds are typically a collaboration between different

stakeholders who benefit from the water supply, for instance hydroelectric companies, breweries, and municipal water companies. These Water Funds, through the protection of watersheds, also provide many additional benefits of ecosystem services and conservation (Kauffman, 2013). They are funds pooled from different stakeholders that are invested by an independent financial institution; the revenue from these investments are used to pay for sustainable watershed management practices and conservation uses. These payments typically are to private landowners or communities in return for engaging in sustainable land use that minimizes impact on the watershed (Kauffman, 2013). Following the establishment of the first Water Fund, FONAG, in Quito, many more have been developed in the region based on FONAG's model (Ortiz, 2011a; The Nature Conservancy, 2014)

4.2.1 The case of Quito: FONAG

FONAG, or Fondo del agua was started in April, 1998 was a collaboration between NGOs The Nature Conservancy (TNC) and Fundación Antisana, and USAID with the goal/purpose of funding conservation projects and overall better management of the watersheds that supply water to Quito (Echavarría, 2001). FONAG is an independently run and managed organization, though it is funded by entities including the Quito municipal water company, EMAAP-Q the Electric Power Company of Quito, The Nature Conservancy (TNC), the brewery company Cervecería Andina S.A. (which is now Cervecería Nacional S.A.), among others.

Much of Quito's water comes from within protected areas, specifically Cotopaxi and Sumaco National Park, and the Ecological Reserves of Antisana, Cayambe-Coca, and Los Ilinizas.

Together, these protected areas make up the Condor Bioreserve (Echavarria, 2001). Its efforts were focused on the Oyacachi, Papallacta, Antisana, and Upper Guayallabamba river basins. Threats within these river basins are of particular concern and the need to mitigate them for FONAG. It focuses its efforts on a multi-stakeholder approach that brings in all the relevant actors, including the various communities, governmental agencies, and NGOs, to create sustainable and equitable outcome to shared water resources (Postel & Thompson, Jr, 2005).

These designated protected areas are not free from threats, along these river basins live various communities that both rely on the water to survive, as well as contribute to its degradation. Of particular focus for projects and programs by FONAG are those communities living in these protected areas, which include the Oyacachi river basin, the Pita and San Pedro sub-basins of the Guayallabamba, and the Papallacta river basin (Chiramba, Mogoi, Martinez, & Jones, 2011). The trustee fund FONAG only uses revenue yields from interests and investments—as opposed to capital—to pay for the various programs and projects it carries out. It was initially set up is funded by several one-time as well as yearly contributions and a 1% tax on water bills in Quito.

Only 20% of the institutional budget is allocated for sub-basin projects; 80% of FONAG's investment funds are used to develop and improve these projects. It improved the management of over 65,000 hectares of river-basin watersheds, and supplying upstream inhabitants including farmers with support financial support for protecting the watershed (Echavarria, 2001).

Among the more common practices of those living in these watersheds is using water for crops and irrigation, and the upper *páramo* plains for livestock grazing, cattle raising, and wood harvesting. A lack of management and poor enforcement has caused erosion, contamination, and

overall degradation of water quality as it flows downstream. Sedimentation (due to erosion) impacts the efficiency of hydroelectricity generation, and critical habitats for fish and wildlife.

One of the biggest challenges to watershed management and protection in Ecuador is the government itself. Both inefficient and frequently changing, foreign aid sources have historically been skeptical of awarding financing for development projects to the governments themselves of developing nations. This is what led to the privatization of Guayaquil's water system in the 90s. For Quito, even with the establishment of an independent fund to finance watershed protection projects, it was still crucial to include, and receive support from, government officials, especially the Mayor of Quito. (Echavarria, 2001). Overall, the approach taken by FONAG has emphasized a multi-stakeholder approach involving all relevant actors, with a strong emphasis on training, education and watershed security enforcement. However, the extent to which the public is aware and informed of FONAG and its conservation and protection efforts are uncertain. An important development with the establishment of the protected land areas was the inclusion of nonstate actors in stewardship practices. The Condor Bioreserve, comprised of several smaller protected reserves and national parks, covers close to 750,000 hectares of land. It was created by Fundacion Antisana (FUNAN) and Fundacion Ecologica Rumicocha (FER), with support from The Nature Conservancy (TNC). In particular, the project came after two earlier conservation projects that established (or just improved?) efficient management of the Cayambe-Coca Ecological Reserve, which also involved various stakeholders to improve the management of the Reserve. These projects also emphasized local community involvement in the partnerships and educating citizens about the importance of watershed protection and the benefits it provides .

