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**The Worth of Water:
A Look at the Water Scarcity Crisis and
the Perceptions of the Basic Need of
Water in South Africa**

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Abstract

Not every South African has access to the same amount of water, quality of water, or infrastructure for water. A core question for me during this research was if and how attitudes towards water and daily water consumption vary along with different levels of water accessibility. Considering both the emerging global water scarcity crisis and the legacy of Apartheid, evident by the institutional inequalities in South Africa, I unravel the current system of water allocation. First, I discuss the definition of water scarcity, the politics surrounding water allocation, and South Africa's Constitutional right to water as well as the Free Basic Water Policy of 2001, which illustrates how the South African government understands its responsibility to provide water to all SA citizens. Second, I analyze the role of water as both a commodity and a human necessity, and discuss the economic perspective, humanitarian perspective, and an alternative perspective about water allocation. Lastly, I present my research in Mowbray and Lwandle, which are two areas in Cape Town that differ substantially in terms of family income, race and access to water. Based on a total of 37 interviews, participant observation, and considering the local discourse, I argue that a person's level of water accessibility influences how he/she understands the value of water and his/her willingness to save water. I found that people who currently consume the least amount of water reported that they are willing to save the most, which goes against a core economic principle of the law of diminishing marginal utility. In addition, I discuss the boundaries of ethnography and the efficacy of my research methods.

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Introduction

“There is too much yard,” Zola said as she explained the two-hour walk to and from the closest “umthombo,” or waterhole, in her village growing up in the Eastern Cape. Zola is from Ngxakolo, a village that is located near Qumbu in the Eastern Cape where there is no infrastructure with regards to water distribution. Zola, a twenty-two year old, is a recent college graduate and the receptionist at the Lwandle Migrant Labour Museum. I had the pleasure of working with her at the museum during my semester abroad and I appreciate her perspective regarding water availability and accessibility, especially because her experiences have varied based on her home village.

Zola started fetching water when she was thirteen years old and she explained how she traveled to the waterhole with her sister everyday before school to fill two buckets. They carried the buckets on top of their heads and the fifty liters of water that was retrieved was divided amongst six people in her family¹. Zola moved to Cape Town to attend college and has since remained in the Western Cape although her family continues to live in Ngxakolo in the Eastern Cape.

In the Western Cape, Zola works at the Lwandle Migrant Labour Museum, which has indoor plumbing and water facets, and lives in a suburb of Cape Town where similarly, water is accessible and convenient. She highlighted one major change in the culture of the Western Cape by saying, “We don’t think of other things that want water... [we] only think of ourselves.” One theme throughout our conversation was that although the water itself is free from the natural waterhole or river, there is a high opportunity cost of water due to the time and energy involved in the process of obtaining it which could be used elsewhere.

Although I was unable to travel to Zola's home village in the Eastern Cape, Zola's story highlights the way in which accessibility to water, which is skewed in South Africa, directly shapes how one understands, consumes, and appreciates water. During my semester abroad, I had the opportunity to intern at the Lwandle Migrant Labour museum, thirty miles outside of Cape Town, and establish relationships with my co-workers. Although I conducted my ethnographic research in the Western Cape, in areas where water was constantly accessible through household taps or public taps, these words resonated with me.

This thesis evolved due to an interest in studying people's perceptions of water. It was not until the past few years that I began to recognize the importance of water in my life. The summer after my freshman year at Trinity, I joined my father for a month on the Appalachian Trail. Despite my status as a "section hiker," I earned some respect and experience when I made it to my five hundred mile mark. In my last week of hiking, I had developed some sense of personal limits: I carried containers with a capacity to hold two liters of water, and drank about 6-8 liters a day depending on the terrain, hours hiked and weather. My dad and I formed the habit of finishing up our water intentionally as we approached the next water source, to keep hydrated and carry freshwater for the next segment of hiking before there was another stream. It was a very hot day, during my last week of hiking when I had already finished all the water on my back before I approach the side trail and walked 0.6 miles towards the water source specified on the trail map. When I found nothing but a dry stream, I then understood how essential water is for survival.

My experience of lacking water, even just for a few more miles until I reached the next water source, changed the way I think about water. Before hiking, I consumed water daily without questioning or exploring how the water got there because water has always been present and available for me, and the notion of always having clean drinking water nearby seems normal. As a middle class American, clean water has been an integral, yet unrecognized, part of my everyday life and I took water for granted regardless of its presentation, whether it is sold in bottles, flows through public bathroom sinks or through my own kitchen and bathroom pipes. My experience of collecting, purifying and carrying my own water while hiking taught me to appreciate this water as a product that has been processed.

Based on my new found awareness of the significance of water, I began to question how other people from less developed countries see water, treat water, and use water. It was not until I came across the documentary “Blue Gold: World Water Wars,” about two years later, that I would rekindle my interest in water, through the lens of the water scarcity crisis. This documentary was extremely influential, discussing the desertification of the world, the potential conflict areas that will arise due to a lack of water, and the corporate privatization of water, which this documentary claims is both a root of the problem and exacerbates the current situation of water scarcity. This documentary sparked an interest in understanding about the current water allocation system and how the modern capitalist system shapes people’s access to and value of water.

During the fall semester of my junior year, I decided to pursue perceptions of water among rural South Africans as my Anthropology honors thesis topic. This topic

appealed to me because it united my interests in anthropology, economics, and the environment. I attempted to plan how I might do research in Cape Town, South Africa which was a location that I chose prior to developing my thesis topic and hoped would work out to have an interesting narrative on water, in some form. Before I studied abroad in Cape Town in the spring of 2013, I had little knowledge regarding the access, availability and consumption of water in the country of South Africa. One friend told me that she went on a trip to South Africa in high school, but ended up spending the significant portion of that trip in the hospital because she drank contaminated water. I had the preconceived notion that much of the available water was unsafe in South Africa, and was eager to study the local understanding and appreciation of water as well as my own reaction to change from my experience of taking clean water availability for granted in the United States. I prepared to study water during my semester abroad by signing up for a course called Natural Resource Economics and reading articles about water systems and water scarcity in South Africa.

After the seventeen-hour flight from New York City to Johannesburg on January 22nd, 2013, we had another two hour flight to our final destination and this is when I found that my presumptions and expectations about water in South Africa were false. While I was on this flight, I found myself sitting next to a twenty-four year old Afrikaans man who was traveling home to Cape Town after doing an internship in California. I asked him all the questions that I thought were important, about what to do while I was in Cape Town -- which skydiving company is best, which beaches he would recommend I go to, which restaurants and bars are the most fun -- then I thought to ask him about water. I asked if I could drink the tap water, and he responded, “yeah, in fact, I bet our

water is cleaner than yours.” His response really surprised me. Was the system for providing clean drinking water actually better in South Africa than in the United States? This claim contradicted what I had thought about water in South Africa, based on the experience of my friend getting sick from drinking contaminated water on her trip. This man’s point of view, that water is cleaner in South Africa than in the United States, may suggest his position of privilege or, perhaps, it indicates his ignorance about the South Africans who lack potable water. I second-guessed my research topic once I arrived in Cape Town, where I enjoyed clean, accessible water every day.

However, as I familiarized myself with South African culture, history, and the surrounding areas, I realized that the level of water accessibility and quality of water in Cape Town was not the norm throughout the country. I quickly understood the correlation between race, proximity to the urban center of Cape Town, and the level of water accessibility. Cape Town residents enjoy safe and reliable access to water through household taps and indoor plumbing. In contrast, residents in townships outside of Cape Town, like Lwandle, have access to water through public taps, which are free to use, and use communal bathrooms. In the Eastern Cape, where Zola is from, people in villages must walk long distances to obtain untreated water from waterholes and rivers. This dualism, between people who have water readily accessible and people who do not, explains the contradiction between the experience of my friend and the claim of my informant on the plane.

Historical Background

South Africa's history, including race relations, gender relations and current politics, as well as the shift from apartheid to democracy in 1994, has shaped the governmental policies regarding water. It is essential to provide context before I further explain my study and ethnographic research. My experiences living in Cape Town for five months allowed me to develop an understanding of the local culture, government system, and economy. Part of my education during my semester consisted of learning about the legacy of apartheid. During the apartheid era (1948-1994), the South African government enforced a strict social hierarchy based on race and labeled individuals as "white," "Indian," "colored," or "black" on required government-issued identification cards. "White" people were privileged through the system, enjoying economic and political advantages. At the other end of the spectrum was the "black" population, which was deprived of the same rights. The government limited the ability for non-white South Africans to live in certain areas, have certain jobs, attend certain establishments or events, and resulted with those categorized as "white" in the positions of power and in the highest socioeconomic class. When apartheid ended in 1994, Nelson Mandela became president, the government switched to a democracy, a Constitution was written with equal rights for all citizens regardless of race, and, incredibly, there was no civil war. There were programs, such as the Truth and Reconciliation Commission, which were designed to heal and rebuild South Africa as a strong nation.

The end of apartheid not only marked the transition of the South African government structure, but also led to a new set of priorities for government officials. Before 1994, the apartheid system benefitted those classified as "white" while

marginalizing the others, and left millions of South Africans, primarily “black,” without an adequate supply of water. Immediately after the new South African government came to power in 1994, it was estimated that 12 million people, a third of the total population or about 33% of people, did not have access to safe water (Muller 2008, p. 69). To put this statistic in perspective, according to the Millennium Development Goals Report: 2012, 11% of the global population was without access to improved sources of drinking water (United Nations).

