

Access to Water, Sanitation, and Public Health Services among Urban Poor in Maceio,
Brazil

A thesis submitted in partial fulfillment of the requirements for the degree of Master of
Arts at George Mason University

By

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Spring Semester 2010
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DEDICATION

This is dedicated to Cidade Sorriso (Happy City).

ACKNOWLEDGEMENTS

I would like to thank the warm and welcoming people of Maceio, Brazil, nary a one of whom refused to answer my questions or give me a few minutes of their time. I hope that this study reaches out to those in a position to provide better access to basic needs to all of the deserving communities. You all have a right to the same chance at a healthy life as those who can afford such services. I will not forget to return to you, so that I may continue to educate and advocate for social justice. I extend my gratitude to my Brazilian hosts, the Peixoto Family, especially Amelia Regina Gomes Peixoto, without whom my fieldwork would have been much more challenging and limited, to Dr. Antonio Fernando Nunes Peixoto, without whom my access to knowledgeable experts would have been much harder, and to Maria de Lourdes Gomes Peixoto, whose special gift of communication helped me build trust within the communities. Thank you to Anna Fernanda Gomes Peixoto, for extending your hospitality to my daughter, when conditions forbade me to take her into the field, and to Grayson da Silva, for offering transportation and protection in neighborhoods that were a little less trusting.

Special thanks to Professor Hugh Gusterson, who has inspired and encouraged me from the beginning of my graduate studies, accepting the responsibility of academic advisor in strange territory. He showed me that I have tools to become an ethnographer and to use what I have learned to enrich my fieldwork experience, and write about it, in my own voice.

Much gratitude goes to Dr. Linda Seligmann, who introduced me to Latin America in a way that was well-rounded and eye-opening. She thoroughly prepared me for fieldwork and offering, through her expertise, advice on how to complete my research goals. Thank you to Dr. Curtiss Swezy, for allowing me to present on the topic of water scarcity and sanitation to his classes, giving me the opportunity to organize my fieldwork under his guidance, and, preliminarily, defend it to graduate peers. Thank you for constantly making yourself available to me to talk about vulnerable populations and how to navigate through participant observation in the third world.

I extend appreciation to Dr. Elvira Beracocchea and Dr. Kathryn Jacobsen, who generously gave their time and advice as part of my committees, as their expertise in the field of epidemiology has been invaluable. I am grateful to Drs. Lisa Pawloski and Lorraine Rudowski, whose enthusiasm and confidence in my public health work has propelled me forward. As an interdisciplinary student on a relatively lonely path, I am

humbled by the hospitality that I received from both the Global Health and Anthropology departments. I also thank Peter Chauss at The Water Project, for trusting me to be the organization's first intern, giving me the green light to use my practicum to learn, write and educate in a way that would enhance both of our goals. To Charles Milling and the MAIS Department, my advisor, committee members and academic mentors: your encouragement, support and guidance gave me the unique freedom to design an individualized curriculum about a topic that is not only timely, but about which I am passionate. Special thanks to Allison Widmann, who extended her time to help me organize my data.

Finally, heartfelt thanks goes to my family, especially my devoted husband, Jeff Snyder, whom I love for absorbing the financial sacrifices that were necessary for me to return to school, full-time. Your willingness to take on the extra duties at home, while I traveled far and wide to gather data, was immeasurable. Thank you to my mother, who traveled numerous times during my thesis preparation, to our home, to spend time with the kids and encourage my work. I gratefully embrace my giving children, Eden and Grace, whose patience during my courses and fieldwork have made this thesis possible. It is my unconditional hope that this research, along with that of my colleagues, will make this chaotic world a cleaner, healthier and more equitable place for my daughters to grow as strong women, as providing mothers, and as vocal warriors for the less fortunate. I am proud of you both, always.

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ABSTRACT

ACCESS TO WATER, SANITATION, AND PUBLIC HEALTH SERVICES AMONG URBAN POOR IN MACEIO, BRAZIL

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George Mason University, 2010

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Access to water, sanitation, and public health services is a key indicator of quality of life, and these resources are greatly limited for the urban poor in Maceio, Brazil. Maceio, the capital of Alagoas state, is an environment rich in natural resources and culture. A sharp rise in population, new construction, and globalized business have made a marked impact on the city, since its founding in 1815. Despite development, the urban poor struggle to advance, unable to afford the new standards of modern living, including finding the means of accumulating income, the challenges of retaining good health, and seeking quality access to basic needs. Never designed for its current population, Maceio's original infrastructure is limited, and its ability to provide services to the entire community is severely strained.

This field study, based on field research in 2008 and 2009, examines the type of access impoverished citizens have to resources in urban areas of Maceio looking at three critical resources: water, sanitation and healthcare. The thesis investigates whether lack

of access to clean water, sanitation, and efficient health care led to population vulnerabilities to, in particular, waterborne and hygiene-related diseases, and what level of care was available to those affected by disease

Using data gathering, primarily through interviews and participant observation, I was able to determine the proximal access to resources and services to the poor, and through these indicators, make connections between that access and the occurrence of disease in the population. Although the study is meant to be anthropological rather than epidemiological, this observation of the “diseases of poverty” interprets various diseases as both widespread in the studied population, and a product of social inequality.

The imbalance of access uncovered during my fieldwork illuminates the growing concern in public health that unnecessary suffering and premature death, typically among the poor, still exists in modern Brazil. Inequality among those who greatly need services is rampant, yet the developing nation concentrates its expenditures on alternate priorities.

1. Introduction

Far from the popular nightlife of Recife, the coastal city of Maceio, Brazil, the capital of Alagoas state, is a rising tourism destination known for its quiet beaches and reef snorkeling. A photo of the Maceio coast can be seen in Figure 1.1. With a year-round tropical climate and an environment dense with vegetation and rainforest, both residents and visitors alike enjoy Maceio's consistent temperatures and beautiful scenery.



**Figure 1.1. Maceio Coastline
(Snyder 2009).**

Although only about 197 square miles, Maceio has a population of approximately 896,965 people (IBGE 2009), with the majority living in urban areas, including many who have migrated to the city with the hope of job opportunities in the capital city of Alagoas. José Cícero Soares de Almeida, the city's current mayor, oversees 53 boroughs or districts, which are home to a varied constituency ranging from unemployed poor to business-owning elite. Maceio, like other developing cities in Northeast Brazil, has seen many changes since its founding in 1815. Once a village set up around a sugar mill in the early 1600s, Maceio later became home to a trade port and a regional center for handicraft and festivals (IBGE 2009). The city attracts people from varying racial and ethnic groups, age strata and regions, making it socioeconomically diverse. As seen in the photo at Figure 1.2., Maceio's culture is a study in contrasts.

As one drives from the airport to a hotel, to the beach, or to the countryside, the changes in Maceio's rural and urban texture catch the eye.¹ Lush sugar plantations and abundant coconut groves border every area that is not covered by water. Wooden and plastic one-room favelas² along the outskirts of the city, where fisherman both live and sell their catch, are only blocks away from gated multi-level concrete homes in fruit-tree dense suburbs. Newly constructed high-rise office buildings overlook the dilapidated ruins of old concrete churches, and armed guards stand sentinel outside imperious government buildings while crime runs rampant in the darker alleys. Looming statues of regal leaders, once symbols of hope, rise above parks filled with the homeless, and well-dressed businessmen rush past unkempt women and children begging on the streets.



Figure 1.2. Buildings in City Center: old, new and unfinished (Snyder 2009).

Wal-Mart and McDonald's chain stores lend proof that global corporations have made their way to Maceio, even while street peddlers and pedi-carts shuffle along the streets, selling less costly merchandise outside of the modern buildings. There are signs that investment has faltered, as numerous abandoned construction projects are marked with handwritten banners announcing that they have run out of money, and the initial rush of foreigners seeking to invest in the beachfront has subsided, leaving behind boarded-up mansions and partially-developed land. See Figure 1.3.

Unfortunately, Maceio has not been the lucrative investment developers were promised, mainly because the city's infrastructure cannot keep up with growth. Figure 1.4 shows that Maceio experienced a 42.6% increase in population from 1991 to 2007, This kind of steady growth also characterizes the entire state of Alagoas and the nation of

Brazil. Increasing population can indicate change in reproduction and migration, the latter of which is thought to be the main reason for growth in Maceio due to its concentration of jobs as the state capital.



Figure 1.3. Partially-developed land
(Snyder 2008).³

Never designed for its current population, Maceio's utility infrastructure was built decades ago with limited capacity for growth for energy, water, and sanitation. Earlier population growth projections have been exceeded for municipal systems such as water and sanitation, which are strained past capacity. Funding for expansion is scarce and assistance for both construction and repair is limited.

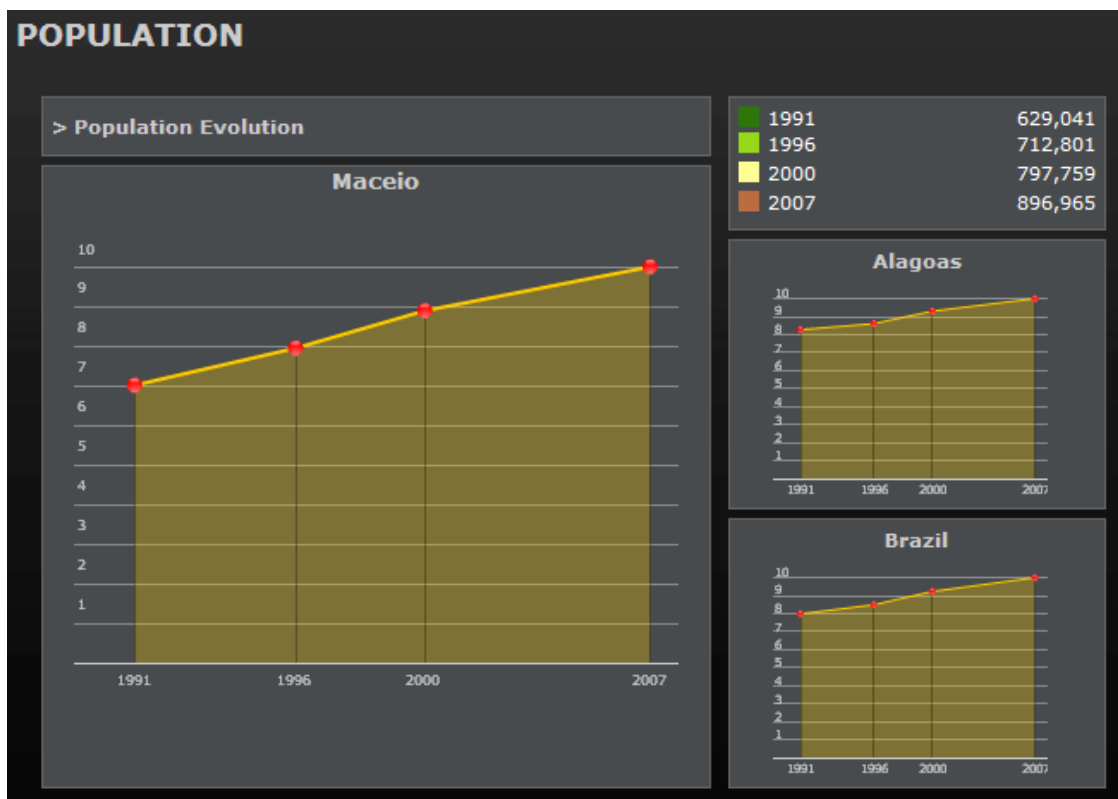


Figure 1.4. Population Evolution in Maceio (IBGE 2009).⁴

Many of Brazil's roadways between cities are two-lane highways, often impassable during seasons of rain and flooding, inhibiting the needed flow of merchandise, parts and supplies (Taliani 2006, 14). Continuous air conditioning within corporate offices, hospitals, schools and homes can be both energy and cost prohibitive, and portions of the city and suburbs regularly lose power. Investors often prefer the more developed planning of Brazil's mega-cities such as Rio de Janeiro or São Paulo, but those cities also have infrastructure issues.

Approximately 58% of Maceio's citizens live below the poverty line (see Figure

1.5.), meaning their households do not meet Brazil's federal minimum wage income. This makes local cooperative investment unlikely. Coupled with frequent strikes by public services, such as transportation, education and healthcare, the lack of local investment leaves a cloud of uncertainty over the city's growth potential.

MACEIO MAP OF POVERTY AND INEQUALITY		
Description	Amount	Unit
Incidence of Poverty	58.37	%
Lower Limit of the Incidence of Poverty	46.63	%
Upper Limit of the Incidence of Poverty	70.12	%
Poverty Incidence Subjective	57.63	%
Lower Limit of Subjective Poverty Incidence	48.81	%
Upper Poverty Incidence Subjective	66.45	%
Gini Index	0.52	%
Lower Limit of the Gini Index	0.50	%
Upper Limit of the Gini Index	0.54	%
Source: IBGE Census 2000 and Expenditure Survey – POF 2002–2003		
Note: The estimated consumption for the generation of these indicators was obtained using the method of estimation of small areas by the authors.		
Elbers Lanjouw and Lanjouw (2002).		

Figure 1.5. Maceio Map of Poverty and Inequality (IBGE 2009).⁵

Brazilians, proud of their celebrities, soccer teams, Carnival and rainforests, are on a local level, more concerned with their own day-to-day survival than the impending promise of the city. Brazil is burdened with the growth of poverty and the inequitable distribution of its resources nationwide (Prasad 2008, 131). “The wealthiest 1 percent of the population earns a higher percentage of total income than the poorest 20 percent, and

almost the same as the poorest 50 percent,” and the wealthiest 10 percent “earn half of the income in Brazil” (Prasad 2008, 132). Jobs are difficult to find, and the pay is low. Labor in coconut groves and sugar cane is dangerous and isolating (Taliani 2006, 14), and living and working within the city is expensive and competitive. The wealthy and the poor often live side by side on the numerous city blocks, and having a little money can make a big difference in opportunity (Levine and Crocitti 1999, 402).⁶ Nationalistic and loyal (Skidmore 1999, 197), Brazil’s people are rich in religious traditions; they are wealthy in spirit but poor in personal resources. The gap between the poor and the wealthy is wide, the standard cost of living is high, resources are not equitable, and social programs are not sustainable.



Figure 1.6. Expressions of discontent with the government. Translation: Election is a farce! Do not vote! Live the Revolution!
(Snyder 2009).⁷

Throughout the years, Brazilians have become outspoken about the shortcomings of government and vigilant about prosecuting corruption⁸ (see Figure 1.6.). Sometimes,

they take their discontent to the streets in the form of social movements (Skidmore 1999, 197).

Despite various social problems, Brazil is a formidable rising player in the global market and is consistently thrusting itself in the world eye through agriculture, trade, and, most recently, as the winning bidder for the 2016 Olympic Games. Brazilian economists describe Brazil's current economic status as readying for a new growth cycle, marked by women entering the workforce, low absenteeism among workers, a low reliance on exports and continuous GDP growth since the early 1990s. Economists believe that Brazilians are in a position to invest and franchise on their own if foreign investment slows and there is a surge of entrepreneurial spirit (Kanitz 1995, 59-115).

Brazil's government has made great strides with social programs since the early 1980s, especially in terms of healthcare, maternal and infant mortality⁹ and race relations (Skidmore 1999, 200-210), but, like all other matters of development and investment, lack of dedicated funding means social services and programs often go underfunded. Despite improvements, there remains much to be done.

With approximately 80% of Brazilians relying on public healthcare (Foreign Policy Digest 2009), there is an overwhelming dependence on government funding for this national program, yet there are more private services available in Brazil than public. See summary at Figure 1.7. The costs of privatized services, when available, are often prohibitive for a population that is considered to be 40.9% hungry, or unable to afford sufficient food (Skidmore 1999, 198). Yet the government continues to build, invest, and develop in areas other than social programs.

Brazilian Health Care Sector Figures	
•	Population: 165.1 million
•	Gross domestic product (GDP): BRL2.46 trillion
•	Percentage of GDP spent on health care: 7.6 percent
•	National health care expenditure per capita: BRL690
•	7023 hospitals (80 percent private, 20 percent public)
•	527,000 hospital beds (60 percent private, 40 percent public)
•	Hospital beds per 1000 population: 34.9
•	23,319 health clinics
•	12,000 laboratories
•	220,000 physicians and 320,000 nurses and nursing personnel
•	Physicians per 10,000 population: 12.6
•	Life expectancy average: 65 years

Figure 1.7. Brazilian Healthcare Sector Figures (O&P 2004).