4.2.2 Protecting the Guayas river basin?

The city of Guayaquil, and the Guayas province more generally, has not taken an active role in implementing innovative solutions like watershed management to help provide its residents with potable water. Though there does exist a governmental agency CEDEGE (Comisión de estudios para el desarrollo de la Cuenca del río Guayas y la península de Santa Elena), established to deal with the issue of pollution in the river basin, it has been unable to make positive impacts due to its lack of funding and resources. Also, due to the size of the watershed, and the number of different landowners and stakeholders that exist throughout it, it has many different governmental bodies are involved in its management and oversight (Barker, Cabrera, & Rodríguez, 2009).

Despite the potential difficulties in finding an effective management strategy for such a large watershed, Guayaquil would benefit enormously from watershed management. Guayaquil must currently put considerable time, effort, and resources to treating the raw water that reaches the filtration plant, due to pollution from upstream agricultural runoff as well as wastewater, sedimentation, and other types of pollution (Frederick, Southgate, & Lach, 1999). Moreover, as represented by the success and expansion of such programs in other parts of the country, and its expansion to other parts of the region as well, indicates that it is an effective program, most likely due to in large part its collaboration with many non-governmental bodies. As it is not a governmental agency, such as CEDEGE, it is not constrained to the similar budgetary restraints and political maneuvering that often occurs in the country. Moreover, it works directly with the communities, eliminating the need of strong, central oversight to help with implementation. The Funds in the other watersheds have been based on the premise that the

user pays, and as such, would still require cooperation of Interagua, who would likely need to levy a new tax, or merely direct a portion of its revenue, towards this water fund. Based on its high purification costs, however, it seems likely that Interagua would agree to participate.

Interagua spends \$1 million per month on making the water safe to drink with a filtration process as well as chemicals, due to the high turbidity of the water that arrives at the plant, La Toma (El Comercio, 2007). Thus, this plan is feasible with real potential to have a positive impact on the water quality and overall health of the ecosystem of the Guayas river watershed.

Chapter 5: Conclusion

5.1 Development and clean water: Towards a sustainable future

The central role of access to clean drinking water to sustainable development has been emphasized by many actors at the international level. The UN focuses on this topic and works to address its widespread implications and applicability. The question is this: Who should provide it: the government, or the private sector?

There has been many questions as to what is the most effective, or best practice, to supply water to populations, and in particular those living in poor communities in the Global South (Terhorst, Olivera, & Dwinell, 2013). Due to the failure of public utilities to accomplish this, private sector involvement was seen as a viable alternative.

As many scholars have pointed out, however, the debates about public versus private sector provision of water and sanitation services mistakenly focuses on who is providing the service. A better framework would look at the issue as one of regulatory effectiveness.

The capacity of the government in Ecuador to carry out these functions has been limited, and varying over time. This has led to uncertainty, discontinuity and the systemic exclusion of poor populations from the official water networks. The first and foremost obligation is to provide increased coverage of higher quality water and sanitation services and to achieve that end requires the presence of good regulation and enforcement, regardless of whether the water and sanitation service provider is publicly or privately owned. Thus, watershed management is also crucial to maintaining a sound city water-management plan. Its flexibility and openness to innovative alliances between various stakeholders creates great potential for this policy measure. What is the likelihood of this type of plan being established for the Guayas river watershed?

There are instances that point to the potential for such a management scheme, from CEDEGE, to the fact that some of the watershed is already part of protected areas, and the fact that watershed management has already been successful in the capital Quito and other parts of the country.

As discussed, the issue of equitable access to clear water in Ecuador's urban areas is one of governance and oversight not scarcity. There is enough water for all; it's a matter of political will, economic incentives, strong governance and oversight. Can Ecuador meet this challenge? With the renewed focus on watershed management, there are some hopeful signs. Ultimately it will come down to the political will to see it through.

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