In my personal experiences, I found that it is easy to recognize differences in the social and economic position of people given their race. Camp’s Bay, an affluent area in Cape Town with well-known beaches and nightclubs, is almost entirely white. The townships are located outside of the city, in areas where the majority of the residents are black, which is a product of the “resettlement” laws enforced during the 1960s and 1970s. The displacement of minorities limits social mobility despite the Constitution’s claims of racial equality. The infrastructure in the townships is lacking with no paved roads or running water, and people live in shacks rather than houses, getting worse educations, and struggling to find jobs. Even if residents of townships do find a job, the majority of employment opportunities are within surrounding cities, requiring workers to pay for travel.

The shift from apartheid to post-apartheid South Africa in 1994 was a shift from an exclusively white government to one that became racially diverse. This was a crucial change, but has not changed the lives of those categorized as “black,” who continue to be marginalized and live in many of the same conditions. Those categorized as “white” continue to have a higher socioeconomic status and power in many of the public and

private institutions. On the other hand, “blacks,” “coloreds,” and “Indians” are now legally eligible to vote and own land in previously known “white” areas, but face some degree of social and economic immobility, as they do not have the same opportunities and connections as their “white” counterparts. Apartheid’s lasting effects can be seen in how skin color continues to be a source of discrimination.

Concerning my focus on water allocation, it is no surprise that the “white” population has access to water, whereas there are many “black,” “Indian,” and “colored” people without it. In Camp’s Bay, the whites have indoor plumbing without question, whereas in Khayelitsha, a large township outside of Cape Town, the residents who are primarily “black” use communal taps for their water supply and have access to one toilet per row of six to eight homes.

The Meaning of Water

Prior to my semester abroad, I had begun a list of possible research questions for my thesis: What value is attributed to water in South African culture and how does water accessibility reflect power relations? What is the current water management system and does it work effectively? How is water distributed in South Africa and what causes the varying degrees of accessibility? How do perspectives differ among people of varying social class and who “suffers from water” (Ennis-McMillan 2001)? How does limited accessibility to water affect an individual? What practical and technical issues cause the failure of the current system, and what underlying social issues dictate water allocation? These research questions helped to focus my thoughts and process, and were instrumental in narrowing my thesis topic.

In South Africa, I experienced a relatively sheltered lifestyle in a nice living situation and I interacted with people that had few concerns about water. After my second week in Cape Town, I wrote my advisor an email expressing my concern for my research subject, “I was a bit discouraged not to notice any major differences in water use or the perception of water, where we are drinking the tap water and showering everyday, etc.” He suggested that my first step was to check my questions against reality. My questions turned out to be more informational than topical, and I recognized the need to choose a specific project that I could study through empirical research during my short time abroad, that would provide insight into my initial questions. My research question became more solidified in the next few weeks, through recognizing the opportunities provided through both my Natural Resource Economics course and my internship in Lwandle to further develop my research.

Ultimately, my main goal in this research project is to unpack the meaning of water to South Africans and understand how accessibility to water effects the perception of basic needs water. With more information about how people think about water, I hoped to gain a fresh perspective beyond the economics of the water scarcity crisis. My hypothesis was that one’s perception of water is subjective and more influenced by social and cultural norms than fundamental needs, but ultimately depends on the individual’s level of water accessibility. In my research I focused on Mowbray, an area in Cape Town that had household water taps and indoor plumbing, and Lwandle, a township forty-five minutes outside of the city that had public taps outside. My research is insightful and thought provoking, although much of my fieldwork introduces new questions about how to interpret and analyze the informant responses.

Throughout this thesis, I aim to provide a basis through which one can holistically comprehend the various elements of the water scarcity crisis. Before I analyze my ethnographic research findings, I discuss the historical context of South Africa and lasting influence of Apartheid, the existing literature about the emerging water scarcity crisis, government policy regarding water rights, and the current as well as alternative approaches to allocate water. I also interpret the definition of value and relate it to water and the process of water distribution, both in the economic sense and the sociological sense of the word meaning “concepts of what is ultimately good, proper, or desirable in human life” (Graeber 2001, p. 2).

I focus on the power dynamic in South Africa, which corresponds to the populations with and without access to water. South Africa is a dualistic society, where one population has a readily accessible supply of water in the home, in the urban city areas, and the other, vastly black and living in townships, experiences an environment with fewer conveniences and the consequences of water inaccessibility. I aim to understand how water is allocated in South Africa and analyze this system through the context of the water scarcity crisis, as a socio-environmental construct.

My ethnographic findings challenge fundamental assumptions of economics, such as the law of diminishing marginal utility. This law claims that the marginal utility, or level of satisfaction of each of additional unit, gained from consumption of a good or service eventually declines (Acceptable 2009). Based on this law, one would believe that the people with the highest level of water consumption would be willing to save the most. However in my research, Mowbray residents who currently consume the least amount of water are willing to save the most.

Anthropological Methods

As I conducted my ethnographic research, I questioned many aspects of my research and encountered unexpected challenges. As an undergraduate anthropology major, I am familiar with anthropological methods through coursework but had little experience conducting ethnographic fieldwork. In South Africa, there were times that I felt uncomfortable in my role as the anthropologist, especially in Lwandle. Conducting ethnographic research in Lwandle is one of the few experiences in my life where I have truly been the minority or the “outsider.” People questioned my presence in the township and I was extremely aware of my status as the only white person as well as my inability to community with the residents due to the language barrier. In both Mowbray and Lwandle, I thought of different ways to ask questions about water and other information that would be useful as I continued to conduct fieldwork. An alarming realization that I had was that I did not necessarily believe my informants when they estimated their level of daily water consumption. I questioned whether the informants’ estimations matched up those informants’ actual consumption level. Further, I questioned if and how my data could be interpreted to represent the true reality.

Throughout the process of conducting research, I explored the boundaries of my methodology and came to understand that anthropologists can never be sure that their findings reflect reality. In other words, anthropologists discover partial truths. In the conclusion, I revisit this point, considering the efficacy of anthropological methods and explaining “the crisis of representation” (Marcus & Fischer 1999, p. 7).

Chapter One: Power and Accessibility

What is water scarcity?

Although water is seemingly abundant, the issue of water scarcity that arises from a combination of factors on the supply side, meaning a physical deficiency of water on a global scale, and on the demand side, meaning there is water but it is not being used optimally. There is an approximate volume of 1.4 billion km³ of water on Earth; only 2.5% is fresh water (Shiklomanov 1993, p. 4). And, the majority of this freshwater is locked into polar icecaps or too far underground that it is inaccessible. An analogy to further illustrate this minute percentage of fresh water is that, “if all the earth’s water were stored in a 5-liter container, available fresh water would not quite fill a teaspoon” (Marq de Villiers 2001, p. 36). This is not a new problem we are facing because the volume of water on the Earth has not changed over time; however, rapid population growth and wasteful consumption drive the amount of water per capita down. Water is a complicated resource to measure because there is a dynamic cycle of rain, runoff and evaporation, but freshwater resources are indeed limited. Desalination, or converting seawater to drinkable water, is a costly process that is not a viable solution to the lack of freshwater, nor is it foreseen to solve the crisis within any short-term timeframe.

Scientists have attempted to measure the scarcity of water using various algorithms. Frank R. Rijsberman (2006), the previous Director General of the International Water Management Institute, references the Falkenmark water stress indicator as the most widely used measure of water scarcity. Considering both the level of water availability and the population of a country, the measurement is used to calculate the status of that

country with regards to their level of water security. Based on estimates of water requirements in the household, agricultural, industrial and energy sectors, along with the needs of the environment, 1700 m³ of renewable water resources per person per year is the threshold to have a sustainable water supply. Thus, according to this model, any country whose renewable water supplies cannot sustain this figure experiences water stress. If a country's water supply is below 1000 m³ per person per year, that country experiences water scarcity. Further, if a county's water supply is below 500 m³ per person per year, then that country experiences absolute water scarcity (Rijsberman 2006). To put this into context, in 2000, the people in Southern Africa were estimated to have between one thousand and two thousand cubic meters per year. For South Africa, it is estimated that the water supply will be below 1000 m³/capita/year before 2050 (Rijsberman 2006, p. 4).

Research on water use indicates that the population of the United States and Canada use the most water, with an average of 1693 m³ per person per year, and the continent with a population resulting in the least amount of water used is Africa, estimated with an average of 244 m³ per person per year (Marq de Villiers 2001, p. 18). In his book, *Water: The Fate of Our Most Precious Resource*, Marq de Villiers states, "In Africa alone, by these measures, 300 million people, one-third of the continent's population, already live under conditions of scarcity and this number will likely increase to more than a billion by 2025" (p. 23).

There is an alternative way to understand water scarcity, aside the Falkenmark indicator's categorization of a sustainable water supply, water scarcity, and absolute water scarcity. It is a holistic approach that places as much emphasis on the role of

humans as it does on nature. Water scarcity is not a natural disaster. Water scarcity is a socio-environmental disaster, meaning that if a person lacks an adequate supply of water, it is due to the physical absence of water in the area, or more likely, restricted access to water although there is enough. This relates to the political ecology perspective, which is further explained in the following chapter. Rjisberman discusses the limitations of the Falkenmark water stress indicator and emphasizes that this measurement lacks universality. There are many variables to consider when determining whether an area is water scarce and the Falkenmark indicator only takes into account a country's population and physical water supply. Below, Rjisberman outlines three major considerations to understand the categorization and reality of water scarce areas.

Whether an area qualifies as 'water scarce' depends on, for instance: a) how people's needs are defined – and whether the needs of the environment, the water for nature, are taken into account in that definition; b) what fraction of the resource is made available, or could be made available, to satisfy these needs; c) the temporal and spatial scales used to define scarcity.