In Maceio, reliance on government-subsidized water and sanitation is also great. Although the split between those citizens who have access to public services and those who require private services is approximately 50/50, that is predominantly not by choice. As will be explained in Chapter 2, Maceio's public water service provides more water service than sanitation, because development of sanitation pipes has fallen behind. Figure 1.8. demonstrates the percentage of the population that must rely on private versus

public services for sanitation. Even though Maceio is not considered to be a “privatized” city, many people must outsource their sanitation to private services. The labels “upper” and “lower” here are used to describe northern and southern portions of the city, which is how CASAL, the local water company, differentiates its service areas. Of those people requiring private services because of lack of public access, it is not known how many choose not to pay for services at all, choosing instead to go without resources. Based on my observations during fieldwork, there appear to be many.

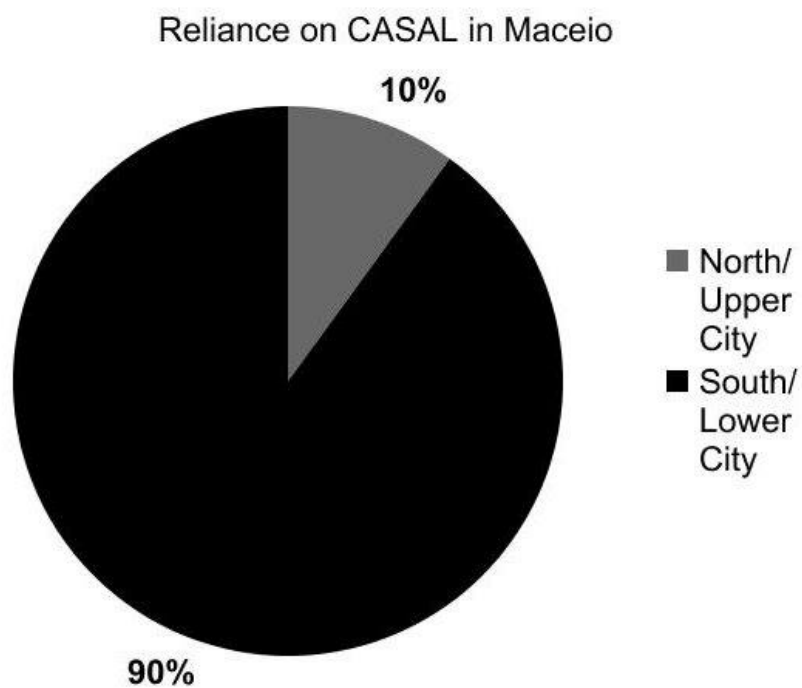


Figure 1.8. Public Water Dependence in Maceio (CASAL 2009).

Nonetheless, despite regional shortcomings, most of Maceio’s citizens have relatively proximal access to basic resources, healthcare and public education, meaning

this city's urban population fares better than many on its rural outskirts and even other northeast cities. However, this local access does not ensure the quality or convenience of such services or reliability of care.

Research Framework

My field study examined what type of access citizens had to resources in urban areas of Maceio looking at three critical resources: water, sanitation and healthcare. My intention was to use water, sanitation and healthcare as key indicators to determine if there were any populations vulnerable to, in particular, waterborne and hygiene-related diseases, due to this possible lack of access and what level of care was available to those affected.

While this study looks at disease indicators for urban populations, research was from an anthropological view. The research framework included data gathered in a pilot study in January 2008 and fieldwork in June and July 2009. The bulk of fieldwork was participant-observation in various communities in Maceio, Brazil, attempting to sample across the general socioeconomic strata. Examination was based on a qualitative research design that was both descriptive and inductive, and it allowed interaction with a wide range of participants.

Thirty-five interviewees were asked about the quality and quantity of their available water, about their personal and community sanitation practices, and whether or not they believed there were any health risks associated with their water and sanitation habits. Various participants were also asked about their access to healthcare, and representatives and experts in each of the fields of water, sanitation, disease, healthcare

and social services were also consulted about their opinions. This study also includes research from many local Maceio sources, including libraries and government offices, as well as an investigation of both private and public hospitals and clinics.

Data were gathered with the assistance of a small team of invaluable collaborators, including my Brazilian host and translator, Amelia Regina Gomes Peixoto, two Brazilian data collectors, Maria de Lourdes Gomes Peixoto and one who has asked not to be identified,¹⁰ and word-of-mouth informants. I was fortunate enough to have access to a number of highly knowledgeable experts in the fields of study, many of whom helped because of the superior reputation of my Brazilian sponsor, Dr. Antonio Fernando Nunes Peixoto, a well-known doctor. Dr. Peixoto's access to persons across various socioeconomic groups, professions and political ideologies enriched my research decisively.

Data were recorded by hand and stored securely. Some of the names in this thesis have been changed to protect the confidentiality of the participants and per the parameters of the Human Subjects Research Board at George Mason University, which approved this research in June 2009. Some gave permission to use their real names; when pseudonyms are used, this is indicated in the endnotes.

Fieldwork included mapping of water and sanitation pipes, municipal service projects, favela communities and government-assisted communities in Maceio in order to identify which communities have access to municipal water and sanitation. This study ascertained whether water management in Maceio was public, private or a combination of both and how that water was accessed by residents (i.e. by homeownership, by paying

taxes, monthly invoice or via pre-payment). The overall research conclusively determined that there are fewer water and sanitation services available to urban poor communities compared to other area communities. It explains why this is the case and what the consequences are of this lack of access.

Although medical and epidemiological data were made available during fieldwork, translation and decoding of this research is too time-consuming for a small anthropological study. Further research is needed to measure the exact frequency of water-related illness and disease by socioeconomic level by comparing the prevalence of water-borne diseases in urban poor communities to illnesses in those who live in communities where clean water is readily accessible.

Research and fieldwork examined both the traditional and modernized Maceio, observing what changes have taken place that are clearly market driven, and noting that, unlike larger cities such as São Paulo and Rio de Janeiro, which I also visited during my studies, although much has changed in the fishing town, more has stayed the same. The living conditions of families without running water or sanitation, in various communities, were observed first-hand. Throughout my observations, I noticed the laughter of children and the din of local gossip that seems to indicate an indifference to their conditions. Yet, at the crowded public hospital, through the hallways of the dying and their relatives, I reflect that the hush is not indifference but acceptance. I wonder if the poor have accepted this way of life, deciding that it will never change.

While my research invites others to use this thesis as a foundation to conduct in-depth epidemiological studies based on the anthropological findings, this fieldwork

should not be viewed as a medical examination. While “diseases of poverty” are also studied in epidemiological research, the connection in this study interprets various diseases as a product of social inequality.



Figure 1.9. Small friends from Happy City, to whom this study is dedicated (Snyder 2009).

When, due to an imbalance in social fairness, a citizen’s living environment, such as lack of water and sanitation, causes illness, he or she will need medical treatment to cure and, ideally, provide preventative care or long-term maintenance to prevent reoccurrence, suffering, or death. When neither the environment nor the healthcare is optimal, lower life expectancy and higher mortality occur. I set out to illuminate the

growing concern among public health workers that this suffering is among the greatest of global social injustices: death from preventable diseases, typically among the poor, while a developing nation concentrates its expenditures on alternate priorities.

2. Complexities of Water and Sanitation Management

Between great expanses of land, our earth is covered with water. Waters recede and flood, disappear and replenish. Water appears to be a consistent, renewable resource. However, only approximately three percent of the earth's water is absolutely clean and useable freshwater; much of it is frozen in ice caps and glaciers in relatively uninhabited areas of the earth, with only a small portion running in a few pristine rivers and surface waters. Clean water also exists in vapor, eventually returning to the earth in precipitation like rain or snow, with the possibility that climate change is reducing both the quantity and quality of that return. Figure 2.1. illustrates the distribution of water on earth.

Distribution of this usable water is also not equitable around the world (Bouguerra 2006, 46 and Stein 2008, 5). The map at Figure 2.2 demonstrates the variance of global water scarcity, including a rise of physical water scarcity, or a limited access to water, in regions that used to have plentiful resources, such as the arid Southwestern United States. Physical water scarcity affects approximately 1.2 billion people worldwide (Stein 2008, 18).

At a grassroots level, water scarcity leads to what could be characterized as an inhumane life, one without access to a basic human need.

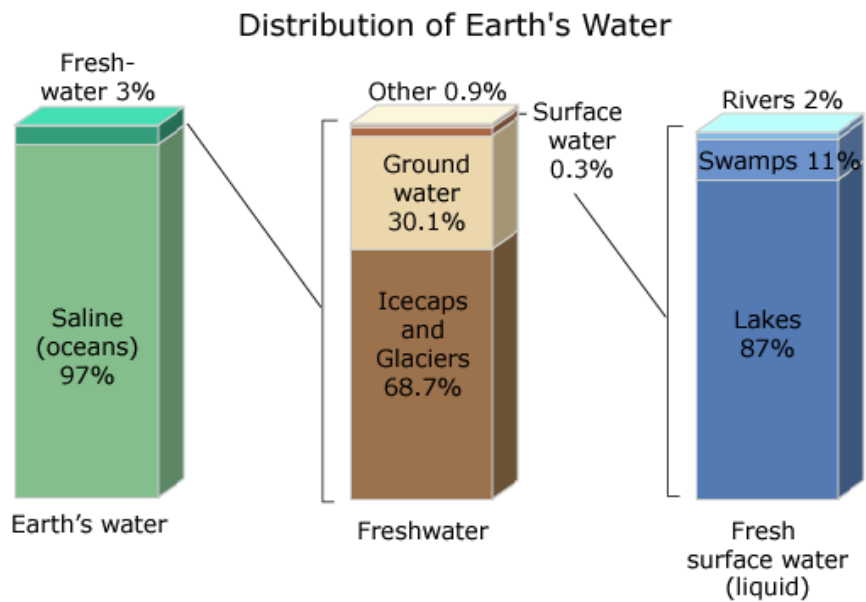


Figure 2.1. Distribution of Earth's Water.
(USGS 2009)

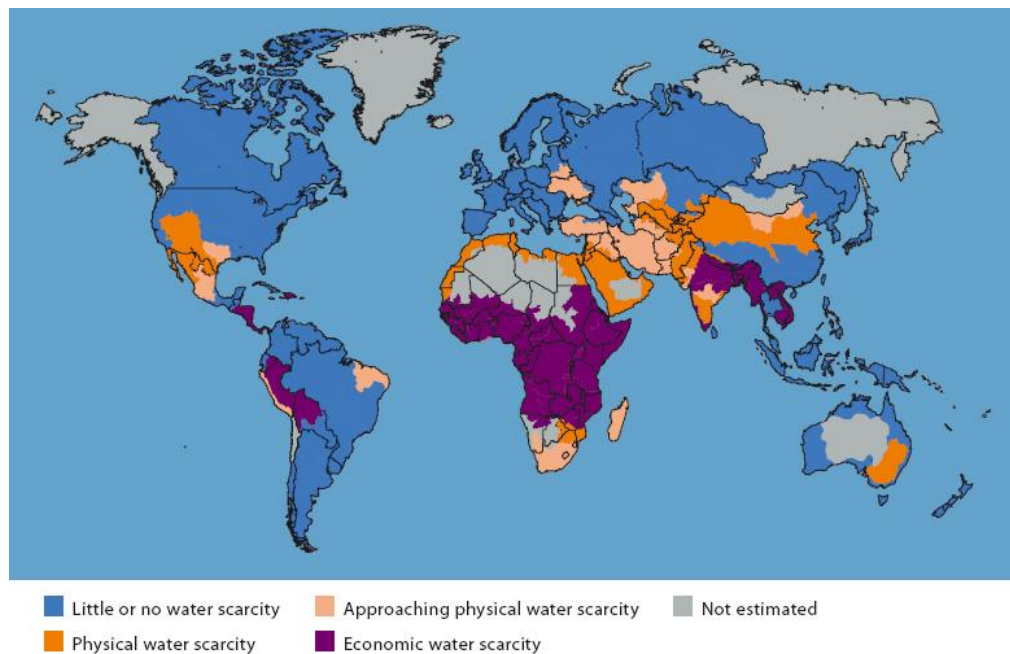


Figure 2.2. Water Scarcity Map
(IWMI 2007).

Scarcity of Water and Sanitation

Water is a necessary sustenance: A person cannot live without water (Bouguerra 2006, 125). The human body is 70% water (Wagner 1994, 11), and an adequate standard of living includes a minimum of 13 gallons of water a day for a variety of usages, including hydration and hygiene (Bouguerra 2006, 125 and Stein 2008, vii). Effective management of sanitation also relies on the adequate movement of water to carry wastes away from where people live, through pipes and canals. Thus water is needed to ensure those wastes do not cause illness (UNICEF 2008).¹¹ Practicing safe water handling and usage is imperative for health. Waterborne diseases caused by lack of hand-washing and bathing, as well as from contamination of water sources result in millions of preventable deaths over time (McDonald and Jehl 2003, 69).

Water is necessary for the production of crops to ensure adequate nutrition in every population (Stein 2008, 14). There is a relationship between access to water and poverty, since those persons who lack such access cannot produce food, care for animals or promote a healthy lifestyle (Miller 2007, 22).

The relationship between water, sanitation, and disease has been written about since both biblical and classical eras (Barzilay, Weinberg and Eley 1999, 7). The use of wells, the disinfecting of water, and the disposal of wastes are mentioned in the Hebrew Scriptures (the Old Testament of the Christian Bible), and the Romans related personal hygiene to health and were among the first to wage war over water (Barzilay, Weinberg and Eley 1999, 8-11). Water has always been both life-giving¹² and life-threatening.¹³ As researchers in the 21st century, we know more about environmental health and

personal hygiene than our ancient forbearers, but not everyone has access to public health information or the means to comply with best practices.



Figure 2.3. Fetching water from the closest source
(with permission, The Water Project 2009).¹⁴

According to the United Nations, “despite recent progress, more than 2.5 billion people lack access to improved sanitation, while nearly 1.2 billion people defecate without sanitary facilities, posing a major health threat to their communities” (UN 2008, UNICEF 2008). More than four million people, mostly children, are affected by diseases related to water and sanitation each year (WHO 2004).

Both the UN and UNHCR have recognized water as a basic human need and, even more importantly, a human right.¹⁵ Yet worldwide the scarcity of usable, potable water threatens the lives of many populations (Gleick 1999).¹⁶ Individual scarcity is the most unfortunate reality of the water crisis, with restricted access to water for many, whether defined in terms of availability, cost, or convenience.



Figure 2.4. At the water
(with permission, The Water Project 2009).

Even when water is available in a community, it is frequently either priced outside of the affordability of the most vulnerable populations, or the source is at such a distance that obtaining clean water is hard, time-consuming work. Women are limited by their inability to contribute to the family income because they must spend their day accessing water, and young girls must spend their day fetching water¹⁷ instead of going to school (McDonald and Jehl 2003, 68). Impoverished citizens often pay up to 20% of their earnings for water, and one in six people worldwide must still fetch their water at a source (Swanson 2001, 11-12).



Figure 2.5. A daily routine
(with permission, The Water Project 2009).

A 2006 UN World Water Report argued that "there is enough water for everyone" and "water insufficiency is often due to mismanagement, corruption, lack of appropriate institutions, bureaucratic inertia and a shortage of investment in both human capacity and physical infrastructure" (UNESCO 2006, 46). Peter Gleick of the Pacific Institute also notes that "inefficient water use, inappropriate allocations, water pollution and ecological destruction" are the biggest problems (Gleick 2003, adapted for McDonald and Jehl 2003, 187). Surface waters have been overused as a landfill for a wide range of wastes, and effective, clarifying water treatment is costly (Wagner 1994, 12). However, clean water is essential for the flow of people, products and businesses.