(p. 1)

One paper that influenced how I approached my research of the water scarcity crisis, which provides another aspect of the issue, was that of medical anthropologist Michael Ennis-McMillan. Through his work, he demonstrates how anthropological field work can be beneficial in analyzing the implications of water scarcity. Ennis-McMillan (2001) studied the significance of water in Mexico City, explaining, "during the field work, I particularly explored the meaning of drinking water in daily life and how the local discourse on suffering was associated with disruptions in water consumption" (p. 373). His ethnographic research illustrates the importance of having a sufficient water

supply, and delves into the biological and social challenges if basic water requirements are not met. Ennis-McMillian's approach is very appealing to me because it enforces the idea that water scarcity does not have a universal definition or scale. I believe that the study of water scarcity cannot take place on a large scale with quantitative data alone, but must have a component that focuses on the local and personal level.

South African Government Policy

The number of South Africans lacking access to potable water is due in part to the country's status as one of the "driest" countries in the world in terms of the freshwater supply and a physical shortage of water, but also due to the lack of effective government action and management. Although geographical location and weather conditions play a role in the issue of water inaccessibility, one cannot blame nature alone. California, Utah and Nevada, are also classified as dry areas but Americans in these states do not have the same severe water accessibility issues that South Africans face (Postel 2000). This illustrates that water management is the major source of the problem of water inaccessibility, and ultimately water scarcity.

Despite the shift from the apartheid government to the democratic government under the African National Congress (ANC) in 1994, the current imbalance regarding who has access to water is one example of the existing disparities among whites and blacks. Post-apartheid, the ANC governed with the intention of cultivating a less segregated society, eliminating the politics of race, lessening economic gaps between the black and whites and decentralizing government to become more local. South Africa began implementing policies to address water scarcity and allocation problems during the

mid-1990s, as the post-apartheid government recognized the need to ensure that water would be strategically used and distributed throughout the country to prevent further problems.

Rose Francis (2006) highlights the legacy of apartheid as the major factor contributing to the highly skewed distribution of water. During apartheid, there was little emphasis on equity regarding water resources and also very little emphasis on water conservation. In 1998, according to Francis, the country's water supply was thought to be sufficient for only thirty more years if the population had continued the same water use patterns that were developed during apartheid (p. 6). She breaks down her research and focuses on the relationship between apartheid and the current resource inequities, the transition to a democracy and the developmental policies of the new government, the post-apartheid legal changes in water law and policy, and lastly an analysis of the Constitutional right to water.

The legal action the South African government has taken is one major component of this thesis. I examine the sequential legislation and policies, which have shaped water distribution nowadays and whether they are effective. Early in Nelson Mandela's presidency, the 1994 White Paper titled "Water- An Indivisible Asset," which was released by the Department of Water Affairs and Forestry, outlined acceptable levels of water accessibility and sanitation. According to the Department of Water Affairs (2013), "A basic water supply service currently only provides the *minimum* volume of water required for direct consumption, for food preparation and for personal hygiene. It is not adequate for a full, healthy and productive life. This minimum volume was set in the 1994 White Paper, based on international guidelines as 25 liters per person per day" (p.

9). In comparison to the figures provided by the Falkenmore water stress indicator, 25 liters per person per day seems negligible, even at a level of extreme scarcity. The conversion for one cubic meter to a liter is 1:1000, and so the calculation for the daily water supply per person in a country with water scarcity is approximately 2,740 liters and that of a person in a country with extreme water scarcity is approximately 1,370 liters. The reason behind these drastically different figures is because the Falkenmore Indicator relates to water in food production, the industrial sector, as well as environmental requirements and domestic purposes. The political understanding of the minimum amount of water required is based on domestic purposes alone, which is a much narrower picture. As Rijsberman states, “on average, it takes roughly seventy times more water to grow food for people than people use directly for domestic purposes” (Rijsberman 2006, p. 4). With that being said, the inaccessibility to clean water for any basic domestic needs is not caused by water scarcity, rather the inadequate water management and allocation scheme.

In section 27 of the South African Constitution, every citizen is entitled to a sufficient supply of water, which is a right that is lacking from many other constitutions including that of the United States. The Free Basic Water Policy, which was implemented as part of the 2001 Strategic Framework for Water Services, works to enforce that everyone’s right to water is met. The new decentralized government structure allows for the local governments to introduce and operate the Free Basic Water Policy appropriately if it were necessary, a process which is overseen by the national government to ensure that everyone receives a sufficient amount of water.

Implications of the Free Basic Water Policy

The basic need of water as 6000 liters per household per month has evolved into a piece of conventional wisdom in post-apartheid South Africa, as noted in the legal system and specifically, the Free Basic Water Policy. However, this figure is not easily configured and applicable to every individual. The standard amount deemed the basic need for water is often questioned and criticized. A more general study based in California by Peter Gleick, one of the world's leading water specialists, states that it takes six liters per person per day for survival. Gleick (1996) determines that 50 liters per person is the daily minimum amount of water needed to sustain an adequate standard of living. In his research, basic water requirements were divided into four categories: water for drinking, hygiene, sanitation, and preparing food. Five liters per capita per day is needed for drinking, twenty liters per capita per day is needed for basic sanitation, 15 liters per capita per day for basic bathing, and lastly, ten liters per capita per day for basic food preparation (Gleick, 1996). The United Nations (2003) stated that the daily requirement for water is 20-50 liters, which implies that the need of water cannot be quantified precisely.

The South African government, Gleick, and the UN based their estimations of a daily water requirement on biological needs, health standards, and adequate living conditions. This leads to further questions about what defines the biological need for water. This should not have much discrepancy in theory, but in reality this figure may vary depending on the cultural context and health standards. A sufficient amount of water for biological needs could mean a lot of things, varying from an amount which allows one to live comfortably to an amount that allows one to merely survive.

The National Water Policy Review, released by the Department of Water Affairs and last updated in July of 2013, reaffirms that, “everybody in South Africa has the right to a basic amount of water and a basic sanitation service that is affordable. With this right comes a responsibility – not to abuse the right to free basic services and to pay for services where these are provided over and above a basic service” (p. 8) These legal interventions demonstrate the shift in priorities; the current ANC focuses on the entire South African population rather than favoring one group over another. This excerpt in particular illustrates the hopes that the population does not abuse the free supply of basic water and alludes to the problems of funding and how the government handles the distribution of water.

Mike Muller, the Director General of the South African Department of Water Affairs and Forestry from 1997-2005, argues that the Free Basic Water policy plays an important role in promoting sustainability. Muller (2008) touches upon the criticisms of the policy, including errors of inclusion and exclusion, but advocates that one sees the big picture and recognizes the positive implications and outcomes of the legislation. He argues that the Free Basic Water policy not only serves to provide the basic necessity of water for all people but also to address social, environmental, and economic aspects of water management. The underlying reason for providing the Free Basic Water policy, Muller argues that the policy is meant to recognize that clean water sources are finite and to encourage water conservation. Muller’s defense in arguing for the Free Basic Water Policy relates to Francis’s point, that the apartheid system instilled water use patterns that cannot continue without dire consequences in the near future, although his argument also challenge’s Francis by suggesting that social justice is not the main driving force behind

the government policy.

Political Ecology of Water Scarcity

“It’s like we (people in the Western Cape) have more privilege to water than they (people in the Eastern Cape) do,” Tina said, a black co-worker from the museum who is from Cape Town but also familiar with regions in the Eastern Cape. Her point further inspired me to study the inequitable distribution of power and, specifically, the inequitable distribution of water.

Water scarcity in South Africa places water constraints on all sectors of the economy and personal consumption, although it is evident that the effects are perceived and felt unevenly throughout different populations. Anne Ferguson and Bill Derman (2008), professors at the Department of Anthropology at Michigan State University, conducted research “focusing on the social, political and policy dimensions of the water reform process, with the goal of examining the social and environmental consequences of such changes, if indeed any result from the reforms” (p. 278). Derman and Ferguson define the two dominant frameworks in understanding water issues: scarcity and economic value. This article focuses on how outcomes of environmental change often result in the poor and discriminated-against being hit the hardest, and the role of power relations in the process of water distribution. Ecosystems and social systems are often regarded as mutually constituted and although resource utilization may be ecologically degrading, it is socially profitable at the same time. (p. 283).

Conclusion

Overall, this chapter provides background on the existing literature of water scarcity, an overview of the system of water allocation in South Africa. In South Africa, it is evident that discrimination is institutionalized, through the geographical concentration of blacks” in townships and “whites” in the city center of Cape Town, who are more often than not occupying positions of authority and agency. The infrastructure for water circulation also reflects a systematic bias in favor of the urban, the financially comfortable and historically, the “white.” Government acknowledgement and action, in the form of the Free Basic Water Policy, is a step in the right direction, although I question the legally defined standard need of water as 25 liters per person per day. There is a discrepancy between how much water is required for one’s basic needs among current literature including Gleick, the UN, and the SA government, which led me to develop an interest in this question in my fieldwork as well.

Chapter Two: How to Approach Water Scarcity

In South Africa, like the western United States, water is scarce and the system of allocation not only involves a political aspect of the government's role to ensure that the right to water is met, but also complex social and environmental dimensions of water management. Understanding how the current allocation of water in South Africa operates and how it is a reflection of certain political, economic and social motives is critical in grasping and addressing the water scarcity crisis. Three crucial considerations that one must recognize as central to the question of water management are the economic model for business corporations, which dictates the process of providing clean water; the level of accessibility to all citizens, which is key to ensuring social justice; and the level of conservation, which is crucial for environmental sustainability in the future. In this chapter, I will analyze the implications of water being at once an economic good and a human right, and I frame the question of water allocation through the lenses of efficiency (achieving maximum productivity while using the least amount of energy or expense) and equity (the quality of being fair). I will outline both the current economic approach, which emphasizes firm profit-maximization, and the humanitarian approach, which emphasizes human rights and equality, in hopes of determining if these approaches are mutually exclusive.

The Current Economic Approach: Market Economy

Economics is “the science of how people deal with scarcity,” as referred to in *Economics for Dummies*, and so it can be inferred that it is the best discipline to manage and mitigate the emerging water scarcity crisis (Flynn 2011, p. 7). Traditionally,

economics is grounded in assumptions about rational expectations and focuses on a number of concepts, of which I will emphasize cost-benefit analysis. The neoclassical viewpoint focuses on economic efficiency as a primary goal in a society, and neoclassical micro economists often analyze prices in relation to resource allocation. Market based solutions are based on the optimization problem: the ultimate goal for private firms is to maximize profit, while the consumer aims to maximize their level of happiness or satisfaction, also known as their level of utility. Economists strategize to improve the level of efficiency within markets, which is a key factor in analyzing the role of economics in terms of water allocation. Along the same lines, there is the notion of endless growth within the economic and political system of capitalism and a cultural aversion to curtailing consumption. Despite the physical quantity of resources, neo-liberal economics maintain that there is a technological fix to scarcity and therefore we do not need to construct any radically different social habits. (Flynn 2011).

Water is categorized as a “natural monopoly”² and is not in the same league as a competitive market, although there is a strong emphasis on the degree of efficiency and profit gain for the firm. The notion of price is intrinsic to the discipline of economics; it is a standard through which economists grasp the worth of a good or service. As discussed in *Price Theory in Economics*, market goods have an “objective” value, which is reflected in that good’s price (Weber 2010, p. 26). Water pricing is an agent through which economists can exercise some control over the markets, in terms of affecting the quantity supplied and the quantity demanded. The act of reducing the quantity of a good or service through increasing the price is called “demand management.” (Weber 2010).

Although water is allocated through market institutions, there is no economic water market because it is unfeasible. In theory, a water market would assign value to water as a commodity (not only the cost of extraction), signal scarcity, and provide a structure to trade water; however in reality, I have found that it is impossible to assign exact value to water. An economic market for water would fail to operate because it would not meet any of the four necessary conditions: certainty, transferability, no externalities³ and sufficient competition. Thus the development of water markets is not a viable solution to the water scarcity crisis. The next section further explains why water does not fit into the economic model of the market.

Water, a Common Good

Although economics claims to be a practical discipline, water is not a “pure” economic good, or commodity, and therefore it does not fit into the quintessential economic model. Through mainstream economic theory, water is categorized as a common good. This means that it is a rival good⁴ as well as a non-excludable good⁵ (Weber 2010). The notion of being non-excludable forces one to recognize spillover effects, which refer to externalities, both positive and negative, of economic activity. The classic example is the effect of air pollution, which decreases the surrounding community’s quality of air. Similar to air, water is a resource that is available and consumed by everyone. The unclear methods of evaluating the cost of spill over effects from water pollution and excessive groundwater extraction present another issue that complicates the economic approach to the water scarcity crisis.

Although economics is a social science designed to manage scarce resources optimally, the discipline falls short in terms of providing concise methods to address the markets of good that are not classified as private or public. Due to water’s constant flow through natural processes and forms, the supply of water is difficult to determine and this influences the process of commoditization, which mandates that clean must be stationary, stored, and available at all times.

Good	<i>Excludable</i>	<i>Nonexcludable</i>
<i>Rival</i>	Private	Common
<i>Nonrival</i>	Club	Public

Table 1: Classification of Goods.

(Weber 2010, p. 24)

Since water is not a “pure” commodity, there is no universally accepted economic method to assign value to water. Robert Young (2005) discusses the significance of water policies and the complex methods of the valuation of water in economics. There are various methods to value water, depending on whether it is used as an input for the producer, an environmental public good, irrigation systems, or for industry and municipal uses. Young is confident that the discipline of economics is a useful tool for water management and calls attention to the normative branch of economics, called welfare economics, which can be used for policy recommendations. Despite Young’s optimism, there is still no clarity in how, or if, one can use the framework of the current market economy to allocate water both effectively and equitably.

Pricing Schemes

The ability to control the quantity of a good or service demanded through adjusting market prices seems intuitive, although in the context of water, pricing schemes are ineffective. There is currently a high fraction of people who refuse to pay for water under the current base-pricing scheme because they do not perceive water as a commodity. According to Smith and Hanson (2003), residents of Cape Town townships report that they refuse to pay for water for at least one of the following reasons: they are confused about bills, they feel a sense of injustice about the unequal services, they are dissatisfied with the water service, they feel as though water is a God given right, they cannot afford to pay for water, and/or they have poor customer relations.

Using economic jargon, the demand for water is inelastic, or in other words, an increase in unit price of water will have a very small impact on the quantity of water demanded. The demand management strategy, employed through price control, is thus a futile attempt to reduce water consumption and instead proves to be a policy tool to decrease welfare and collect taxes (Ward et al. 2007). This idea is explored by Steven Renzetti (1992), an economist in Canada, who studies how efficient pricing would influence the water market, and which economic pricing mode would maximize the number of people with access to freshwater. This study is based on the water supply in Vancouver; however Renzetti's findings are applicable to a general analysis of water pricing schemes. His conclusion is that changing the pricing system is not a viable solution for controlling the amount of water consumed or emphasizing equity within the system.

The way Renzetti structured his research and arrived at his conclusions illustrates how difficult it is to quantify and account for reality. Renzetti begins by considering the theoretical pricing models. Then he estimates the empirical demand and supply functions for the household, commercial and industrial sectors. Based on these estimations, he solves for the market-clearing price and quantity⁶ and lastly, Renzetti estimates the consumer surplus for each pricing scheme. The consumer surplus measures the area between the price that the consumer is willing to pay for a given quantity of water and the market price corresponding to that quantity of water. A positive consumer surplus is indicative of the level of welfare, given that people are willing to pay even more than the market price they are charged for water. Based on the consumer surplus, he then chooses the best pricing scheme in terms of maximizing welfare.

Renzetti concludes that a shift to efficient pricing would raise the total surplus by approximately 4%. This implies that changing the pricing scheme to reflect the scarcity of water is not capable of influencing the overall welfare of the population and hardly decreases the amount of water consumed. In a cost-benefit analysis it would not be worthwhile to spend the time nor the resources to change the current system because prices have little effect on welfare.

Within a broader context of water allocation in South Africa, Sampath, an economist and author of “Issues in Irrigation Pricing in Developing Countries,” focuses on an alternative way to price irrigation water. He argues that there should be an efficient pricing system that enables the cost of irrigation to be shared by the consumer and the producer, and the value of water should change depending on the season and the year. According to Sampath (1992), the flat rate pricing system is inefficient and does not

signal scarcity, however a shift to efficient pricing, involving various prices associated with water based on multiple variables including the costs of obtaining and distributing the water is also problematic. He argues that an efficient pricing scheme would have a high administrative cost, be difficult to understand, require subsidies to achieve agricultural goals, result in little rapport and confidence for consumers and lastly deviate for equity. Thus, he states that the government should play a prominent role in the allocation of water to redistribute water equitably, provide certainty to some extent with respect to the supply of water, gain the benefits of economies of scale⁷, and absorb the negative externalities that are most notably poverty and the environment (p. 967). This would be a new approach to pricing that is grounded in the relationship between the consumer and producer, but would also require government interaction.

The Humanitarian Approach

Economists studying water allocation often emphasize the inclusion of welfare into the equation; however, real issues cannot be easily translated into economic terms. Also, often the traditional economic framework is narrow in its optimization for the firm rather than the society as a whole. The humanitarian approach aims to promote human welfare through protecting South Africans' right to water as granted in the Constitution in this context. This is a more holistic outlook that recognizes a greater list of variables, including the underlying social issues and political motives that contribute to the inequities within the water allocation system. This approach might also appeal to economists who argue that it would be more costly not to provide the basic need of water to everyone, which would lead to costs of healthcare and social welfare.

Legal Dispute between the Economic and Humanitarian Approach

In order to show how the economic approach and the humanitarian approach apply to the situation in South Africa and how they have both been active in the dialogue about water allocation, I recall a legal case in Soweto. Within the water market, there is an increasing block tariff, meaning that the first block of water is free and subsequent water use results in a water bill. In the commercial and industrial sectors, there is an annual connection fee that covers the cost of having access to water but includes no cost associated with how much water is used. Historically, households had an identical system. While some are now transitioning to a metered water supply, which charges a constant unit price for each marginal increase in water consumption, this is a phenomenon that is primarily seen in richer, urban communities. In other areas, which do not have a metered water supply, there is no incentive to conserve water.

The majority of blacks in South Africa live in townships: impoverished areas outside of cities that are synonymous with shantytowns. Townships commonly have a very high population density; the nuclear family unit alone does not occupy residences, rather they are occupied by extended family members as well. In townships, residents cannot afford to pay for water and there is no infrastructure to allow for indoor plumbing. Due to these conditions, there are public taps that provide water for multiple families. These taps, although necessary for human rights, are controversial because they are sponsored by tax revenue. This is the crux of the matter, illustrating the distinct ideologies of humanitarians and economists about how to solve the problem of water scarcity and the tension between them. The humanitarians support this anti-capitalist

approach, which redistributes wealth through taxation and classifies all South Africans in impoverished areas as worthy of receiving government support. The economic standpoint, on the other hand, is concerned with the extent to which the government collects taxes as well as who is worthy of receiving benefits through tax money.