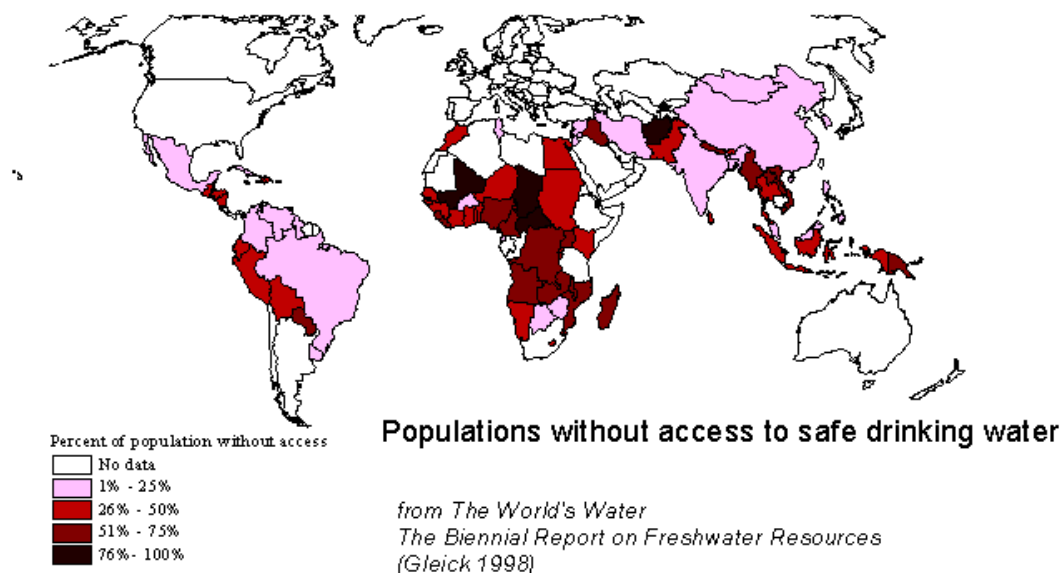


Figure 2.6. Populations without Access to Safe Drinking Water (Gleick 1998).

The availability of water has cultural, economic, social and political significance (Prasad 2008, 8), but it is being misused and exploited. Water has become “blue gold” (Barlow and Clark 2003), and humankind has found a way to commodify this basic need (Barlow 2007, 68).

Management of this commodity is often sharply misaligned with the needs of a population. Poor management happens in many ways, particularly in terms of transfer of expense. Supplying water to an area often means increasing costs to consumers, and when faced with a future that may include significantly increased physical water scarcity, those costs continue to rise above the affordability range for even wealthy end users. Basically, corporations pass along overhead costs to the consumers (Barlow 2007).

Privatization has also, in developing countries, unfairly targeted the poor, who cannot pay for any increases in costs (Miller 2007, 74-75), but corporations are not typically concerned with the social ramifications of their operations (Barlow 2007). Instead of creating markets based on the conservation of water, corporations are investing in water to ensure the availability of water for their own usage. Beverage companies are tapping mountain springs to reserve water for their bottling plants,¹⁸ and international investors are building hydro dams to divert water into energy. Corporate planning involving water has been large-scale, resulting in colossal dams that divert water for the use of a few but constrain water access for millions (Armstrong 2002 and Ward 2002, 46-69).

Use of water for manufacturing and energy is very big business, with adequate access to water for affected populations unapparent on the priority list of water

stockholders. After all, in most countries, the water industry is becoming a politically-charged lobby, with the goal of making consumption profitable. In Brazil, hydropower¹⁹ has meant lower government subsidized energy bills for customers, but what is being charged to consumers is not enough to cover what the Brazilian government pays to create that energy. This attempt at efficiency may lead to the bankruptcy of yet another of Brazil's utilities (Ward 2002, 144-149).



Figure 2.7. Itaipu dam
(with permission, Alexander Witkowski 2007).

Not all management of water need be negative, however, even though water has ceased to be free in most areas of the world. In fact, charging residents for water usage has shown to be an effective training technique, since curbing water use to fit one's budget conserves water (Miller 2007, 89). Putting a price on water has also meant that many urban and rural areas throughout the world have benefited from the development of piping, wastewater facilities, new wells and pumps, the replacement of degraded systems, and fairer distribution of resources. Ideally, this is how management, even private management, should work. Effective management of water, whether it be public or private partnerships must honor the requirements of a community, and involve

government monitoring, to ensure needs are being met (Miller 2007, 40, 54-56). This, of course, requires the government to have the best interests of the population in mind.

It would be far too ambitious in one study to catalogue the wide range of examples of how privatization and management have helped or hurt various societies across the globe. A number of scholars have investigated the impacts of privatization in Brazil, and several works, such as Danilo Anton's *Thirsty Cities*, are referred to throughout this study. This study aims to provide an example of what happens when urban development, public or private, affects a large population, how development without adequate planning can negatively affect a population, and how, without social considerations, development ultimately leads a targeted population to be disproportionately vulnerable to disease and even death.

An Introduction to Maceio's Water

For a city that theoretically has plentiful saltwater and freshwater sources, Maceio's citizens are often without potable water. Even wealthier communities find that their taps are dry for a few days each month,²⁰ which brings the inconvenience of having to rely on the excess water in their rooftop collection containers.²¹ For lower income residents, there is no regular, reliable clean water supply, although some citizens have invested in collection containers to use as their main water source.

As with many cities in Northeast Brazil, Maceio's urban growth has stretched available water and sanitation sources beyond capacity, with many pipelines corroded and in disrepair. Maceio's waterways also vary in water quality, and there are no uniform water systems for the entirety of Maceio. Although there are only two cities

whose water services are privatized in Northern Brazil, Manaus and Nova Progresso, with bids awarded as part of construction projects, privatization has been used in other regions as a means of developing systems (Prasad 2008, 130-131). As a city standard, Maceio has not turned to privatizing water services. Many communities have their own choice for water services and outsource to private and semi-private companies who are often unreliable.



Figure 2.8. Rooftop water collection in Maceio (Snyder 2009, 2008).

Municipal water networks are also behind in reaching every portion of the city. Some urban residents live without any plumbing or water, fetching it from wells or pumps. Populations on the outskirts of town use a combination of water resources from city pipes, rooftop water collection and storage, private wells and pirated tapping into public waterways. The city's piped water also lacks a consistent quality, with the center

of Maceio receiving the clearest water, but few residents from the city center opt to drink from the tap. To understand the shortfall of water in Maceio, it is important to understand the difficult water management challenges that have been historically present in Brazil.

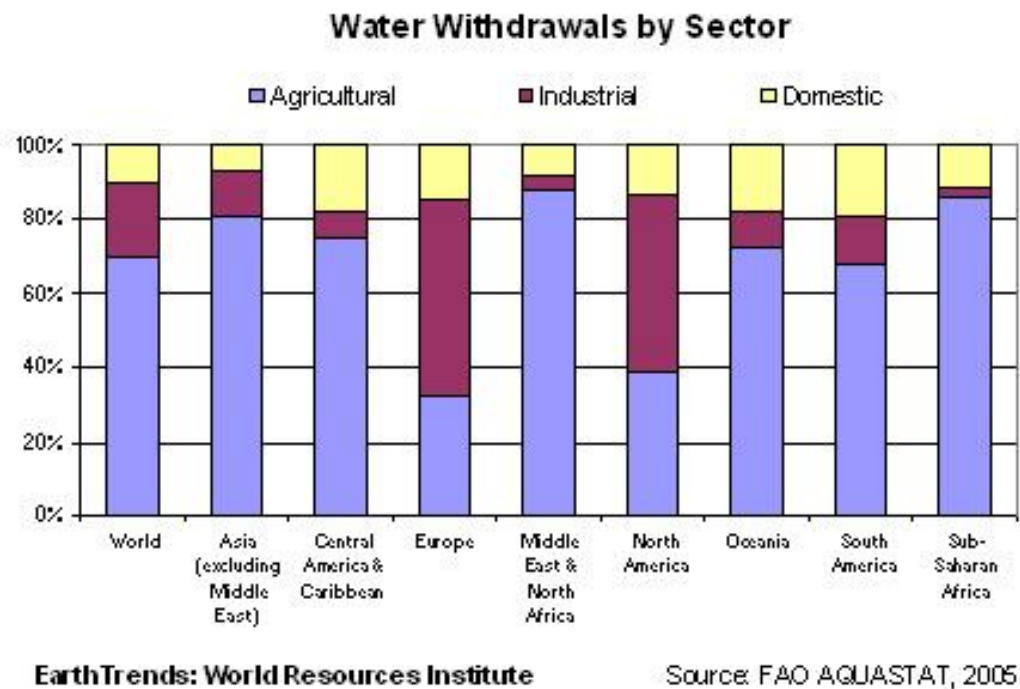
Management Issues

According to Anne Coles and Tina Wallace in *Gender, Water and Development*, only half of the worldwide access to potable water is via piped resources (Coles and Wallace 2005, 2), and lack of access to water through pipes or groundwater resources is a significant problem for both rural and urban areas in developing countries. Ideally, water management companies are responsible for providing water to meet the needs of a variety of consumers: residential, agricultural, and industrial. See Figure 2.9. In addition to providing water to consumers, most management companies are also responsible for receiving wastes through a wastewater facility, an emissary,²² or some other collection system.

Water managers have a huge responsibility, as the design and construction of water networks takes time, but providing water to a population or removing life-threatening waste should not, but often does, wait. There are political and economic hurdles to planning, and even when management is running smoothly, municipalities across the globe are finding that water and sanitation management is costly and burdensome.

The burden and cost of water management lies in both the development and upkeep of water and sanitation systems. There are hardships based on supply and

demand, particularly in areas where populations have increased disproportionately to development. That is, especially when the need for water outweighs supply, or when there is no easy way to bring water to a geographically-challenged community, successful water management is difficult.



**Figure 2.9. Water Withdrawals by Sector
(FAO AQUASTAT 2005).**

A major lack of wastewater treatment facilities in cities across the developing world also means that, even when clean water is accessible, communities are still at risk of water-related illnesses. The table in Appendix A is a comparative of Brazilian states that lack sewage.²³ Brazil has many hurdles to overcome with its water access before it

can cope with its shortfalls in sewage. Nationally, many municipalities are burdened with old, degrading networks. Reservoirs are decaying, distribution systems are in disrepair, and pipelines cannot be easily expanded. Pumping stations are not able to keep up with the needs of the population, and, when privatized, investors often pump groundwater wastefully from underground sources, leaving little remaining for public consumption. Often the truly clean water is only available at a well or pumping station at a cost (Anton 1993, 1-5), or by purchasing it by the bottle.

Brazil has made considerable improvements in nationwide water services since the early 1980s. In her essay about water management in São Paulo, Margaret Keck credits that city government as having done a fair job at expanding the piped water system in the 1990s, reaching nearly 90% of city residents. By the time the expansion was finished, however, there was no municipal funding left to run the services. The government had no choice but to outsource. The lowest bidder for new private management was Light, a Canadian energy company, which, in exchange for providing the services, was permitted to use São Paulo's ground and surface water sources for hydropower. Even though the physical infrastructure was to bring "city water" to residents for free, residents were now forced to pay for both water and sewage at an unexpected cost (Keck 2002, 163, 170). The table in Appendix B demonstrates the availability of water and sanitation in Brazil, by district, and in which Alagoas can be compared to other states.

This cycle of development and expansion, bankruptcy, and, sometimes, private takeover of a public service is common throughout Brazil and much of Latin America.

As Keck points out, the irony of Brazil's historic economic development is that the infrastructure of a mega-city, such as São Paulo, can quickly collapse due to rapid urbanization (Keck 2002). That is, these cities are not designed for fast growth and the influx of people that often follow expanding potential job markets. São Paulo is not unique in its infrastructural problems, as migratory population growth causes inflated urban sprawl across major cities in many developing countries. Rapid buildup in any city quickly taxes available resources. When resources are already strained, expansion can lead to crisis.

Development has repeatedly left the needs of Brazil's citizens behind. Keck describes this as Brazil's desire for accumulation versus livability, with water resources (as well as assets such as agriculture, oil and forestation) being used primarily to "fuel the region's growth" rather than providing sustenance for the people (Keck 2002, 162). Maceio has also undergone recent economic developments and experienced an increase in population growth, which has further exacerbated the service inefficiencies that already existed in the city. The municipality has been able to keep its water public, but business has often been difficult for Companhia de Saneamento de Alagoas (CASAL), the local water and sanitation management company.

In an in-person interview on June 25, 2009, Senhor Emanuel de Franca Costa, a senior project manager at CASAL, said that the business of keeping water public and providing a discount program to help the poor is expensive, and the water is still not free to customers. "CASAL had been approached about privatizing at one point, but we felt it was not a good idea because CASAL's goal is to provide access to water to all of the

communities. We do not feel this is the focus of the corporations,” he said.

“Privatization would not be best for Maceio, because the focus of privatization is making money, not providing access.” Still, even with the commitment to remain a public manager, CASAL is unable to meet the needs of all of the residents of the city, with many having to rely on private service providers to deliver water to areas where pipes have not been placed.



Figure 2.10. CASAL's business offices in Maceio (Snyder 2009).

Wealthy persons who live in urban outskirts access their resources privately. Water is delivered daily, and sanitation is pumped bimonthly, or according to need.

Maceio's poorest urban communities, like the Feijao favela,²⁴ are unable to access any affordable water and/or sanitation services. Some managed communities are only receiving partial access to services, and others complain that even the cost of non-privatized water management is beyond their means.



Figure 2.11. CASAL pumping station in Ponte Verde, Maceio (Snyder 2009).

Favela communities are the most vulnerable in terms of access to any resource. Unrecognized as legal communities by the government, these shanty colonies are typically situated on the edge of urban centers. The residents of favela communities, once mostly migratory workers, temporarily setting up residence in the city while they

searched for employment, are now made up of people who consider their home to be quite permanent. In Maceio, some favelas have been in existence for over 20 years. Those communities consider themselves anything but transient.



Figure 2.12. Favela community in Maceio without access to water or sanitation services (Snyder 2009).

Favelas are often the only place that the urban poor can live, many of whom traveled there from rural towns like Palmera or Interior, in search of education or work in Alagoas' capital city. Once these hopeful citizens arrived, they found that the cost of living was beyond their means or that jobs were scarce and they had no money left to

return to the countryside. So they stayed, setting up makeshift houses made out of wood, tin, and plastic sheeting, among a sea of shanties.

In Maceio, favelas are home to college students and young professionals, among others, who often find ways to pirate electricity or Internet access. These utilities have recently reached even some of the more remote areas of the city, even though they have no water or sanitation.



Figure 2.13. Boys playing near home in Maceio (Snyder 2009).

Here there is no noticeable racial demography. Maceio's favelas are a shared blend of white, Afro-Brazilian, and mixed races. Residents work at office jobs in the

city; they are domestic workers in the suburbs, fishermen and shop workers, and there are plenty of unemployed poor. The various favela communities in Maceio are known to social service workers and policemen to have certain “personalities.” Some favelas appear to be tranquil, and others are bustling with trade and products. Favela dwellers often choose where they live based on location, interest or need, with fishermen living at the favela along the shores of the lagoon or construction workers living in the City Center or in communities situated near bus lines. Mothers may choose a favela convenient to a school, while drug dealers may choose a favela less likely to be frequented by police.



**Figure 2.14. Favela Community in Maceio
(Snyder 2009).**

One common denominator of these favelas is that they are typically separated from traditional city services, such as schools, water, medical care, and transportation, either by demography or geography. Water management blueprints show that Feijao, for example, is separated from services by a large four-lane road and wide median, with water and sanitation sources within their visual, but not physical, reach. See blueprints in Appendix C. The wide strip of white “beach” between the serviced communities and the waters of Lagoa Mundau are where several favelas are situated.



**Figure 2.15. Favela in northern Maceio
(Snyder 2009).**

As can be seen from the blueprints, there are no services. In fact, the blueprints show that there is absolutely nothing in that area. Access to water for Feijao requires fetching it from the lagoon or siphoning it from the streets, spigots or wells in the neighborhoods across the median.

These residents fetch water manually every day. The lagoon may seem like an agreeable source of surface water for the favela, since living on its shore makes this waterway convenient and accessible. However, the lagoon is heavily polluted with waste run-off from the favela because there are no working alternatives for their lack of sanitation services, particularly in the vicinity of the community.

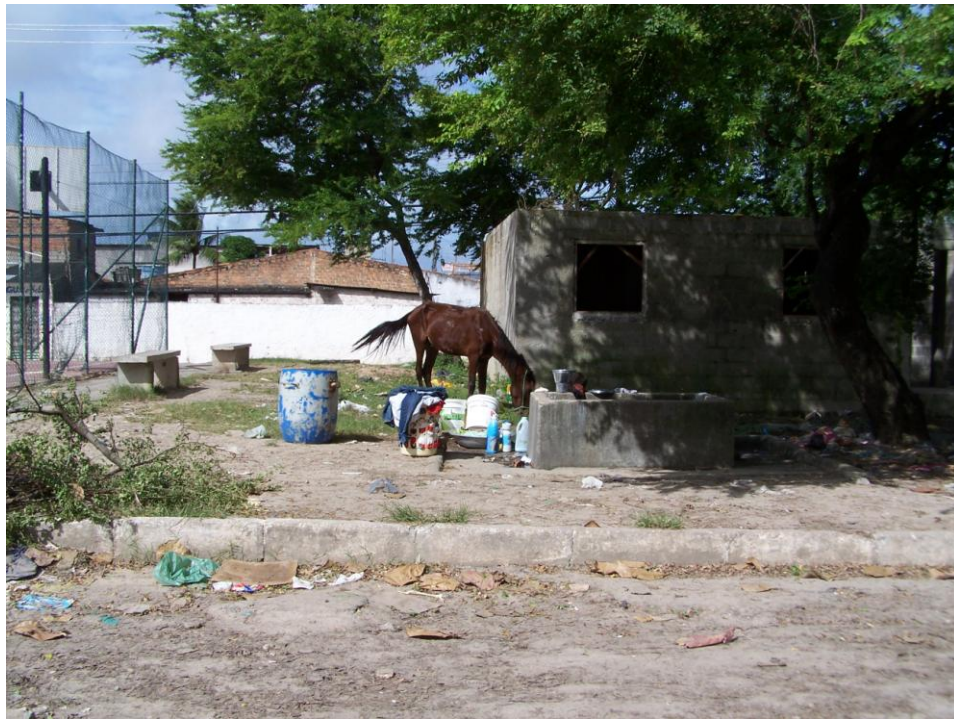


Figure 2.16. Frequented well near a construction project in Maceio, Brazil. Favela residents cross the street to use this well for both domestic and agriculture (Snyder 2009).

Despite its contamination, families widely use the waterway for a variety of activities and practices, including washing and sport. This lagoon is also their livelihood, and most of the residents of this favela are fishermen.

Siphoning water from across the median is a daily practice. Favela residents regularly fill containers with fresh water from outdoor spigots and wells belonging to the serviced community across the roads, often laying a makeshift network of pipes to pirate that water into the favela.



Figure 2.17. Fishing at Lagoa Mundao (Snyder 2008).

These practices are illegal, because access to water in Maceio is not free to any resident. The practices of illegal access to water is so widespread, however, that Senhor de Franca Costa, from CASAL, notes there is little anyone can do to deter the use. When CASAL finds the pipes, they are disconnected, but the residents rebuild. “It happens in the middle of the night or sometimes where we cannot see the connection or where it is being laid,” says Senhor de Franca Costa.



Figure 2.18. Well outside of a poor community in Maceio (Snyder 2009).

Favela residents will likely continue the practice as long as they live beyond the ends of the water management system. Since unrecognized as communities, shantytowns will never be a part of CASAL's network. Favelas are not the only population lacking services, however, and this is a problem that CASAL acknowledges.

The management company has stacks of blueprints for new water and sanitation projects that have to be prioritized and reprioritized, depending on the availability of municipal funding and the agendas of city politicians. As is the case across much of Brazil, service projects in Maceio are started and stopped depending on budget constraints or the personal agendas of the city mayor and state governor. Winning funding in Maceio, as in other parts of Brazil, is often a game of kissing-up, and continuous support is never a guarantee. Both CASAL and the HGE, the large public hospital in Maceio rely on continuous government funding. Sometimes they are given grants to continue projects, but most of the time they wait. The local and state politicians, namely the mayor and the governor, are responsible for requesting funds. I witnessed the posturing that accompanies such funding requests on July 14, 2009, when Luiz Inacio Lula da Silva, Brazil's current president, came to Maceio during a rare goodwill tour through the State of Alagoas. His stop in Maceio was unexpected, and the city rallied quickly to clean the streets, repaint curbs, and even plant new trees in the vicinity of the main beach drag in Ponte Verde, where large tents and grandstands were set up for members of the presidential entourage, the press, and the general public. By midmorning, there was a considerable presence of federal, civil and military police.²⁵

As with most festivities in Maceio, the event started several hours late. Many people were emotional and crying, trying to pass handwritten notes and presents to members of the President's public relations team, who made an effort to talk to and comfort most of them with personal attention. The leading officials from Maceio and Alagoas were all present on stage, and several speakers took turns talking about recent developments in both the city and the state.



Figure 2.19. An attentive crowd awaits President Lula's address (Snyder 2009).

There was exaggerated, loud booing for the Governor of Alagoas, Teotonio Brandao Vilela Filho, while Maceio's citizens cheered loudly for their mayor. Mayor

José Cícero Soares de Almeida's speech was an hour long and very high in praise of President Lula, thanking him for his attention to Maceio. Mayor Cicero thanked President Lula profusely for all of the money he has earmarked for Maceio's housing, water, sanitation, education, hospital, and tourism projects.

I was later told by supporters of the mayor, who said they are not fans of President Lula, that the mayor's exaggerated, emphatic speech was necessary so that national funding would continue to flow to the city. His obsequious behavior was intended to garner special attention of President Lula, so that funds could be earmarked especially for Maceio's projects.



Figure 2.20. Politicians on Speech Day
(Governor of Alagoas is far left and Mayor Cicero is center, Snyder 2009).

One reason why the Governor Vilela Filho was met with so much public resistance is, ironically, because he is responsible for tightening the purse strings of the state, allotting only restricted amounts to each city. Supporters of the governor, including personnel at the public hospital currently on strike, said he is actually doing a good job, trying to prevent bankruptcy due to overspending, but that the general public does not understand how the budget works.

CASAL employees are hopeful that since the city has been granted recent funding or PACs (Programa de Aceleracao do Crescimento) from the government, the company will be able to finish previously abandoned or stopped water and sanitation programs and to keep working until everything is finished. However, the management company is only given a certain amount of funding at a time, and they often do not know when the rest of the money will come. As is typical with many projects in Brazil, CASAL will proceed with the funding given, with the hope that the rest will follow. If not, like many more development projects in Brazil, CASAL will shut down the site until more funding is provided. CASAL was allotted an estimated 35 million Brazilian Reais (BRL), or approximately 20,255,822 USD²⁶, to provide pipe construction for the new government housing program, Vida Decente, yet this amount may only pay for half of what is needed.

This new low-income government housing program has two municipal goals, and CASAL has an interest in both. Meant primarily to eradicate favela living in Maceio, the new housing community locations will put the urban poor on the city water and sanitation network.



Figure 2.21. President Lula before his address in Maceio (Snyder 2009).

The housing program called Projeto Vida Decente, or “Decent Life Project,” will not only improve the quality of life for thousands of urban poor but also prevent the destruction of CASAL’s current piping system. Construction takes time and manpower, however, and funding is not the only cause of system-wide project delays.

With so many people to service in Maceio, and with complex maintenance problems, it seems difficult for the water manager to get ahead. In our conversations, Senhor de Franca Costa noted that the community directly across from Feijao favela now has virtually unusable pipes. The waste from the favela, including waste from fish parts, has clogged the network. This means that blueprints for water system have now been

redrawn to show that the surrounding communities also needs new pipes and do not currently have optimal access to water.



Figure 2.22. Billboards announcing the new government housing project in Maceio (Snyder 2009).

As with all water networks, there are also regular interruptions to water access, including disruptions in the system and water main breaks, which are handled as quickly as possible, depending on the availability of parts, supplies and manpower.

To this end, CASAL is working to replace old, degraded metal pipes, most of which were installed before 1975, with new PVC piping. It is a costly project, but one

that is necessary, allowing purified water to remain clean and clear from the city facilities to the end-user. Senhor de Franca Costa says that CASAL's attempts to provide the cleanest water from their water treatment facility is often inhibited by the age of the pipes. Currently, water leaves the treatment plant clear but is often yellow and filled with iron and other materials by the time it reaches a residential tap. Senhor de Franca Costa said, unfortunately, CASAL cannot control what happens to the water after it leaves the plant.

Water service and sanitation services are also disproportionate to each other throughout the city. As is demonstrated in Appendix D, CASAL's blueprints show there are not always sanitation pipes coupled with water piping. The streets with the darkened circles have sanitation. The streets with the hollow circled do not. As seen in the blueprints, even in communities that have been in existence for some time, have water but no sewage services. Senhor de Franca Costa notes the pipes were never laid, meaning and supported by the district tables in previous Appendix B, some of the communities have access to water without access to sanitation. These communities are left to their own recourse for managing their waste. Wealthier residents hire private sanitation companies to pump waste from septic systems, whereas poorer residents dump waste directly outside their home. There is no city standard, and open dumping, although prohibited, is not regulated.

Even with a diligent water manager, it is possible that all urban residents are at risk for water-related diseases. As can be inferred from the photo at Figure 2.23., waste

dumped precariously outside of residences in open waterways is an obvious health hazard.



Figure 2.23. Dumping sewage directly from homes into Riacho canal (Snyder 2009).

CASAL's current challenges seem to outweigh the considerable effort they are making to provide water to Maceio's residents. Despite the city's attempt to bring water to most of its residents, the lack of safe, uniform sanitation still puts the entire urban population at risk for illness.

The Lure of Privatization in Latin America

CASAL's list of projects may someday overwhelm the city's ability to self-fund water and sanitation services, but for now Maceio's system is still public and city-owned. The municipal need for pipe and sewage development, maintenance and service may someday outweigh government subsidization and consumer support. Like other cities in Latin America, Maceio may look at investors. When a city's funding for water and sanitation is insufficient, privatization, when possible, can be a tempting alternative. Even though investors may have other goals in mind, bringing in stakeholders can be a utility's only choice. Many municipalities in Brazil have privatized one or more public services such as energy, water, or sanitation, or they use a combination thereof, because they can no longer afford to run the programs. The practice of privatization is widespread.

In *Opposing Currents*, Vivienne Bennett, Sonia Davila-Poblete, and Nieves Rico assert that throughout the developing world, water management is no longer under local municipal, state, or even national control. By the 1990s, they observe, most of Latin America's utilities were privatized, and along with electricity, banks, and transportation, water has become a preferred stock of stakeholders (Bennett 2005, 4, 32). Unfortunately, this typically means that the corporation's interests are served first, with development expenses passed along to local citizens as a normal cost of business. Investments are expected to be profitable. Instead of being regarded as a necessary good for survival, water has instead come to be viewed as a type of liquid gold.

Competition over this resource has become known as the “water wars,” such as those that took place in Cochabamba, Bolivia, when between 1997 and 2000, citizens fought a subsidiary of the transnational company Bechtel over a contract to take over the city’s water management (Bennett 2005, 32-33, 72). In *Water Wars*, Vandana Shiva describes privatization as “cowboy economics,” metaphorically alluding to the bold settlement of the American West. She states that, despite any existing occupation or use of the land, settlers could, *carte blanche*, ride in and stake a claim to the land, displacing indigenous people and securing rights to surrounding resources. Privatization, particularly in Latin America, is a similar process in which corporations are the cowboys and neoliberalism is their platform (Shiva 2002, 22-24). As common rights are thrown out in favor of market pressure and debt repayment, citizens are often left with the burden of reduced access to water. Unfortunately, as this resource becomes scarcer in the future, social inequality may also increase.

In Latin America, the 1990s marked the beginning of water privatization in at least nine countries, including Chile in 1990, Argentina in 1991, Colombia and Mexico in 1992, Brazil in 1994, Trinidad and Tobago in 1996, and Bolivia in 1997. Water systems in Ecuador and Honduras were privatized in 2001 (Andres et al. 2008, 156-157). Residents in areas becoming privatized began to find their formerly public or public-private service cooperatives (in which homeowners each pay a share to receive equitable access to water) taken over by transnational corporations. Others found their former access to water, from pipes, wells, and even rivers or streams, blocked as investment companies rerouted various systems and closed others. Private companies would now

ask residents to pay for their needed water through a meter, pay-as-you-go pump, or via delivery by water tanker.

Initially, privatization was presented as a win-win partnership between cities and corporations. Citizens would benefit from more efficiently run and updated water systems and companies would turn a modest profit, often in addition to reserving some of the water for their own projects, such as hydropower or bottling.

As Shiva argues, although privatization by large corporations is a lesser known threat to the world's water sources than pollution and climate warming, it is a major factor in water scarcity. Water for capital is a growing concern in many countries and a long-time reality for many in low-income countries, where citizens are being forced to pay for clean water that was once freely accessible. It is considered "bad for humanity, [but] good for business" (Stein 2008, 55). The reality is that these costs are making it difficult for the average citizen to afford privatized water. When corporations need to divert more for their own projects, the citizens they were meant to serve go without. Even though resource privatization may mean a reprieve from a city's financial problems, it may create more problems. Privatization does not necessarily mean development will benefit the affected population. Instead, it may mean that the cost of business is passed along to those who can least afford it.

Defining Access

As mentioned above, the concept of access or livability is debatable. In many communities throughout the world, water is, arguably, available. But when water for a price is the only truly accessible source, obtaining water for a family's use can be a huge

monetary sacrifice. When a family lives at or below poverty-level and/or is among the unemployed poor, paying for water is financially impossible. Therefore, water is not truly accessible – it is not free. Figure 2.24. illustrates the percentage of income an average Brazilian family spends on water. “MS” means monthly salary, and the graph shows that persons with the lowest salaries have the highest burden (Prasad 2008, 140).

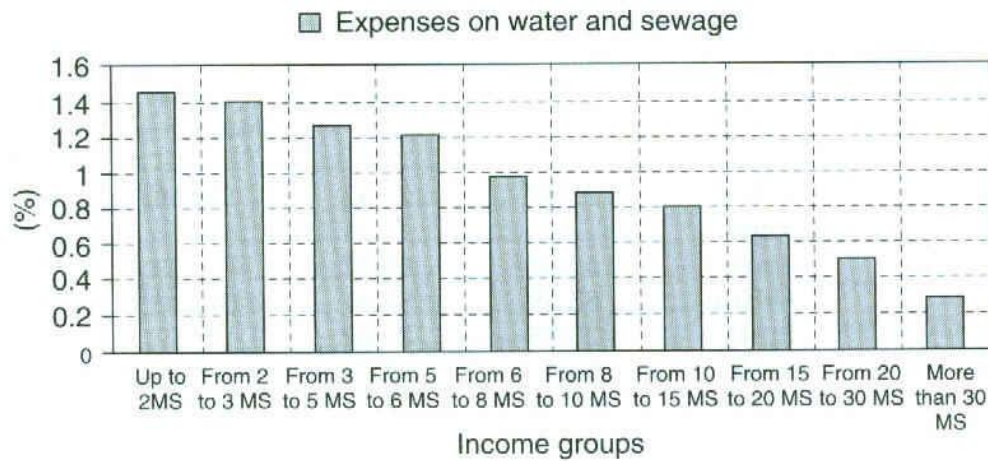


Figure 2.24. Expenditure on water and sewage. The average percentage of income spent on water in Brazil by salary
(IBGE 2003 and Prasad 2008, 140).

Unfortunately, there are not many alternatives to cost or convenience of piped water in Brazil. Although most of the country is situated on or near surface water sources, these resources are not always an alternative because of pollution. Even when a city is situated near a plentiful water source, geographical location does not necessarily mean the water is available or safe for public use. In São Paolo, for example, more than

two-thirds of groundwater resources continue to be reserved for private, industrial use (Anton 1993, 71), and the rest is contaminated (Keck 2002). Taking one's chance at using unfiltered surface water can lead to a host of health issues, but for many urban citizens it is their only choice.

In Maceio, when urban communities are beyond the reach of municipal services or within the "responsibility" of the city government, as in the case of favelas, these populations have to find their own means to access water and sanitation. Between scarcity, cost, and the importance of water for basic survival, these populations are vulnerable to threats of violence, desperate measures, adverse health problems, and death. Desperate measures include pirating water illegally, stealing water from other people's homes or businesses, drinking unfiltered water or going untreated when afflicted with water-borne illnesses. Simply needing a drink of water becomes a contemplation of social justification.