In 2004, the government began prepaid meters as a cost recovery strategy and an effort to reduce the water demand in the townships (Dugard 2010). A cost recovery strategy aims to ensure that the service of providing water is sustainable and will not lead to large sums of debt. The Johannesburg Water Ltd. installed pre-paid water meters in Soweto, an area of Johannesburg, formerly a township that is still predominately black. Following the guidelines of the Free Basic Water Policy, the water taps provided 6,000 liters of water free of charge each month to each household. This amount of water did not suffice, and the taps typically ran dry after the twelfth day of the month. In order for families to get the tap flowing again, one would need to pay. Below is a passage that illustrates the conditions resulting from the metered water supply, in the context of the Free Basic Water Policy guidelines.

With average households of thirteen or more people, many of whom are People Living with HIV/AIDS (PLWHA), the standard FBW is insufficient to meet basic needs. The FBW is allocated per stand (as opposed to per individual), so is biased to smaller households, e.g. white families with fewer children who moved to Johannesburg's proliferating gated communities. As a result, Phiri residents must make undignified and unhealthy choices about basic hygiene and health. For example, careers of PLWHA must choose between bathing their patients or washing their soiled bed sheets, and parents must choose between providing their children with body washes before they go to school or flushing the toilet.

(Dugard 2010, p. 176)

Mazibuko vs. the City of Johannesburg

The inefficient supply of water in the townships led to the *Mazibuko and Others vs. the City of Johannesburg and Others* legal case. On March 27th, 2005, there was a fire in one of the backyard shacks in Phiri, a poor suburb of Soweto (Dugard 2010, p. 176). Due to the lack of water provided through the taps, the people had to resort to throwing buckets of ditch water and they could not prevent the shack from burning down. There were two children in the shack at the time of the fire. This tragedy highlights the violation of the right to a basic amount of water and was a powerful example of what can happen when the right to water is violated. The property owner, Vusimuzi Paki, along with four other residents, took issue with the government to address the prepaid water meters and automatic shut offs. The case was opened in 2006 and closed in 2008. The verdict, which deemed the prepaid water meters unlawful, demonstrates how providing water to all South Africans, as promised in the constitution, is a priority over maximizing profit. However, the fact that it took a legal case, fought out over two years, shows that there is no collective set of principles for South Africans when it comes to water allocation. (Dugard 2010).

The Paris-based company Suez, which took over South Africa's retail water restructuring in 2001, demonstrates one example of this economic approach. At that point, there was a very large population with an inadequate supply of water within the townships. Suez did not focus on this problem; instead of a goal to maximize welfare, the company aimed to maximize profit. From 2001 until 2006, Suez employed a cost-recovery strategy⁸ that involved water cut-offs as a major tool for decreasing business costs. By cutting off the water supply after the allotted amount of water was consumed,

the company saved money while shifting the costs of additional water to the communities using the taps. This approach is related to “demand-side management,” a theory that postulates that increase prices decrease consumption and is referred to previously in the chapter. (Dugard 2010).

An opposing view to that of Suez is the rights-based approach, or as I have referred to the alternative perspective, the humanitarian approach. One example of this is the applicants’ case in the *Mazibuko and Others vs. the City of Johannesburg and Others*, which argues that prepaid meters are a violation of an individual’s right to water, health, dignity and justice. The humanitarian case won, and the use of the taps with prepaid meters were deemed unconstitutional which illustrates that the government does value the safety of people.

The Tragedy of the Commons versus Spaceship Earth

Water has traditionally been treated as a natural right-- a right arising out of human nature, historical conditions, basic needs or notions of justice. Water rights as natural rights do not originate with the state; they evolve out of a given ecological context of human existence.

(Shiva 2002, p. 20)

Rather than seeing water as a commodity, water can be seen as a natural right, which is a viewpoint that aligns with that of the commons. When discussing methods of natural resource allocation, the concept of the commons is important to acknowledge and understand. The commons refers to a resource that belongs to or affects the whole community, although over time, there has been a shift away from the commons to privately owned property. The commons can refer to an area within the atmosphere,

bioregions, or at the local level. One famous theory, which introduced me to the concept of the commons and advocates for private property, is that of Garret Hardin. His paper, “The Tragedy of the Commons,” was published in 1968 and states that man, as a rational actor motivated by self-interest, will deplete common resources given the opportunity. This has been an influential piece of work, which is referenced widely today and is just as applicable, if not more, now as it was forty years ago. Hardin’s argument serves as a justification to privatize land, water, and other natural resources in order to protect them from overuse. It also relates to the idea of the “cowboy economy,” which refers to the irresponsible, exploitive, romantic, and violent behavior that would typically associated with open economies.

Despite the transition from the commons to private property on the local level, we are facing challenges such as water scarcity, climate change, and excessive resource extraction. These issues arise on the global scale. An alternative view to Hardin’s hypothesis of the tragedy of the commons is that of Kenneth Boulding, an economist and peace activist among other things. Boulding wrote the first chapter of *Environmental Quality in a Growing Economy*, “The Economics of the Coming Spaceship Earth” in 1966, which highlighted the problematic attitude towards consumption.

Earth has become a single spaceship, without unlimited reservoirs of anything, either for extraction or for pollution, and in which, therefore, man must find his place in a cyclical ecological system, which is capable of continuous reproduction of material form even though it cannot escape having inputs of energy.

(Boulding 1966, p. 7)

This notion supports Eisenstein’s argument that the fundamental purpose of government should be to care for the commons, rather than protect the interest of private

property as it does now. The transition back from private property to the commons could serve as a catalyst for a shift towards an alternative economy in which all enjoy equal access to water.

Conclusion

The underlying problem of the water allocation system relates to the various perceptions of water itself. For many, water is a commodity that can be bought and sold, and this is the current economic approach. As I have outlined, there are shortcomings in the current water allocation system, which is not only evident in the number of people lacking access to freshwater in South Africa but also in the traditional economic model and mindset. In order to find a feasible solution to optimally allocate water in terms of efficiency and equity, it is important not only to consider how this structure operates, but also consider alternatives. Recently, people have been consciously shifting to see water as a finite resource and there has been an increase in the awareness of environmental problems. It is necessary to adapt our theoretical frameworks to accommodate the limited supply of water as well as other natural resources. Through changing our culture and mentality, to better appreciate Earth's nature resources, it is possible to shift from a mindset of "the tragedy of the commons" to that of "Spaceship Earth."

Chapter Three: Ethnographic Research

1. How much water do you use daily? Please provide an estimate
2. What do you consider your basic needs for water? What is essential that you use water for?
3. What proportion of your daily water use is used for your basic needs?
4. What do you use the most water for? How do you prioritize water use?
5. Would a limit of 25 liters a day affect your lifestyle? If so, how?
6. If the price of water doubled, how would you react?
7. Are you aware of water scarcity issues in South Africa?

I used this list of questions to understand if and how the informant responses vary depending on their level of water accessibility. In Mowbray, there is water accessible in the households, and in Lwandle, there are public taps.

Mowbray

The first informant group was that of Mowbray, a southern suburb of Cape Town, where I lived during my semester abroad. Upon arrival, my fellow students and I were advised that it was not the best neighborhood due to the relatively high level of crime and lower socioeconomic status. As I became familiar with my surroundings, I picked up on Mowbray's features: there was a Shop Rite that provided lower quality food at cheaper prices, a minibus station which is the dominant form of transportation for the low to middle class, and multiple street vendors with fruit, candy and other household items. In other suburbs, for example, Rondebosch, there were less people along the sidewalks, a mall with more up-scale stores, and a Pick n' Pay and a Woolworths, which were higher quality and more expensive grocery stores.

Methodology

I was offered the opportunity to explore the perception of water among Mowbray residents through my Natural Resource Economics course at the University of Cape Town and the support of my professor. A fellow classmate and I collaboratively wrote a paper titled, “Impressions of Basic Needs Water: An Exploration of the Impressions of Basic Needs Water in the Working Class Neighborhoods of Cape Town,” for an open-ended assignment in the course. The project was submitted for ethics clearance and approved by the director of the Research Unit in Behavioral Economics and Neuroeconomics at University of Cape Town, and we began interviews once we received verbal consent. The connection to UCT was extremely instrumental in gaining access to the population. Mowbray residents were familiar with this institution, which was about one mile away, and I believe that there would be more apprehension or resistance to our study had we mentioned that we were conducting this project for Trinity College, in the United States. Having a level of familiarity with the University of Cape Town was beneficial because Mowbray residents would be hesitant to take participate in an interview if they did not understand where the study was based or where the information would be used.

My partner and I collected data over a four-week period, observing the local discourse on water as well as conducting 26 interviews. The majority of interviews took place at the Golden Arrow bus stop on Durban Road in Mowbray. We chose this location after our attempt to interview people on the sidewalks of the Main Road, outside of the local grocery store Shop Rite. On the sidewalk outside of Shop Rite, trying to interview people was a daunting process and largely unsuccessful as people were either in a rush or

unwilling to speak to us. Although that afternoon was stressful, I learned more about the importance of connecting to informants, and how taking that first step to begin a project is a learning process. After walking back to our apartment building that day, we noted that there was a group of people standing around on Durban Road waiting for the bus. We changed our tactic, aware that the bus stop provided us with an opportunity to ask people with free time, at least until the bus came, to speak to us.