When faced with dehydration or starvation, a person may be faced with an altered standard of ethics (Scheper-Hughes 1992, 22) and be forced to act in a way those not living in extreme poverty may not understand. In her book, *Death without Weeping: the Violence of Every Day Life in Brazil*, Nancy Scheper-Hughes calls this moral relativism, and says that internal logic (based on circumstances) may govern the reason for radical action, not irrationality (Scheper-Hughes 1992, 22-23). This explains why a person who is not normally inclined to steal may do so in order to eat.

On June 30, 2009, during the fieldwork for this project, there was a protest against CASAL by a grotto in Santa Lucia, a district in Maceio. In a conversation earlier that

day, a social worker explained that the community had not had water for several weeks, and understandably, residents were angry and desperate. Community members staged a protest outside the plant, burning tires and shouting. Although no one was hurt, demonstration by dozens of residents who would normally remain quietly at home was a threat to protest daily until water was restored. CASAL stated that the community had been without water for approximately a week while they waited for parts to come from São Paulo to repair broken pumps. The broken pumps are just one of the issues water managers deal with in terms of maintenance. A damaged pump is not an easy fix. Parts are hard to come by and must be acquired from outside of the city. They are expensive, and when there is no funding, residents must wait.

Water used to be supplied to the grotto community through gravitational flow from water towers, but when developers moved through the city a decade earlier, water pumps were installed that would pull the water from tanks on the ground. Since pumps frequently break and parts are hard to get, water access is frequently halted. Developers never considered the possibility that replacing parts would be inconvenient and cost prohibitive and that the “old way” might be most beneficial to residents.

CASAL reacted quickly to the protests, sitting down with community leaders and agreeing to restore water if the protests ended. In order to keep water flowing to the grotto, however, CASAL had to reinstate the old water tanks instead of using the new pumping system. They now plan to continue this method as the primary source of water for that area. In a conversation on July 17, 2009, a CASAL plant manager said that,

although initially effective, the modernized pumps are not the best way to serve the community.



Figure 2.25. CASAL emissary in Maceio (Snyder 2008).

At a grassroots level in Maceio, this example illustrates how a water development project failed to consider the expense and inconvenience of maintenance to a funding-deprived water manager. This was an example of how community action can be an effective means to get what you want. One plant administrator said that it was odd that demonstrators chose to protest on a federal holiday and demonstrate outside of a

wastewater facility versus a pumping station. Regardless, the community was heard and water was quickly restored.

This type of community reaction has been an effective attention-getter in many water-starved areas in Latin America. Whether it is community cooperation or a social movement, the proactivity of a population may eventually be the only truly effective means to restore the right to water.

Even when water and sanitation are publicly available, as is the case in the favelas of Maceio's city center, which is situated on the water management grid by default of location, the inability of the poor to pay for services still renders the services legally inaccessible. The grotto community that protested to regain access to their water will still pirate water or steal it from local faucets and pipes because they cannot afford to pay the bill. Despite their access to this resource, it does not belong to them. From the government's view, no one is allowed to use any water unless they pay.

As shown in previous Figure 1.8, a substantial number of city residents lack access to public services. This is especially true of sanitation. Paying for private sewage removal is costly, and when given a choice between paying for a private service, for example, and paying for another necessity, a family may find other methods of disposing of waste, such as dumping in a nearby canal or into their yard. A poor person may use the same reasoning when choosing between obtaining clean, filtered water at a cost or parasitic water for free such as in the favela, just as they may be forced to make choices between paying for medicine or providing for a family (Farmer 1999, 187-188). This concept will be discussed further in later chapters.

For those people who are fortunate to have access to both water and sanitation services in Maceio, there is an associated cost. A typical bill from CASAL includes both water and sanitation, unless one is outside the sanitation system, whereas the bill will just include water.



Figure 2.26. Domestic waste dumped outside of a favela home in Maceio (with permission, COOPLANES 2009).

Sanitation is billed at 80% of the water usage. For example, if the water is 100 BRL (approximately 57.87 USD), then sanitation is 80 BRL (approximately 46.30 USD), with the total bill at 180 BRL (approximately \$104.17).²⁷ An example of a local utility

bill can be found at Figure 2.27. This bill is the water utility cost for a family of three located in Barra Nova, a suburban area on Lagoa Mundao, just outside of Maceio.

SAAE
MARECHAL DEODORO

SERVIÇO AUTÔNOMO DE ÁGUA E ESGOTO
Cidade: MARECHAL DEODORO
CNPJ (MF) 12.516.266/0001-70
CEP: 57160-000 Fone/Fax: (82) 3263-2612

Fatura Mensal

Rt: 01 Qd: Seq: Matrícula:
CPF/CNPJ: Identidade:
BARRA NOVA

Mês/Ano:
11/2009

Mensagem
Em caso de dúvida ou Sugestões ligue(082) 3263-1669 ou 3263-2612.
Pague suas contas em dias, evite o corte.

Tipo: RESIDENCIAL	Média: 10	Hidrômetro: OL 107851	Dt. Emissão: 04/11/2009
DTL: 07/10/2009	LAN: 614	LAT: 644	Consumo: 30

Descrição	Valor
Água	64,34

Vencimento: **15/11/2009** Total à Pagar: **64,34**

Histórico dos Pagamentos	Histórico de Consumo
05/09- 5	08/09- 10
06/09- 8	09/09- 10
07/09- 3	10/09- 21

Mensagem ao Cliente:
" VEJA SE TEM DEBITO EM ATRASO...EVITE O CORTE "

SEM OCORRENCIA

Autenticação Mecânica Tecsoft Tecnologia

ESTA CONTA NÃO QUITA DÉBITO ANTERIOR

Resumo da Análise:
Manancial: Nascente voltadaqua.
Análise Físico-Químicas
Parametro Result. Referencia
Cor (UH)..... 2,5 rd a 15 prd
PH..... 5,90 6,0 a 9,5
Turbidez (UT)..... 1,13 1 rd a 5 prd
Sabór..... - não objetavel
Odoz..... - não objetavel
Condutância..... - Sem referencia
Alcalinidade OH..... 0,0 (CaCO3)
Alcalinidade CO3..... 0,0 (CaCO3)
Alcalinidade HCO3..... 6,0 (CaCO3)
CO2..... 5,0 (CO2)
Cloretos..... 20,5 250 mg/l (Cl)
Dureza Total..... 8,68 500 mg/l (CaCO3)
Ferro Total..... 0,18 0,3 mg/l Fe
Fluoretos..... 0,70 1,5 mg/l F
Cloro Residual..... 2,0 5mg/l (Cl2)
Análise Bacteriológica:
Coliformes totais..... 0,0 Ausente
Echerichia Cole..... 0,0 Ausente

Figure 2.27. SAAE Residential water bill (Informant 2009).

This area is serviced by Servico Autonomo de Agua e Esgoto (SAAE), a water and sewage manager similar to CASAL. This residence has water service, but no

sanitation, as sewage pipes were never laid. They must also pay for a private company to pump their septic system, whenever it is full.^{28 29}

The monthly salary for this family is 1500 BRL (approximately 870 USD) and their water expense is approximately 4.29% of their income. As demonstrated in Figure 2.24., wealthier families spend a lower percentage of their monthly income on water expenses than low-income families, since they have more disposable income to spend (Prasad 2008, 139-140). If this were a family with a much lower income, perhaps the minimum wage of 465 BRL (approximately 270 USD)³⁰, with the same number of family members or the same water bill, the burden would increase to 13.84%, and the family would still not be eligible for government assistance.

Another water bill used to demonstrate the expense burden is found at Appendix E. This more costly 211.91 BRL bill (approximately 121 USD) is for both water and sanitation services for a family of five, with a monthly income of 3000 BRL (approximately 1714 USD). The relative burden is approximately 7.03%. This bill also is for a family with a high monthly income.

For those who cannot afford a regular-priced bill, a government-subsidized social program is available. In Maceio, eligibility is based on Brazil's federal minimum wage, which is approximately 465 BRL (approximately 270 USD) per month (Reuters 2009). To qualify for the water and sanitation assistance program, a household must prove that their salary is less than 1.5 times the federal minimum or approximately 623 BRL (approximately 360 USD). Once a family qualifies for the program, the water is still not free. Subsidized consumers still pay 9.60 BRL (approximately 5.50 USD) to use up to 10

cubic meters (m³) of water, with any use beyond that amount billed at a rate of 1.83 BRL (approximately 1 USD) for each additional cubic meter. In our conversations, CASAL employees explained that anyone in Maceio can be a part of the social program, if they prove their qualifications, but only those persons situated on the water management network can get access. If a family lives outside of CASAL's grid, such as in a favela, they are still out of luck. Even with government programs, a significant percentage of Maceio's population remains disproportionately affected by lack of resources, regardless of ownership of land, property, or a geographically-convenient location.

For those without access to clean water, regardless of income, pirating the source or paying for water to be delivered are the only options. Even high-income families with access to piped water find a way to save money on utilities, using a device known as a "cat" to stall or slow the gauge on the meter. Cats are everywhere, and I was hard-pressed to find a family not using one. The use of such a device makes a considerable difference in water expenditure. Figure 2.28. shows the cost on a water bill for a family of five (they do not have sanitation) for a one month period.³¹ The cost is 19.65 BRL (or approximately 11 USD), a considerable savings, and lower than the SAAE bill's family of three.

Water delivery companies are everywhere in Maceio, and men on bicycles with five gallon bottles zip along the city streets, bringing water to customers far and wide. One such water bottle company noted that they deliver approximately 1,000 of the large bottles in the Ponte Verde³² district alone. There are many brands of water, including spring waters and filtered waters.

COMPANHIA DE SANEAMENTO DE ALAGOAS
Rua Barão de Atalaia, 200 - Centro - Maceió - AL CEP 57.020-510
C.N.P.J. 12.294.708/0001-81 INSC EST. Nº 24.008.146-3.

Casal

AVISO - SUJEITO A CORTE APÓS O VENCIMENTO

RESPONSÁVEL						MÊS/ANO	
LEIT. ANTERIOR						MÊS/ANO	
LEIT. ATUAL						MÊS/ANO	
CONSUMO						MÊS/ANO	
MÉDIA						MÊS/ANO	
CONS. RATEADO						MÊS/ANO	
ENDEREÇO DO IMÓVEL						MACEIÓ	
RES.						MACEIÓ	
CÓDIGO						VALOR	
002 AGUA						19,20	
004 MULTA MES						0,38	
005 ATUALIZ. MONETARIA						0,02	
JURROS DE MORA						0,05	
VENCIMENTO						TOTAL A PAGAR	
15/11/2009						19,65	

QUALIDADE DA ÁGUA (STREBULA)	Nº AMOSTRAS	TURBIDEZ	COR	CLORO	PH	COLIF. TOTAIS	E. COLI
	43	43	159	43	159	0	0
	MÍNIMO EXIGIDO	124	124	124	124	124	0
	REALIZADAS	120	117	43	13	118	0
	QUE ATENDERAM A LEGISLAÇÃO	OBSERVAÇÃO					

Casal

MATR. 0631728	MÊS/ANO 11/2009	47	16	0950	0125	000
VENCIMENTO 15/11/2009		TOTAL A PAGAR 19,65				

82650000000-3 19650012820-8 00631728112-6 00900000000-1

**Figure 2.28. Water bill with “cat” device
(Informant 2009).**

The price range for the bottles is anywhere from 3.50 BRL to 5.50 BRL (between 2 USD and 3 USD)³³ for 5 gallons. The relatively low price for a large quantity of safe drinking water is still out of reach for a non-working person. This is also the

rechargeable bottle price, and a customer must turn in an empty bottle to get a filled bottle.



Figure 2.29. Water ready for delivery in Ponte Verde (Snyder 2009).

Upper-income residents in Ponte Verde can typically afford to buy the spring water, whereas residents of poorer communities generally use the filtered brand. In a conversation with an informant, I was told these bottles are sometimes refilled from a water hose, which is not considered potable, so it is important to purchase the refilled bottles from a reliable source.

This filtered water is not obtainable for the residents who seem to need it most. In our conversation on July 17, 2009, a representative for the bottled water company said they deliver quite a bit of water to poor communities but never to the favelas. “They cannot afford it,” the representative stated.



**Figure 2.30. Refilled 5-gallon bottles
(Snyder 2009).**

3. Disease Implications of Polluted Water and Exposure to Wastes

Availability of clean water, regardless of method of access, is a growing concern for urban areas. Understanding the challenges and limitations of water infrastructure is an important foundation for discerning how this problem leads to disease. Water scarcity is not just a lack of plentiful water but also a deficiency in clean, potable water. When water sources become polluted, the issue is not just of quantity but also of quality. There are twice as many people worldwide without access to sanitation as there are without access to water. For billions of people worldwide, the life-threatening implications of lack of access to water is compounded by the staggering adverse health connection from over-exposure to wastes.³⁴ There is a relationship between water quality, sanitation, and the presence of disease (Barzilay et. al. 1999, 7).

Water Pollution

Global waterways have not always been in their current compromised state. In pre-colonial times, streams that flowed through the natural filtration of rocks were likely suitable for domestic and agricultural use, with acceptable potability for drinking, cooking and bathing.³⁵ As populations of immigrants moved across nations, however, clean water resources became increasingly polluted from both the dumping and runoff of

all types of waste. Over time, these practices have led to an overall decline in the quality of global waters, even some of the once most pristine (EPA 2008).

Water pollution is the invasion of pollutants into any body of water via one of two different mechanisms: point and non-point sources. Point sources are those pollutants that come from a single, recognizable source, such as chemicals dumped through a drainage pipe or a specific landfill. Non-point sources are pollutants that may not be traceable to any one particular source, but instead are a collection of pollutants that collectively cause contamination. These sources are many, from sewage via households, nutrients from agriculture, radioactive waste and oil from industry, as well as biological sediment that builds in lakes, rivers and streams (EPA 2008).

In addition to man-made pollutants, violent storms and natural disasters provide a threat to clean water sources. These disasters are thought to be on the rise due to climate change, causing dust and other pollutants to travel through the air and settle on water resources.³⁶ Water main breaks and catchment overflow may also compromise filtered, potable water, forcing consumers to find other sources of safe water.

Pollutants due to population density in cities have risen quickly throughout the decades. People have been producing more waste, and there has been a population trend towards urban areas, because of growing job markets (Melosi 2005, 168-172). Due to the growing need for regulation of both air and water pollutants, various countries, such as the U.S., established regulations to control pollutants in waters (EPA 2009). Despite new regulations and an increase in environmental awareness, indicators show that

contamination is on the rise for all types of waterways, including fresh water, wetlands and oceans (EPA 2008).

The ability of CASAL and SAAE to provide useable water is also greatly dependent on the state of Maceio's main water sources, which are three rivers. In a conversation on July 17, 2009 with a laboratory manager at CASAL³⁷, he stated that the Rio Pratagy provides $\pm 3,000$ liquid meters of water per hour, Rio Catole provides $\pm 1,200$ liquid meters/hour, Riacho Aviacao provides ± 500 liquid meters/hour and Pocos Artesianos, an underground aquifer provides ± 150 liquid meters, all are available predominantly for public, city use.

Lack of environmental policy enforcement is a major problem in many countries. Lax regulation of industrial polluters gives big business carte blanche permission to invade waters with cancer-causing pollutants, even in the United States, where regulations like the Environmental Protection Agency's (EPA) Clean Water Act and the Safe Drinking Water Act have been enacted by the government, but are often not enforced aggressively (Duhigg 2009). There has been recent attention in the U.S. regarding the failure of the EPA to sanction violators from the chemical industry to coal plants, whose contaminants are adversely affecting the health of residents, from tooth decay to cancer.³⁸

The U.S. Safe Drinking Water Act, however, does require public water utilities to provide a list of contaminants to customers on their water bill (EPA 2009), and Maceio has adopted similar standards. This standard, known as "Paragraph 518", requires water managers, such as CASAL and SAAE, to demonstrate water potability to consumers.

Both U.S. and Brazilian water utilities must list the amount of certain naturally-occurring or man-made contaminants on the water bill (EPA 2009). A listing of the EPA's drinking water contaminant standards can be found in Appendix F. The EPA's chart notes the regulator's goal for the maximum amount of each contaminant in water. Appendix G is a similar list of tested contaminant standards for CASAL, which was provided to me by the laboratory manager, on July 17, 2009.

QUALIDADE DA ÁGUA DISTRIBUÍDA	Nº AMOSTRAS	TURBIDEZ	COR	COLOR	pH	COLIF. TOTAIS	E.coli
	MINIMO EXIGIDO	43	43	159	43	159	0
	REALIZADAS	124	124	124	124	124	0
	QUE ATENDERAM A LEGISLAÇÃO	120	117	43	13	118	0
	OBSERVAÇÃO						

Figure 3.1. CASAL water quality distribution table on water bill (Informant 2009).

Comparing the CASAL and SAAE bills introduced in Figures 2.27. and 2.28., there are a few differences in the amount of information these two local Maceio companies share with consumers. A close-up of the contaminant list found on each bill is provided in Figures 3.1. and 3.2. While SAAE has a more detailed itemization than

CASAL, in a conversation with a CASAL water treatment manager on July 17, 2009, I was told that any customer can ask for access to the same chart shown in Appendix G.

The importance of this information is two-fold. First, it demonstrates that there is a basic potability requirement for water being piped to local citizens in Maceio, and second, it shows that public health information regarding contaminants found in water is readily available.

Resumo da Análise:			
Manancial: Nascente voltadagua.			
Análise Fisicos-Quimicos			
Parametro	Result.	Referencia	
Cor (UH).....	2,5	rd a 15 prd	
PH.....	5,90	6,0	a 9,5
Turbidez (UT).....	1,13	1 rd a 5 prd	
Sabor.....	-	não objetavel	
Odor.....	-	não objetavel	
Condutância	-	Sem referência	
Alcalinidade OH.....	0,0	(CaCO3)	
Alcalinidade CO3.....	0,0	(CaCO3)	
Alcalinidade HCO3....	6,0	(CaCO3)	
CO2.....	5,0	(CO2)	
Cloretos.....	20,5	250 mg/l (Cl)	
Dureza Total.....	8,68	500	
mg/l (CaCO3)			
Ferro Total	0,18	0,3 mg/l Fe	
Fluoretos.....	0,70	1,5 mg/l F	
Cloro Residual.....	2,0	5mg/l (Cl2)	
Análise Bacteriológ.			
Coliformes totais....	0,0	Ausente	
Echerichia Cole	0,0	Ausente	

Figure 3.2. SAAE water quality distribution table on bill (Informant 2009).

As most pollutants are human-made, however, the most significant improvements in water quality will need to begin with heightened industrial regulation and changes in domestic sanitation practices. It is difficult to know where to start in countries where

there is little funding, no uniform regulations, lack of public health education and of governmental and citizen proactivity. When the governments of such countries neglect the needs of their citizens, it is often hard to promote a sense of solidarity. Hope turns to indifference, and indifference turns into habit. This pattern describes the popular attitude towards both water pollution and sanitation observed in Maceio.



**Figure 3.3. Wash Day
(Snyder 2008).**

In conversations with 13 favela community members on July 2, 2009, Feijao residents said they try to conserve as much water as they can, but it is impossible to keep what little water they have clean. “To wash clothes, we dig a hole in the back of the

house and put water in it. We wash clothes in there until the water dries up.” Although this description displays a good water catchment method and a conservative use of water, it also means that the lack of access to clean water forces vulnerable populations to use polluted water for domestic chores. The practices of these local community members resembled residents in Cochabamba, Bolivia, who without clean water had to use polluted water for their personal hygiene.

In “Flow,” the water documentary characterizing the challenges of vulnerable populations without adequate water access due to privatization, one woman says that outsiders call the community’s people dirty, but without access to water, they have no choice in their hygienic practices (Salina 2009). To that end, social movement leader Oscar Olivera, in his speeches about what the return of water to the public of Cochabamba, said that the return of water was a “return of dignity to the people” (Olivera 2008 and Salina 2009).

Echoing concerns about the motives for privatization from Chapter 2, it is important to note that water privatization often means that companies draw the cleanest water from rivers and underground aquifers first for their own use, and what remains available on the surface is often polluted due to dumping and sewage (Salina 2009 and Anton 1993, 1-5). The Tiete River in São Paulo, for example, has become highly contaminated in recent years, and despite severe disease outbreaks, it remains polluted due to the cost of clean-up. With lack of available or affordable sanitation alternatives, the same citizens needing clean water often exacerbate the problem by dumping sewage into the waterways that must provide that water.

This was also the case in Maceio, where residents daily, if not hourly, dump wastes into the local Riacho Salgadinho canal that empties onto the tourist-laden beaches. There are simply few alternative options, and these populated, dense communities are at a higher disease risk with no real environmental or health policies in place to protect the livability conditions in their urban environment.



Figure 3.4. Natural and man-made pollution on a popular Maceio beach (Snyder 2009).

Insufficient Sanitation

The World Health Organization's statistics, which report that over 2.6 billion people lack proper sanitation, indicates that a significant global population is living at a

compelling risk. The problem is wide-scale. This includes indicators for nearly all continents, including approximately 25% of Latin Americans lacking adequate services.



Figure 3.5. The author with a young boy in his favela home (Snyder 2008).

The U.S Centers for Disease Control and Prevention estimate that in Latin America and the Caribbean, 125 million people, out of 580 million,³⁹ live without adequate sanitation and 50 million people drink unpotable water (CDC 2009). Across the board, sanitation issues in both urban and rural areas include (1) lack of basic sanitation, which is the ability to manage human waste in a household, (2) no on-site sanitation creating a need to dispose of sanitation off-site (accessibility), (3) a lack of safe food handling practices before consumption or distribution, and (4) lack of effective planning for the management of wastewater or contaminated water, and inefficient use of ecological or natural recycling of waters.

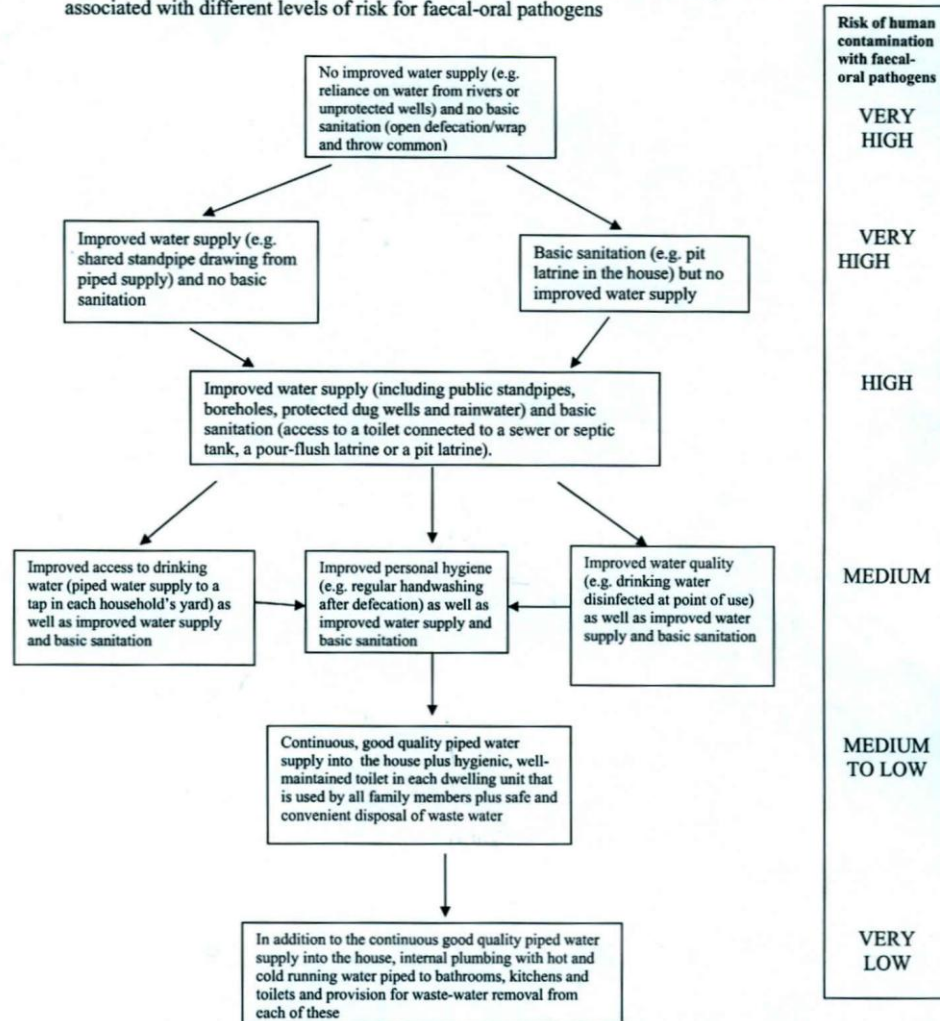


**Figure 3.6. Community of “landless” outside of Maceio
(Snyder 2009).⁴⁰**

Lack of sanitation is not just a problem of the poor but an issue that cuts across demographic variables of race, income-level, and geography. It affects rural communities, as well as those in the city, and fieldwork interviews revealed that families with higher incomes, such as doctors and lawyers, believed their sanitation, although adequate, could be improved. Satisfactory improvement is unlikely, however, with so many populations deficient in options for sanitation. The continuous trend of migratory populations towards urban areas is already burdening existing services.

The increase of urban dwellers may soon mean health issues due to lack of adequate sanitation reach epidemic proportions. In fact, a UN development report states that by 2015, increases in urban populations will mean that millions more people, worldwide, will be affected by diseases related to sanitation simply because they have no place to put their waste (Satterthwaite and McGranahan 2006). “Without a rapid increase in the scale and effectiveness of sanitation program[s], the [United Nations Millennium Development Goals] sanitation target for 2015 will be missed by at least half a billion people – and it is in the regions with the worst provision that progress is most lacking. As a result, hundreds of millions of people will suffer the indignity of having no safe and convenient place to defecate. Tens of millions of people, most of them children, will become ill, and many will die” (Satterthwaite and McGranahan 2006). The authors further illustrate their concerns in Figure 3.7., which demonstrates the risk level for disease based on type of sanitation

Figure 1: How different standards of provision for water, sanitation and hygiene are associated with different levels of risk for faecal-oral pathogens



SOURCE: Drawn from Prüss, Annette, David Kay, Lorna Fewtrell and Jamie Bartram (2002), "Estimating the burden of disease from water, sanitation and hygiene at a global level", *Environmental Health Perspectives*, Vol. 110, No 5, May, pages 537-542.

Figure 3.7. Association of Sanitation Types and Risk of Disease.

. Correlating Appendices A and B, which list the number of districts in Alagoas without sanitation, and using prior Figure 1.8., which demonstrates how many people in Maceio must rely on non-public sanitation services, global concern can be viewed at a national, state and grassroots level. The map in Appendix H shows the entire urban

Maceio area and which type of sanitation services each area relies upon. Residents along the upper arm, towards Recife, utilize individual septic tanks. The other areas represent various sewage systems, including the emissary, a compactor and stabilization pond. There is no uniform system. The sanitation infrastructure seems to be a collection of different systems that have been “added on.”

Maceio’s water management company provides over 80% of the water to the city population, yet it only provides 10% of the sanitation services to portions of the city. Based on a conversation with CASAL’s project manager, Senhor de Franca Costa, the percentage of residents lacking sanitation services is not likely to improve dramatically in the coming years. CASAL’s existing sanitation facilities are pushed to capacity with the current served population, and the funding is simply not there to expand. The government-subsidies given to CASAL are for other projects, like new residential and commercial developments, projects that will benefit the future landscape of the city, while the existing infrastructure struggles with its current load.

The Alternative Sanitation

When public sanitation is not available in Maceio, there are typically two options: 1) a person can pay for private services, such as obtaining a septic tank, having the home hooked up to the tank and paying to have the tank pumped when full or 2) utilizing “free” methods of disposing of waste, such as dumping it into a yard or canal, both of which are illegal. For most of Maceio’s poor, the latter is the only option. During my fieldwork, 13 out of the 13 community members in the favelas, which are made up of both working and nonworking poor, reported, when interviewed about sanitation costs, that sanitation

resources, both public and private, were far too expensive to afford. These families described and showed me the types of receptacles they use for waste in their homes and their usual sanitation practices.



Figure 3.8. A home in Barra Nova with pipes from the kitchen out to the yard (Snyder 2009).

In an interview on July 2, 2009, a mother in Barra Nova, an outskirt of Maceio situated on a saltwater lagoon, said that while the family has excellent public water service, they have no sanitation. The family defecates in a hole in the ground with a seat built over it in an outhouse. As seen in Figure 3.8., food and liquid wastes from the

kitchen flow out of the house into the yard only a few feet from the house, where children play and many animals roam. Like many poorer family dwellings, there seems to be no boundary between where one lives and where wastes flow, causing concern that people living and playing in the same areas can become ill.

In interviews with community members on July 2, 2009, all thirteen families interviewed in the Feijao favela demonstrated that they use big buckets for toilets or simply an abandoned toilet directly on the ground, with a small ditch dug underneath, as shown in Figure 3.9. Waste flows directly under the toilet and out through the dirt to the street. Many of the streets have additional ditches which direct the waste to the nearby lagoon.



Figure 3.9. Toilet with ditch in a favela home in Maceio (Snyder 2009).

Buckets are used in the kitchen as a makeshift sink and catchment for water. Typically, a family member fetches a container of water from a well or spigot in the community across the median, and that container is placed in the sink and used all day, for cooking and dishwashing, until the water is gone. Not until the water is polluted, but until the water is gone. See Figure 3.10.

Since favela homes are typically one room, the kitchen, living and eating areas are communal, and the area is converted into a bedroom for the entire family at night, often with a shared bucket to use as a toilet. In the morning, the common room is changed back into a living area and kitchen. Again, there are no clear boundaries for waste and where people live and eat.



**Figure 3.10. Typical sink in a favela home
(with permission, COOPLANES 2009).**

Some favela residents said that, knowing the health implications, they try to keep at least the solid wastes contained. In an interview on July 2, 2009 in Feijao, one mother said they keep the toilet separate from their living quarters. “It is a tent with plastic on the sides. We dug a hole and we pee in the hole directly; but to [defecate], we put a baggie in the hole and then throw the baggie in the trash.”



Figure 3.11. Using the rainwater canal for sanitation (Snyder 2009).

Many favela and urban poor residents communicated that without available trash services or convenient disposal options, these baggies end up in the streets, in their backyards, along the outsides of their homes or, as described previously, in the Riacho

Salgadinho canal. As seen in Figure 3.11., it is a common practice for residents who live along the canal to build pipes that go directly from their homes to the canal.



Figure 3.12. Garbage washed up along the canal edge (Snyder 2009).

Human and domestic wastes flow freely, around the clock, directly into the canal, which carries that waste approximately 8 miles⁴¹ through the city and onto a public beach. Feijao and the nearby communities also dump into the Riacho. Residents say they have no other choice. In an interview on July 2, 2009 near Feijao, one urban resident said “There is no place else to put our waste.” They use the canal, he said, “or we dig holes.”

The canal, which contains household chemicals, animal carcasses, and industrial products from nearby auto mechanic shops, oils, domestic waste and feces, is almost entirely open, except when it flows through tunnels, and it is accessible throughout the city. There are dozens of communities situated directly on top, including homes which have doorways that open up onto small footbridges directly over the canal. Residents walk from the front door, over the canal, and to the sidewalk, which runs parallel to the waterway. Hundreds of pedestrians walk for miles along the canal to work or to bus stops daily. There is a lack of boundary between people and sewage.

In conversation on July 19, 2009, with Telma Loureiro, an environmentalist with Cooperative de Planejamento Projetos e de Servicos, Profissionais Liberais (COOPLANES), she said, “Kids do play in the Riacho. They play in the water and put their feet in it. There is human waste and a lot of other wastes in the canal. Kids do defecate in the canal, as well as in the lagoon. People who live near or on the canal, as well as the favela-side of the lagoon are at increased risk of scabies and dengue. There are a lot of mosquitoes, and in the canal, the water is stagnant.”

Telma is also concerned that simply moving the favela residents is not going to resolve their most serious health issues. “Even in the government housing, and especially in the homemade houses, *Giardia* is a big problem. The people are drinking directly from hoses and wells. When they take directly from the house, and fill their buckets or containers, or drink from the well, and this water is not filtered. The water is treated for agriculture, or okay for cooking, but people should drink the filtered water from the big bottles (5 gallon jugs). Because they are drinking untreated water, they are getting

intestinal illnesses,” she said. Fortunately, Telma thinks it is possible for some of the residents, especially the children, to build resistance to some of the pathogens.