Our list of questions was designed to understand how each person values, prioritizes and consumes water. After the first time conducting interviews, we carried around an empty five-liter jug as a reference for informants to base their daily water consumption estimates on. After introducing ourselves, our research project at the University of Cape Town, and receiving the informant's verbal consent, we asked the list of questions. My research partner and I interviewed Mowbray residents during the late mornings and early afternoons as many people were taking the bus to work in the city center. The interviews were conducted individually, although we went to the bus stop together, as instructed by our professor, to support each other if any safety issues or other concerns arose. We carried notebooks to jot down the informants' answers to our questions and we also noted each informant's gender, race and approximate age to gain a more holistic understanding of the data. Before interviewing, my partner and I determined that we could classify anyone who appeared to be under 30 years old as young, between 30 and 50 as middle aged, and over 50 as old.

Most people, despite my worries, were receptive and willing to answer some questions, if only for five to ten minutes, before the bus arrived. We chose to stand by the bus stop because we felt as though there was a greater chance that people waiting for

public transportation would agree to answer a few questions rather than soliciting people on the sidewalk. I personally conducted two in-depth interviews with informants, one of whom worked at my residential building and the other was a classmate from the University of Cape Town. With these interviews, I used the general questionnaire as a reference but allowed for more open-ended discussions. There were a range of informant answers, which allowed us to analyze the data in search of a model or structure to explain the informants' consumption and evaluation of water. Our professor assisted in compiling the data into tables and graphs.

Challenges

As I mentioned above, finding the appropriate location to conduct interviews was a challenge in Mowbray. There were also a few people whom we had trouble communicating with, since English was their second language, and that limited their understanding of our questions and/or inhibited them from articulating their answers fully. It also influenced how we received their answers.

Lwandle

I expanded my research, independent of my classmate, to conduct interviews and participant observation in the township, Lwandle. This township is located in the Helderberg Basin region in the Western Cape, immediately off the highway, on a flat landscape near Sir Lowry's Pass, which passes through the Hottentots Holland Mountains. The township was originally established as a migrant worker settlement in 1958, inhabited by black men from the Eastern Cape who often worked in the canning

industry and as manual laborers in white urban area of Helderberg. During Apartheid, the men had limited rights and were subjected to firm government regulation. The Lwandle Migrant Labour Museum enabled me to understand the lives of the Lwandle residents, the meaning of home, and the strict pass laws enforced by the Apartheid government, which were designed to segregate and control the population of blacks. It was not until 1986 that the Pass Laws were relaxed, which enabled women and children to live in Lwandle and spurred the building of public institutions.

Methodology

I interned at the Lwandle Migrant Labour Museum every Friday from 9:00 a.m. - 4:00 p.m. It was a relatively boring job; I worked by myself in the back room dusting off old pictures and artifacts, making inventory lists, and organizing what was stored away. The most important part of my internship was that it gave me the opportunity to get out of Cape Town, which felt like a European city. Lwandle is about twenty-five miles outside of Cape Town, and as the driver hired through the Trinity-in-Cape Town program told me on my first day, “townships are not integrated.” Immediately after we arrived at in Lwandle on the first day of work, I understood.

Aside from the director of the museum who was Afrikaans, I was the only white person in the township. Never have I felt this uncomfortable for being white, or been so aware of the politics of my skin color. During lunch breaks, I would walk around the township accompanied by a co-worker from the museum. They instructed me to never walk around alone, and at times, seemed apprehensive to go with me. When I told my co-workers at the museum about my interest in studying the perceptions of water and talking

to Lwandle residents, the assistant director pointed at a young boy around six years old who was playing in the area behind the museum and laughed as he said, “I feel comfortable with you interviewing people of this size.” The assistant director’s joke shed light on his concerns for my safety as a white person.

As I walked around, especially the first time, I was painfully aware that I was the only white person surrounded by black people, which was a bit unnerving given South Africa’s history of white oppression. People would look at me out of curiosity and others would say words in Xhosa as I passed by, which my co-workers translated for me as “look, white girl.” It was not that I felt threatened directly, but there was a tangible level of discomfort as they were suspicious of my presence in the township and I wondered if these people resented me for what my race had done to theirs.

It was evident by my race that I was not Xhosa, but there were no visual indicators to distinguish me as American, so I presume that most people distinguished me as Afrikaans until they heard my accent, or lack thereof. At the Lwandle Migrant Labor Museum’s annual party, there were a few white people in attendance. One white man was sitting next to me during the presentation and while we were clapping for the introduction of the director, he made a quick comment to me in Afrikaans. I was taken off guard, as was he, when he realized that I was not Afrikaans, nor did I speak the language.

It was not until my last two weeks that I was able to interview residents of Lwandle. With the help of the museum staff, I was able to reach out and connect with this community and begin interviewing residents. With the help of the assistant director, whom I will refer to as Cebo, the receptionist, whom I will refer to as Zola, and another assistant, whom I will refer to as Tina, I conducted six interviews and my answers,

although brief, reveal a lot about how people think of water.

I used the same questionnaire and chose my informants randomly by walking through the main road and approaching people. Two co-workers from the museum agreed to translate for me; South Africa has eleven official languages, the primary language of the Lwandle residents is Xhosa. The other languages include: Afrikaans, Zulu, Swati, Tswana, Venda, Southern Ndebele, English, Tsonga, Sotho, and Northern Sotho. I communicated in English while living in Cape Town, but the lack of people who speak English in Lwandle demonstrates the varied levels of education between the residents in the city of Cape Town, who were typically bilingual, and those in the townships, who knew little to no English. I also noted the perceived gender, race, and age of the informants.

Challenges

Conducting ethnographic research in Lwandle was very difficult. I was limited in my ability to experience the culture because I was only in Lwandle one day a week, where I was assigned work in the museum from 8:30-4:00. As I learned very quickly, I could not conduct ethnographic research alone. I was unable to speak the same language, I was unfamiliar with the community and local norms, and I stood out like a sore thumb. It took time to establish relationships with my co-workers and gain their trust before they helped me with my research. Before I started my internship, I had imagined the process of interviewing Lwandle residents to be relatively simple and similar to my experience in Mowbray but I did not foresee the immense challenges in overcoming the language barrier or the weight of the politics of my skin color.

Chapter Four: Ethnographic Findings

Based on the interviews in Mowbray, my class partner and I were able to create data tables illustrating our findings with the help of our professor. The most interesting aspect of the research in Mowbray was the reported informants' willingness to save was greatest among those who reported to use the least amount of water. Based on the interviews in Lwandle, I noted the difference in the unit of measurement of water consumption in buckets rather than liters. One common finding among all six informants in Lwandle was that they only consumed the water that they deemed necessary.

Mowbray

My partner and I analyzed the data through organizing informant responses based on individual gender, age, and perceived race. We calculated the average estimated daily consumption of water, as well as the average daily need of water according to informant responses. Another key aspect of our analysis includes interpreting the specific answers that people had to other questions, in order to unpack the ways in which people think about water. Of the total 31 informants, 18 were male and 13 were female. The total sample group included two white people, eight colored people, and 21 black people. Lastly, the breakdown of the ages is as follows: 11 were young, 14 were middle-aged, and six were old.

Findings

Given the small sample size, there is not a large number of variables, which are statistically significant; however, with a greater sample, one might recognize more

patterns with informant responses. Below is Table 1, which illustrates that one's perception of daily water use does not vary systematically with age, gender or race (O'Brien et al. 2013, p. 4).

Table 1: Basic descriptions of reported water use in working class neighborhoods in Cape Town

		n	Reported current daily water use (liters)			Significance
Demographic			Average	Minimum	Maximum	
Age	Young (below 30)	11	48.2	10	125	
	Middle (30-50)	14	62.1	10	300	F=0.6203
	Old (Above 50)	6	33.3	10	55	P=0.5598
African race		21	55.7	10	300	t=-0.6132
Non-African race		10	43.0	20	125	p=0.5546
Gender	Male	18	52.8	10	300	t=-0.1405
	Female	13	50.0	10	125	p=0.0.8892

*Note that we did not identify any of the informants as transgendered.

The average perceived daily water use among the sample is 51.61 liters per day, although after omitting an outlier, this figure is 43.33. One third of the informants reported using 25 liters of water per day or less, and the remaining group reported using between 25 liters and 100 liters per day. There was one exception, a man whom reported that he uses 300 liters per day, of which he claimed that he needed 270 liters per day. When asked further about his water needs, he said that he valued his forty-five minute showers and was very apathetic towards the issue of water scarcity. When this outlier is omitted, the average perceived daily consumption of water of 43.33 liters per person,

which is a more accurate representation of data. The majority of people hesitated before they could answer this question, illustrating that they did not perceive water consumption as something easily measured. With that being said, the informants were able to report their water use reasonably well and all of the answers, omitting the estimation of 300 liters per day, seemed realistic. Given the legal standard for free basic water is 25 liters per person per day, our research shows that 35.5% of residents in the working class neighborhood of Mowbray fulfill their basic needs with the current policy. The government's basic need allocation is in line with the informants' reported water use in this study.

The second question was to get our informants' readily thinking about what they considered their basic needs for water. Every informant said drinking, and many also included bathing, cooking, laundry and washing dishes as needs. A middle-aged white woman mentioned gardening, and then was quick to change her mind and say that was not a "need." A middle-aged black woman responded "for my son" and this illustrates how she considered her main priority and need for water is to care for her child. Another middle-aged colored woman spoke about caring for her children as well, and how she must make formula using water. Another usual answer was "for my kidneys," which was the response of an older black male.