In an interview on July 6, 2009, Senhor de Franca Costa from CASAL acknowledged this improper use of the Riacho. “People dump in the Riacho because it is really not regulated. People can elect not to have water service from CASAL. They would have to pay a bill, so they can choose not to. Some areas have water access but no sanitation, so they use the canal for sanitation disposal. Some houses have sanitation service for their toilets, pipes that go down under the house and out to the street where they join other pipes that [carry] the waste to the emissary or waste treatment plant, but the kitchen is not a part of that system. Either the pipes were laid before kitchens were considered, or it is too costly to have the kitchens connected to the rest of the sanitation system. The canal is used only for rainwater, so no one is supposed to be using it for any other purposes, so waste goes in there and just gets carried out. People are not really supposed to be dumping, and there are fines and regulations but they are not enforced,” Senhor de Franca Costa said.

Another common sanitation problem in Maceio is due to malfunctions of the system. Some areas that once had working sanitation now have pipes in disrepair. As mentioned in Chapter 2, lack of community effort and public education about how to properly use septic and piping systems means that often the system is clogged with materials that should be dumped or flushed. Communities across from Feijao now need new sanitation pipes because of by-product refuse that has been thrown into the streets, clogging the drains. In our interview, Senhor de Franca Costa says that the water and

sanitation system through the community was extensive and is now not functional. CASAL representatives showed me blueprints of the area the sanitation network covered before and now where the working system ends. Service has been greatly reduced from what was originally there, at no fault of the management company. “We cannot make any changes or improvements to that community’s system until the favela has been eradicated,” says Senhor de Franca Costa, or the problems will happen again.



**Figure 3.13. A donkey at home
(Snyder 2009).**

Human and domestic wastes are not the only issue in Maceio, as animals freely roam both the inner city areas all the way out to the suburbs. Dogs, birds, cats and

especially donkeys and horses are a norm along city streets. Animals are tied to front doors and often share living space with residents. In an interview on July 2, 2009, a mother in Barra Nova said that she understands that animals can pass along disease, “but what can be done.”

The inability of people to improve their standard of living through access to sanitation is of great concern. Most of the urban and suburban communities in Maceio reported some type of deficiency in sanitation services during my fieldwork. Lack of piped sanitation is a problem, even in significantly dense neighborhoods. None of the favelas that I visited in Maceio had sanitation services, except one situated in the center of the city. Sanitation shortfalls also spanned a wide socioeconomic stratum.

In interviews from June 26, 2009 to July 17, 2009, approximately 80% of 35 interviewees reported “no” when asked if there were regular sanitation services available in their community. Participants also reported that despite lack of public sanitation services, they also did not have privatized service, mainly because it was too expensive. There were no sanitation problems reported in the areas in upper Maceio, particularly among the upper class communities that lived in managed apartment complexes; and white-collar families in the more expensive suburban communities typically paid for private sanitation trucks to pump their septic tanks. Despite this access, in an interview on June 30, 2009, with a participant in an affluent community in upper Maceio, who uses private water and sanitation services, she said the utilities are not always available. The participant said that there are times when they go without water for three days and are not informed. For this reason, they spend their days filling up reserve tanks, in case service

stops for any reason. In addition, sometimes the septic tank is not pumped for days, and the family cannot flush their toilets until service resumes.

Without government or private funding, large-scale solutions to Maceio's sanitation problems are out of reach. Privatization is out of the question due to cost implications, as most of the city's population cannot afford the overhead.

In a conversation on June 25, 2009, CASAL project manager Senhor de Franca Costa said the management company freely admits that municipalities offering public services simply do not have enough money. He also noted that privatized cities lack prioritized attention towards sanitation for the benefit of health.

There are other options, however, if the public is proactive and public health information is available. The World Health Organization (WHO), which named 2008 the Year of Sanitation, suggests that sanitation solutions can be simple and inexpensive, but it does require both national and community cooperation. The WHO urges governments to provide public health education to both urban and rural areas worldwide to teach families about pit toilets, composting, hand washing, wastewater management and water purification (WHO 2008). As will be discussed in Chapter 4, the Brazilian government is trying to provide some public health education, as part of the new favela housing project, but this program is not city-wide. In addition, those with access to public health education programs often do not utilize the programs. Therefore, in addition to those who will become ill due to unintentional contact with wastewater diseases, there may be a high level of disease occurrence that could be prevented by public health education about best hygiene practices.

Diseases of Waste

A lack of access to sanitation and poor sanitation practices result in disease.

Diseases passed along in the water sources, such as the Riacho and Lagoa Mundau, are a public health nightmare.⁴² Agents of disease in water, also known as pathogens, are a hazard in nearly all parts of the world. Waterborne pathogens can occur in all types of water sources, and they are particularly rampant in areas where there are large amounts of untreated wastewater.⁴³

Pathogens are transmitted through human or animal feces (Stauffer 2004, 22), and they can cause a number of adverse health effects. There are many different types of pathogens, including bacteria, viruses, fungi and parasites. Examples of viruses commonly found in wastewater are Hepatitis A and Norwalk virus. A common fungus is *Candida*. Common bacteria, such as *Salmonella*, can cause food poisoning and lead to typhoid, and *E. coli*, commonly found in human and animal intestinal tracts, can lead to kidney failure, and *Vibrio cholerae* is, the pathogen that causes cholera, which can lead to an acute intestinal infection and death (Barzilay et. al, 1999, 43-47).

Many wastewater pathogens can lead to serious gastrointestinal illness, and parasites. Parasites, such as *Cryptosporidium* and *Schistosoma*, can cause diarrhea, which is a significant cause of death worldwide. *Cryptosporidium* is, a parasite with a high prevalence worldwide, and it can also cause abdominal cramping, nausea and vomiting (Stauffer 2004, 23-24).

Schistosoma, a parasite that causes schistosomiasis, can lead to internal organ damage (CDC 2008). It is related to poor disposal practices of human waste (CDC

2008). The WHO states that basic sanitation can reduce this disease by up to 77% (WHO 2009). According to local experts, *Schistosoma* used to be a greater problem in Maceio.

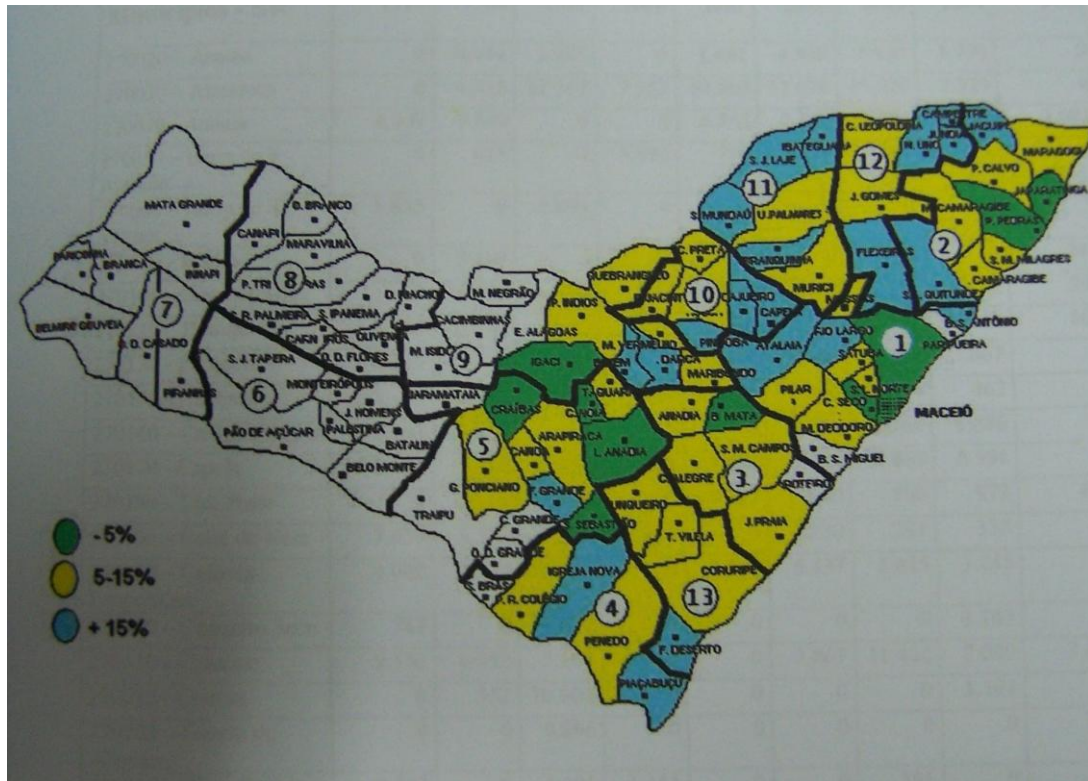


Figure 3.14. Distribution of Schistosomiasis in Alagoas from 2001-2006 (da Silva et. al. 2006).

Alagoas state has an average prevalence rate of schistosomiasis of 5-15%, based on graduate research at University Federal in Maceio, from 2001 to 2005, displayed in Figure 3.14. According to the study, the prevalence of schistosomiasis in Maceio has declined rapidly in recent years due to a vigilant control program targeted at Lagoa Mundau. Because of this program, the prevalence in Maceio is now less than 5% (da Silva et. al. 2006).

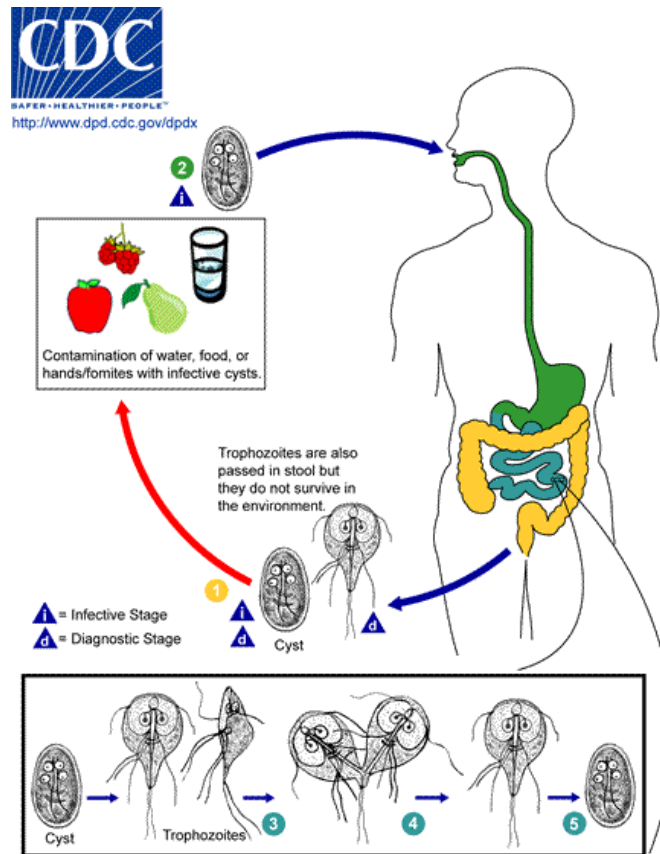


Figure 3.15. Cycle of Giardiasis (CDC 2009).

The pathogen that is still the most prevalent in Maceio, however, is *Giardia*, a protozoan that, as seen in Figure 3.15., causes diarrhea, abdominal cramps and fever (Stauffer 2004, 25). As will be explained in Chapter 4, residents of Maceio are regularly treated for this disease, but there is a discrepancy in how one is treated, based on affordability of care.

According to a conversation with hospital administrators on June 26, 2009, July 1, 2009 and July 6, 2009, the leading cause of death related to waterborne pathogens in Maceio is from diarrheal disease and dysentery.

Bacillary dysentery is caused by the organism *Shigella*, which can cause frequent diarrhea and the vomiting of blood (27-28). Diarrheal disease, such as dysentery, is a serious disease, which affects two billion people worldwide (WHO 2009). According to the WHO, diarrheal disease is the second leading cause of death for children under five years old (and less than one month old), killing approximately 1.5 million children per year. It is a preventable and highly-treatable disease. This disease typically affects children under two years old, and it is a leading cause of malnutrition in children (WHO 2009). A fact sheet on diarrheal disease can be found in Appendix I.

Diseases of Circumstance

There are a number of other water-related and tropical diseases that affect residents of Maceio, and the city has a specialty hospital just for the treatment of tropical diseases. These diseases include malaria and dengue fever, which are mosquito-carried and prevalent in this area because of the widespread occurrence of stagnant water. In addition to the local lagoons, Maceio has frequent rain, and puddles can be found throughout the city and suburbs. Maceio's Ministry of Health provides several publications to inform residents about dengue fever, which can be seen in Appendix J. Additional information about the types of public health information available in Maceio will be shared in Chapter 4.

Chagas disease, a tropical disease that is widespread in Maceio, is caused by the reduviid bug, resulting in both cardiac and gastrointestinal problems. It is thought to be more rampant in areas where there are thatched roofs, which makes it particularly

threatening to both the favela and “landless” communities. While it is not a water-related illness, there are a significant number of people at risk for this disease in the favelas.

Residents of favelas, landless communities and poor neighborhoods are at risk for many diseases, not just those that are water or climate-related, possibly due to their living environment and the close proximity to one another in the dwellings. According to Maceio’s Ministry of Health and doctors at both Sanatorio and HGE, diseases such as tuberculosis and leprosy frequently occur among the poor in Maceio. Hansen’s disease, or Hanseniasis, as it is known in the community, is commonly known as leprosy and is widespread in the favelas. Thought to be spread to others through respiratory droplets, leprosy is often manifested through lesions on the skin. So widespread in this country, the WHO reports that Brazil is one of only five countries that have 90% of the leprosy cases worldwide (CDC 2008).

Tuberculosis, caused by the bacterium *Mycobacterium tuberculosis*, is spread through the air when an infected person sneezes or coughs and a person nearby breathes in the bacilli. The disease, which typically attacks the lungs but can also affect other organs, can be fatal if left improperly treated, and the CDC notes that people who spend a prolonged amount of time, in a closed environment, with an infected person, are at particular high risk (CDC 2008). This scenario may be why many in the urban poor community in Maceio become infected with TB each year, since households are often made up of between 5 to 20 persons.

Examples of public health notifications regarding many of the high-risk diseases among the urban poor can also be found at Appendix J, which unfortunately does not

include any information related to sanitation or hygiene, for which there are none in existence at present.

Another growing problem in Maceio is illness due to molds. Because of the devastating tidal wave that hit the ocean and shore near Lagoa Mundau in 2006, much of the shorefront community was destroyed. Relentless rains in April 2009 demolished the large sandbar that separated Lagoa Mundau from the ocean, and waters flushed through area homes, including that of my friend and informant, Amelia Regina Gomes Peixoto. The sweltering heat that followed the rains and the need to close up the house due to both temporary relocation and mosquito-infestation exacerbated the molding in walls, carpets and closets. My friend, who has asthma, was unable to stay in the house regularly for several months, and the home is still overcome by molds. Flood clean-up is expensive in Maceio, and money is not always available for reconstruction. In Appendix K, Amelia allows me to share photos of her home, which illustrates the damage caused by natural disasters related to water and the ensuing health problems in a tropical climate.

As we can see, there are certain common, widespread diseases that are fostered by factors such as lack of access to clean water, inadequate sanitation, poor hygiene conditions and compromised standards of living. These are circumstantial diseases that, in particular, plague the impoverished. In their texts, Paul Farmer, Benedita da Silva and Nancy Scheper-Hughes offer that diseases that specifically target the poor are not a socioeconomic stereotype or generalization, but instead are substantiated by evidence and the growing, epidemic of widespread disease. These afflictions are often referred to as the diseases of the poor (Scheper-Hughes 1992, Farmer 1999).

To understand diseases of poverty, it is important to look at which Brazilians have been dying of what, and this can also be viewed historically. In the early 1900s, a disproportionate number of Afro-Brazilians died of tuberculosis and gastroenteritis, compared to the white population. Afro-Brazilians were associated with the poorest class, and nutrition has also always been a problem for Brazil's poor (Pineo and Baer 225). This is still broadly true today, although Afro-Brazilians are not the only ethnicity that makes up Brazil's poorest populations.