The third question, "what proportion of your daily water use is used for your basic needs?" was a bit tricky in terms of getting answers. For many of the people who did not initially understand what we were asking, we would rephrase the question by asking how much water they felt they wasted, if any. Out of the total 31 informants, 21 provided a percentage, signifying how much of their level of total water consumption they deemed

necessary. From these numbers, we extracted that on average, informants reported that 73 percent of total water use was for basic needs. Based on this, we can extract that the average perceived daily water need is 31.63 liters per person per day. This calculation is based the informants' average daily water consumption level of 43.33 liters.

The fourth question, about how people prioritize water, was to allow for an understanding of how people allocated their water personally. Most answers were familiar and expected, including drinking, showering, and cooking. Below is Table 2, which displays our findings of the most important category for water use, varied by gender and age (O'Brien et al. 2013, p. 6).

Table 2: Perceptions of the most important category of water use

	Frequency				
	Female	Male	Young	Middle aged	Old
Drinking	8	22	9	21	17
Cooking	8	-	9	-	-
Personal hygiene	54	28	64	29	17
Laundry	30	33	9	43	49
Don't know	-	17	9	7	17
	100	100	100	100	100
Significance	$\chi^2(4)=5.8798$			$\chi^2(8)=8.594$ 3	
	p = 0.208			p = 0.378	

According to our data, women are more capable of prioritizing their water needs than men. Although none of these findings are statistically significant, the data suggests that there are some gendered and age-sensitive aspects to water use. Women prioritize water use for cooking more than men, with 8 percent of women suggesting cooking and zero of the men. Similarly, 54 percent of women reported that personal hygiene was a

priority compared to 28 percent of men with this answer. The implication that women are more preoccupied with cooking and personal hygiene may be a result of cultural gender roles and expectations, which often portray women as homemakers and more susceptible to cultural ideals of beauty. Young informants reported personal hygiene more than double that of the middle-aged informants as well as three times that of the old informants. One possible explanation could be that younger people tend to be less involved with household concerns.

The fifth question, about how a limit of 25 liters a day would affect one's lifestyle, was not applicable to the 11 informants that reported their current daily water consumption as 25 liters or less. Of the remaining informants, there were mixed answers, although many people believed that they could do it if they were more conscious about preventing the waste of water. One middle aged colored male told me that "you can't live on 25 liters a day." He had distinguished himself as a plumber with some experience quantifying water use, and estimated his basic daily water use and need at 40 liters.

The sixth question, "if the price of water doubled, how would you react" was meant to get a sense of how the price of water influences the informants. One person said "I would go ballistic," and another said, "That is not possible." This is not very surprising in light of the recent increase in the price of electricity, which caused many people to react with anger and frustration.

The last question, about awareness of water scarcity issues in South Africa, was to determine if and how the answers of the informants who are conscious about water scarcity varied from those who are not. Twenty informants answered that they were aware of water scarcity issues and three said they were not aware at all, and the

remaining informants did not provide definitive answers, by saying they have heard of water scarcity issues but rarely think about them. One black middle-aged woman, who sold food at the minibus stop, rejected any notion of water scarcity and said that there is a lot of water. Another response was that of an older white woman, “I am a landscape architect so I am very aware that water is scarce in this country,” which illustrates that occupation can influence one’s knowledge about this issue. Another young black man explained how he has visited other countries in Africa and through these experiences he has gained an appreciation for water. The data below illustrates our findings regarding the effect of perceived water scarcity on water use characteristics (O’Brien et al. 2013, p. 7).

Table 3: The effect of perceived water scarcity on water use characteristics

	Water is			
Description	Water is scarce	not scarce	Don’t know	Significance
Avg. daily use	41	62	60	χ^2 (14)=0.5962 p = 0.558
% savings	33%	14%	7%	χ^2 (28)=0.6949 p = 0.508
Type of water use recognized as most basic (frequency)				
Drinking	33	54	0	
Cooking	27	15	0	
Personal hygiene	13	8	67	χ^2 (6)=8.6482
Laundry	27	23	33	p = 0.194

Willingness to save

Willingness to save is an economic term, which we calculated using the

difference between the estimated perceived daily consumption and the estimated perceived daily need of water. There was a wide range of the informants' willingness to save, from zero to 70 percent. A few informants replied that they needed all of the water they consumed, including one woman who reported using 100 liters a day. She was a black middle-aged woman who worked as a maid and considered the water she used towards cooking, washing clothes and showering as essential. Through talking to people about this question, the question of what constituted non-wasted versus wasted water arose.

Among the group with daily water use of 25 liters or less, the average willingness to save was 24 percent, and for the remaining informants with reported daily water use between 25 and 100 liters, the average willingness to save was 33 percent. Below is a graph that illustrates the relationship between the reported daily water use and the perceived daily water need (O'Brien et al. 2013, p. 5). What I found most interesting about this data is that the people who use currently use the least amount of water are willing to save the most.

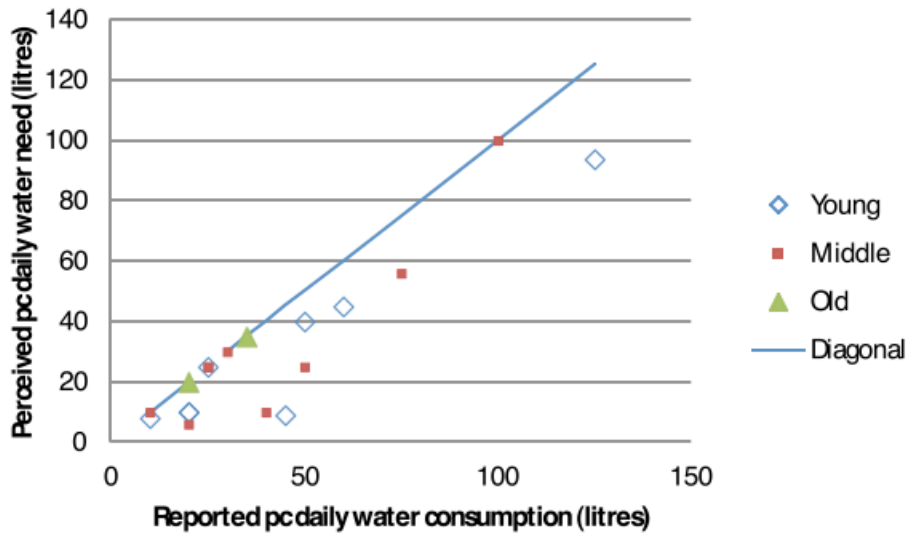


Figure 1: The relationship between reported daily water use and perceived daily water need (n=30)

This trend, if anything, contradicts traditional economic theory’s “law of diminishing marginal utility.” In other words, as an individual consumes increasingly more units of a good or service, the level of utility (personal satisfaction) for each additional unit decreases. This suggests that the additional, unnecessary units of water consumed by an individual are less valuable than the first, necessary units of water consumed. According to economic theory, the people who consume the most water should be most willing to save. Our findings, however, illustrate that the informants who reported using the least amount of water reported that they were willing to save the most, which is the opposite of what an economist would expect. This finding supports my argument that the economic framework alone is insufficient to assign value and understand how other people assign value to water. (Acceptable 2009).

Lwandle

In Lwandle, I was able to interview six residents with the help of my co-workers translating. All of the informants were black and coincidentally, I interviewed both a male and a female in each category: young, middle-aged, and older. The middle-aged man was a local storeowner and one of the old men owned a lunch place that sold chicken and chips, and the remaining informants were residents living near the museum. As an important reference, the standard size of the buckets in Lwandle, according to my informants, was capable of holding 20 liters of water.

Findings

Although this is a very small sample, the informant answers are revealing. It was more difficult to find people who were willing to be interviewed, although Zola and Cebo were there to greet them and explain my project in Xhosa. We walked along the road, which had a few businesses open and interviewed an older man, the owner of a stand selling chicken and chips, or French fries, that Cebo was familiar with as a customer. The owner was receptive, patient to wait for Cebo to translate everything, and friendly as he showed me his buckets of chopped potatoes in the back, explaining that he needs four to five buckets of water at all times. He showed me how he soaks the potatoes in water and told us that he fills up each bucket three-quarters of the way and dumps the water out to refill it with fresh water when it becomes too dirty, which he estimated to be four to five times a day. This was a new perspective, not just of a resident but of a business owner, which allowed me to grasp the variation of one's needs based on their daily activities and the large quantity of water consumed in the process of making chips alone.

One informant out of the total six informants, a young man, was able to provide an estimate of his daily water consumption as 60 liters a day. The remaining informants answered more ambiguously and used buckets as their standard measurement. For example, an older woman, who was inside of her home with the door open and was watching three young children, agreed to speak with us and stated that her family used one bucket of water as well as a smaller bucket that she fills when necessary, excluding the water for washing which she was unable to estimate. Another informant, a middle-aged woman told us that she uses 2-3 buckets a day and only goes to the tap when she must, and the young woman we interviewed said that she typically goes to the tap twice a day to fill up a bucket but she was unsure if her bucket held 10 liters or 15 liters of water. The middle-aged man who owned the store did not provide any estimates, and seemed confused by the question itself. Lastly, the most memorable interview was that with an older man, above eighty years old, who was affiliated with the Migrant Labour Museum as an informant for ethnographic work about the history of the community. He did not comprehend why I was asking any of these questions and after Zola asked him how much water he consumes in a day, he bluntly answered, “I use when I want it,” without any further explanation.

The interaction with the middle-aged storeowner, who yelled, “What company are you from?” as we approached was very insightful. Tina, who had been assigned to walk around with me that day, explained my project to him. She thought it was funny that he had assumed the white girl was part of a government agency and although she assured him that I had no agenda to decrease the availability of water or question his practices, he was hesitant to answer any questions or speak to us further. Tina later explained some

people feel threatened by the government's ability to control the water supply and potentially limit their accessibility further.

“None to Waste”

One overarching finding in my research in Lwandle was that all six informants reported that they need one hundred percent of the water they consume. This is a significant finding because although many of the informants from Lwandle were unable to quantify how much water they perceived to consume, all six were confident that they never wasted water. This can be understood through the words of the middle-aged woman, as Cebo translated, “since we have to fetch it with buckets, we have none to waste.”

This finding is somewhat unexpected because I had imagined that if the cost of water were free, people would be less attuned to saving water. Although there is no monetary cost of water, there is an opportunity cost, which represents the time and effort for one to go fill a bucket of water. Based on participant observation and interviews, I recognize that this opportunity cost is a main reason why Lwandle residents quantify water differently and may explain, according to my research, why Lwandle residents are more apt to waste less water.

Conclusion

Based on the data collected from the Mowbray residents, from a purely statistical analysis of the informants' estimations, the Free Basic Water Policy aligns with the basic needs of water. I could not provide the same statistics using the data from Lwandle

because the informants did not offer precise daily water consumption estimates. I experienced the difference between Mowbray and Lwandle, and not only observed varying levels of water accessibility but also varying levels of the standard of living and community resources. In Mowbray, houses have indoor plumbing and the majority of informants were bi-lingual whereas in Lwandle, there was one bathroom per row of houses and I needed a translator. The majority of the informants in Mowbray were black, which illustrates that there are improvement in the post-Apartheid government, although the community of Lwandle, as entirely black, signifies that there is still a long way to go in the path towards racial equality.

Although the average estimates on water consumption makes sense, individual perspectives about water, including the basic need and the amount consumed, are subjective. This finding, although it may be seemingly obvious, further problematizes the practice of allocating distinct amounts of water to a household or an individual. The amount of water one needs is based on a number of factors including their body, medical conditions, the level of physical exertion on a daily basis, the surrounding environment and temperature, and the ritualistic and normative use of water in terms of one's cultural sphere and occupation. Through science, biologists attempt to study the universal basic need of water, and I argue that this question is flawed. Science and theory are essential in our understanding of water management, but the significance of qualitative, empirical, and ethnographic research cannot be understated. Economics can provide a general structure and vision in terms of how water management should function optimally, but it does not provide reliable data about in terms of how the water allocation structure can feasibly operate. In other words, the process of achieving the objective, to provide

everyone with accessibility to an adequate supply of water, is just as important as the objective itself.

Chapter Five: Conclusion

The implications for the depletion of the global water supply include diminishing food supplies, human misery, famine, conflict, and war (De Villiers 2001, p. 41). And yet, the emerging water scarcity crisis is easily unacknowledged. Recently, I saw that one of my friends linked shared on Facebook with the caption, “I’m going to start drinking Evian!!!!”⁹ The link showed a commercial starting off with upbeat music and adults dancing on the sidewalk as they look at the reflection of their toddler selves. At the end of the commercial, there is an image of two Evian water bottles with the words “drink pure and natural,” and the commentator whispers, “Evian, live young.” Water has been commoditized not only as a product to quench one’s thirst, but to provide the cure to youthfulness and liveliness. This brings me full circle, in realizing the drastic range of impressions about water, which is dependent on a number of factors including availability. For those who lack the opportunity to access and consume freshwater on a daily basis, it is viewed as the main key to survival, whereas for those who live in urban areas, it is branded to symbolize a thriving, energetic, and youthful life.

Although South Africa does not experience a greater level of water scarcity than western parts of the United States, there are a great number of South Africans that lack access to freshwater. The distribution of water is related to the country’s historical context and, as I recognized, South Africa has a dualistic society. The first and most obvious distinction between the two groups is race, which is a lasting effect of Apartheid. As one may expect, those categorized as “white” have a greater level of accessibility to water than those categorized as “black,” who readily recognize the inequitable allocation of water.

The problem of the emerging water scarcity crisis is a local, national, and global problem. I argue that the current economic approach of water allocation, which recognizes water as a commodity, has environmental and societal consequences. South Africans at the margins of society lack the necessary infrastructure to access safe water, while those with a high socioeconomic status enjoy unlimited flows of safe water. In order to change the course of the water scarcity crisis as well as other issues associated with climate change, we must consider the core problems of the capitalism's theoretical foundations. We must transform our current mindset of the rational economic man, who acts out of self-interest, to a mindset where we understand humans to be in right relationship with each other and with the environment.

In order to address the emerging water scarcity crisis, it is necessary to use a multi-disciplinary approach. Ethnography can play a vital role to assess and assist in policy making, and possible solutions for the emerging water scarcity crisis, which will further the number of people who are without a sufficient supply of water. My research illustrates that people's perceptions of water, the basic need of water, and the daily level of consumption is not universal, nor is it predetermined. Without an understanding of how the current water allocation system works and how people perceive water as well as their use of water, it is very difficult to change current consumption patterns and provide the basic need of water to all South Africans.

Although my research focuses to South Africa, the underlying messages about the emerging water scarcity crisis, alternative approaches to water allocation systems, and perceptions of the basic need of water pertains to the global community. Water is a crucial part of all life that is often taken for granted and sold for profit, subject to a

capitalist system that is founded on the concept of endless growth. The current level of consumption is unsustainable, and now it is more important than ever to address the issue of water scarcity as a socio-environmental disaster.

The Efficacy of This Research Method

Through my ethnographic research, I learned about the impressions of the basic need of water among Mowbray residents and Lwandle residents and I also further learned about the role of the anthropologist. The process of solidifying my final research question, or “finding my brick” as a professor said, was surprisingly the most difficult stage in my research; it was a daunting, long, and ongoing process. Although my fieldwork was brief, living in Cape Town for five months, this experience taught me how ethnographic work requires one to find ways to connect to the local culture, get to know the people, and find a niche or point of entry into the social scene. My senior thesis has been the most influential and rewarding experience in my anthropology major, which has encompassed in some way, shape, or form all of my course work. Overall, I have gained a better understanding of how to conduct ethnographic fieldwork and well as how to understand ethnographic findings.

Throughout the process of doing this research, I tested the boundaries of ethnography and the efficacy of my methodology. Was I conducting research in an appropriate manner? How do I interpret these results? What really surprised me, which is less related to my data and more related to my ethnographic research process, was that I doubted the answers of my informants. As I worked on this project, I questioned the validity of the informants’ estimations and yearned for statistical data to compare their

perceived daily level of water consumption and their actual daily level of water consumption.

George Marcus, an anthropology professor at the University of California, and Michael Fischer, an anthropology professor at Massachusetts Institute of Technology (MIT), are the authors of *Anthropology as Cultural Critique: An Experimental Moment in the Human Sciences* (1999 [1986]). They challenge the existing paradigms and argue that this is a transitional state of human sciences. The authors highlight the “crisis of representation,” meaning the failure to describe social reality through unifying ideas across multiple fields, and also question what the role of anthropology and ethnography in this scenario (p. 9). The authors argue that contemporary crisis in ethnography has two characteristics: the attempt to construct common and historically comprehensive theories that apply to all fieldwork, and the realization that the concepts such as class, culture, and the social actor are becoming less pertinent in the process of conducting empirical research (p. 118).

This past March, I attended a lunch with John Comaroff, a professor in the Department of Anthropology and the Department of African Studies at Harvard University, where he emphasized the importance of distinguishing ethnographic facts from ethnographic assumptions. I was especially aware of this difference in my research, where I gathered ethnographic assumptions through speaking with my informants and recognize that I cannot provide ethnographic facts because I was unable to compare the informants’ answers to the informants’ behavior in reality. My research functions as a platform for further research to distinguish how perceived consumption differs from actual consumption.

Future Research

If allotted further time and resources, I would expand my research findings to include informants' perceptions and estimations of water consumption and needs, as well as the informants' actual water consumption and needs. This data would allow me to analyze the accuracy of peoples' estimations of their water use. I would conduct ethnographic research with two different groups, one from an urban area with accessibility and the other from a rural area with public taps, who would agree to document their actual water use. Ideally I would live with each community for a period of time, conduct interviews and enjoy in-depth conversations about water use and perceived needs, and gain more information including income and standard of living.

Endnotes

¹ The area where Zola is from can be described primarily as a black, Xhosa community; Xhosa is both an ethnic group and one of the eleven official languages of South Africa.

² A natural monopoly is when one industry controls and supplies the product to a large population

³ An externality is a consequence of an industrial activity that affects other groups and externalities, or side effects, are not represented in the cost of the goods/services involved in the industrial activity

⁴ A rival good, also referred to as a subtractable good, is a one that cannot be simultaneously consumed by more than one consumer.

⁵ A non-excludable good refers to one which is not possible to prevent other from using that good.

⁶ Market-clearing is synonymous with equilibrium and refers to the point at which the price and quantity balance out

⁷ By economies of scale, I refer to the idea that it is cheaper and more effective for the government to manage a big dam than it would be farmers with little dams

⁸ A cost recovery strategy aims to ensure that the service of providing water is sustainable and will not lead to large sums of debt.

⁹http://thestir.cafemom.com/baby/154591/new_evian_dancing_babies_commercial

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