Living conditions are thought to be a factor in the higher mortality of the poor, yet in the past and today, inadequate record-keeping about the health of the poor makes it difficult to confirm how many deaths are related to what diseases or circumstances. The physical diseases of the poor may also have a stress aspect. In *Rural Health Care*, Milton Roemer asserts that citizens that live outside the reach of public services may experience feelings of isolation, as well as neglect. In *Poverty, Ethnic Identity and Health Care*, Bonnie and Vern Bullough suggest that the health of an impoverished person may be compromised by additional psychological stresses, such as helplessness and fatalism, which can damage health in ways analogous to racial discrimination. Similar to racial and ethnic barriers, poverty often causes feelings of alienation and aloneness (Bullough and Bullough 1972, 54-57). In their texts on refugee health issues in the U.S., Anne Fadiman and Aihwa Ong note this concept as well, saying that refugees feel that the public looks at them as if they were to blame for their "condition" (Fadiman 1997, 166 and Ong 2003). An impoverished person may feel the same way. During my fieldwork, I certainly found this to be true. Conversations with various members of poor

communities revealed a sense of fatalism, in particular, as well as a lack of control over their living conditions.

In my investigation of this issue, the epidemiology department at the Ministry of Health was extremely helpful, handing over a flash drive full of epidemiological studies and reports to the City of Maceio regarding disease and mortality studies for the municipality. These studies show positive correlations between tuberculosis and urban poverty and a higher occurrence of both scabies and leprosy among poor communities. The Ministry of Health's initiative to research diseases of the poor is commendable, considering the challenge of obtaining data.

In her lecture on September 9, 2008, at the Pan American Health Organization (PAHO) in Washington, D.C., now former-Deputy Director Cristina Beato said that one of the biggest hurdles that public health workers face in Latin America today is lack of existing data. My fieldwork also concluded that quite often researchers have to start from scratch in an attempt to make connections between people and disease. An informant from Maceio's largest public hospital agreed. In a conversation on July 6, 2009, she showed me a room filled with stacks of papers, a few computers and no one working. They try their best to update their systems, however, she said, "sometimes, data happens," and sometimes no one gets around to it. Substantial data has been collected on various diseases in Maceio. In particular, the threat of diarrheal disease to the local population has been widely studied among the poor in Maceio.⁴⁴ In conversations with the epidemiology departments at the Ministry of Health on July 1, 2009 and July 13, 2009, I was told that their ongoing studies regarding diseases related specifically to

socioeconomic factors do conclude that the poor will always get sick more often than the wealthy, but it also depends on the specific quality of life of each person. For example, diabetes and hypertension are on the rise in both the poor and wealthy communities. Not specific to quality of life or socioeconomic factors, automobile accidents are the overall leading cause of death in Maceio.

Relating Water Practices to Illness

During my fieldwork, it was an overall observation that residents in Maceio, regardless of income level, possessed a basic understanding of safe water practices. Participants interviewed seemed to understand that they can get sick from drinking polluted water, and many reported that they do not believe they have ever become ill from using, specifically, polluted water, because of their basic knowledge of safe practices. Residents feel they are careful about what water they drink versus what water they use for cooking and bathing chores. However, these residents also said that they have frequent occurrences of intestinal illnesses. Thus, I was concerned that, despite basic knowledge of safe water practices, residents were still becoming ill with water-related diseases.

Community members said they commonly became ill with intestinal diseases and parasites. Comments varied depending on who was asked, and depending on the proximity to city services. In interviews with residents in urban poor communities in Maceio between June 2, 2009 and July 17, 2009, approximately 29 respondents reported they felt they have, at one time or another, become ill from exposure to water and wastes. This was also true of all 6 higher income participants in Benedito Bentes, who reported

that giardiasis, skin diseases such as scabies, intestinal worms and vaginal yeast infections, due to prolonged exposure to moisture and improper hygiene practices, are common diseases that plague nearly all Maceio communities. All 13 Favela residents from Feijao reported cases of hepatitis and severe gastrointestinal problems. Although most did not know the scientific name for their ailments, favela participants reported vomiting, severe stomach pain and yellowing of the skin. Others reported opened wounds on their arms and additional signs of skin infections, usually diagnosed as scabies.

Questions about sanitation practices also focused on the community's children. I aimed to discern broader patterns of understanding of health issues among urban poor adults by asking about the general health of their children and finding out how the children are taught about best safe practices.

In interviews from June 2, 2009 to July 17, 2009, 29 residents from a wide range of poor communities voiced concern about the health of their children, who may not be as careful about hygiene practices as adults. All four communities queried answered that they felt their children were at risk for water-related illness or disease, with the exception of Happy City, the new government housing project, who say they trust their new water supply, even for drinking.⁴⁵

However, 29 parents from Feijao favela, Jatuica, Benedito Bentes and City Center said that their children play in waterways and, in the case of Feijao, also play daily in waste deposits. While other community parents say their children typically "know" not to play in areas where there is waste, in an interview on July 3, 2009, one parent from

Happy City said “I know they play in there when I am not around.” This revelation could mean that despite having access to clean water and piped sanitation in their new government-subsidized home on filtered CASAL water, children from this modern community may still be at risk for waterborne illnesses.

In fact, in interviews from the same time span, 29 parents from all communities shared similar stories about their children’s hygiene and sanitation practices, regardless of socioeconomic status. Playing in the streets, gutters, backyards filled with animals and in lagoons are common activities of most children in Maceio, and they play without much parental supervision. Some of these children are as young as 3 or 4 years old.⁴⁶ When asked what types of sanitation practices the children use when they go out to play, most parents were unsure, mentioning that their children likely went to the bathroom in the canal, lagoon, in a trashcan, in the street or in the grass. A few community residents from Benedito Bentes and Jatuica said that their children typically come home if they need to use the bathroom, but it just “depended on the child” and if they were in a hurry to keep playing.

This is not for lack of trying to build some level of community knowledge about safe sanitation practices, however. Across the communities, interviewed parents said that they “more or less” teach the children about what is safe water to drink and what hygiene practices to use after going to the bathroom, but mothers and grandmothers from Feijao, specifically, said “the kids do not understand.”



Figure 3.16. Children at play in a Maceio neighborhood (Snyder 2008).

Other “good hygiene practices” were defined as brushing teeth, taking a shower, brushing hair, washing hands, with most parents reporting that they teach their children these concepts regularly. In interviews with 35 residents from varied socioeconomic backgrounds from June to July 2009, all but the Feijao residents felt their children possessed some knowledge of best practices, with one community generally reporting they feel their children are very knowledgeable. Because of the required community workshops prior to moving from the favela to the government housing, the two mothers from Happy City believe that all of their children now know about proper water,

sanitation and hygiene practices, such as taking showers when they get home from play and washing their hands after using the bathroom.

Thirteen parents in Benedito Bentes, Jatuica and City Center also said that the children learn health education in school, but other than that, there are no free public health education services geared towards water and sanitation. Again, Happy City was the exception to having targeted access to health information, because of their mandatory workshops they receive prior to their move to government housing.

Despite knowledge of best practices, however, all 35 community parents interviewed including Feijao, six city districts including affluent Jatuica and Ponte Verde homeowners, and Happy City, said that their children regularly have intestinal worms and have, at one time or another, been affected by dehydration. People in all six communities noted that their children were regularly affected by diarrhea, although some felt that the symptom could be related to the flu or another type of respiratory virus versus parasites. Both favela families and more affluent families said they believe their children regularly have water or sanitation-related illnesses, with the exception of Happy City, whose residents feel their children should now be less affected by those concerns because of the new housing. None of the parents interviewed, however, believe that it is possible to build a resistance to water or sanitation-related bacteria. They believe it is a symptom of normal life.

Clean water can also be disconcerting to residents who are not used to treated water. In early July 2009, Happy City residents experienced their first public, piped water and sanitation services in their lives and immediately experienced a health “scare.”

When families moved into the newly built, government homes, they reported that their skin was turning white and patchy. Residents feared they had scabies or even leprosy and called social services for help.

In an interview on July 3, 2009, one mother described how she rubbed down her children every night with lotion, concerned about what the relentless skin condition could be in their new, promising home. Fortunately, social workers were able to work with CASAL to determine that the white skin was due to a fluctuation in chlorine in the new water pipes, causing a film after bathing. The problem has now been corrected, and the residents retell the story with quite a sense of humor.

Skin conditions and illnesses related to water are not typically a laughing matter, however, as one of the epidemiologists from Maceio's health department stated. In an interview on July 13, 2009, an analyst with the Ministry of Health stated that the poor "definitely" get sick more than those who have access to more resources. "In the favelas, especially, there is diarrhea, TB, scabies (and other illnesses). These people have problems with the water, however, not because of the quality but because they don't know how to use it. They don't wash hands or they don't have a kitchen sink. They reuse the water. So, the water quality may be good, but the water is being misused," he said. Although improper hygiene practices are a problem among the poor, the reuse of water is because the favela communities have a physical scarcity of water, and, based on my observations, when they did access water, that water quality was not always optimal. The favelas did not appear to have access to water, let alone high-quality water.

More disturbing, however, is that diseases afflicting the impoverished are not just a matter of discomfort and inconvenience. This population is also dying from “diseases of poverty.” In interviews with 29 residents in urban poor communities in Maceio, between June 2, 2009 and July 17, 2009, only 2 of 29 interviewees reported they have not had a family member die from a water-related disease or illness, specifically, and every respondent out of approximately 13 in this area knew of community members who had died of water-related illnesses or diseases, such the diarrheal disease, dysentery.

Preventing Illness

Despite the high prevalence of illness in Maceio’s poorer communities, due to wastewater pathogens, laboratory managers at a CASAL say they are vigilant about preventing contaminants in water, especially fecal matter. In an interview on July 17, 2009, a laboratory manager with CASAL said “There is no allowance for impurities in water. It is not what is allowed but what is not allowed. We test [water] every day from different areas. There are always people out collecting the water samples. The water is collected outside of the house from a spigot. If there is no spigot, we don’t collect it. Community members are responsible for the cleanliness of the water inside of their homes,” he said.

The laboratory manager proudly showed me temperature-controlled cases where samples from each home or residential area are kept for comparison and test tubes with growth culture tests for fecal coliforms. “[Even if we find fecal matter in the samples], since the water is not recycled, but cleaned and sent to sea, there is no chance that people are getting fecal coliform in their water at the house,” he added.

As previously shown, residents can see for themselves that testing has been done for fecal coliforms by looking at the quality report on their water bill. CASAL's water treatment processes for both surface water going to residents and wastewater flowing out to sea is similar to the water treatment process commonly found in the U.S.⁴⁷



Figure 3.17. CASAL Wastewater Treatment Plant (Snyder 2009).

Wastewater in Maceio is not recycled, lowering the risk of possible contaminants in the water sent through the municipality for use. In an interview on July 17, 2009,

CASAL's treatment plant manager said that the water goes to the treatment plant "used," is cleaned and then sent out to the emissary. "It is not reused."⁴⁸

Still despite the standardized water treatment process at the plant, managers say that the plant is not adequate for the waste volume sent by the local communities. In our interview, CASAL's plant manager said "This [plant was built] thirty years ago. There is a new project [proposal] to duplicate everything, because right now they have three cubic meters per hour and they are supposed to have at least five cubic meters. The new project would allow for seven cubic meters."



Figure 3.18. Filtering water at the CASAL plant (Snyder 2009).

From their other water pumping facility, CASAL states that the water that is sent to the homes is potable. In our interview, CASAL's laboratory manager said "[The water] is potable and clean for that list of maximum permitted impurities. However, some of the water travels thirty meters or more to a house, and we cannot guarantee what happens [for the last 30 meters]. There are all types of pipes: damaged pipes, rotting pipes, old pipes, pipes that are rusted and full of iron. So, when it gets to the house, [the water] is mostly clean, but people still buy the bottled water because they don't know what has happened to their water since it left CASAL," he stated.

During my fieldwork, this general attitude that the services are operating at "the best that they can do" was a widespread sentiment. Government agency representatives in Maceio were typically empathetic towards the plight of the poorer communities, yet unconcerned about the limitations of government assistance. From water managers to the Department of Habitat to the Department of Social Assistance, implementers said that those who can provide programs aimed at helping those in need are at the threshold for help, for now. When asked whether or not there was enough public health education available for vulnerable populations, particularly in terms of safe use of water and the relationship between sewage and disease, the epidemiologist simply stated, "The government has reached the maximum to be covered. They are working on it."

4. Observations of Brazil's Public Health Services

The lack of access to potable water, lack of basic sanitation and compromised standards of living leads to a higher risk for disease. This, in turn, raises the question of what kind and quality of healthcare and public health programs are available for the urban poor. These vulnerable populations may be located outside the reaches of healthcare facilities, the quality of the care may be compromised, and optimal care may be cost prohibitive. The poor are getting sick more often, yet it is likely more difficult for them to find treatment (Farmer 1999, 4, 27-28, Scheper-Hughes 1992, 31 and Adamo 1998, 233).

Access to Healthcare

In more than 29 interviews with residents in urban poor communities in Maceio between June 2, 2009 and July 17, 2009, I asked participants who have been ill with water-related illnesses about their course of treatment. When asked if they received treatment for their illnesses, 80% of the respondents were treated at either a clinic or hospital, but half of those participants felt the treatment received for their ailments was inadequate. None of the interviewees had follow-up treatments, which they report was discouraged by the public hospital administrators. The public hospital workers encouraged patients to contact their neighborhood clinic instead. For many of their

illnesses, in addition to -- or instead of -- traditional pharmaceuticals, most people were given recipes for homemade prescriptions.⁴⁹ Common in Brazil, a combination of water, sugar and salt is called the “homemade I.V.” or “homemade soda” and is proven to cure a variety of conditions, including dehydration.



Figure 4.1. Sanatorio: public-private hospital (Snyder 2009).

All 35 of the residents, including those in Feijao, reported that healthcare services are available in their communities. Unfortunately, the wait times and the quality of such services are not ideal. As seen in Figure 4.2., one of the reasons for such a high wait time

is because the number of public hospitals is not adequate for the number of people who need them.

According to a 2008 marketing study by research company Frost & Sullivan, public and private healthcare institutions are distinctly different. “The public healthcare provision is strictly related to life conditions of the Brazilian population as a whole...while the public health services are based upon principles of universality, integrality and equality, the private provision is focused on a niche of clients and their satisfaction” (Frost & Sullivan 2008).

According to the summary of the survey depicted in the previous Figure 1.7., the Brazilian government expenditure on health care is approximately 7% of GDP, and approximately 80% of Brazilians utilize the public health system, Sistema Único de Saúde or “SUS”. Brazilians do not have to pre-qualify or pre-register for healthcare services, and they can receive such services at any hospital that is a provider for SUS. However, the study also states that the Ministry of Health is the funding agency for the public health sector in Brazil, but that lack of money has drastically retarded the quality of the public healthcare system, as well as the scope of coverage (Frost & Sullivan 2008).

The alternative to public services is, of course, private healthcare. The study noted that privatized care aims at providing higher quality services to those who can afford the care, although that is only approximately 25% of the Brazilian population. There has been a recent increase in private care, however, thought to be driven by the inconvenience of using public healthcare facilities, namely the lack of government

resources, stagnant infrastructure, long wait times, lack of doctors and lack of amenities (Frost & Sullivan 2008).

	Total	Public	Private	
			Non-SUS	SUS
Number of Hospitals	7,155	2,727	1,362	3,066
Hospitals with ICU	1,756	432	592	732
Hospitalizations [*]	23,252,613	7,022,089	10,630,932	5,599,592
Total Number of beds	443,210	148,966	123,430	170,814
Hospitalization to Bed Ratio (%)	52.5	47.1	86.1	32.8
Total Number of Beds by Hospital	61.9	54.6	90.6	55.7
Number of ICU Beds ^{**}	33,589	4,484	23,966	5,139
ICU Beds to Total Number of Beds Ratio (%)	7.6	3.0	19.4	3.0
ICU Beds by Hospital	19.1	10.4	40.5	7.0

^{*}2004

^{**}Estimation

Source: IBGE

Figure 4.2. 2005 Hospital Statistics for Brazil (IBGE 2005).

As is also shown in Figure 4.2., the Frost & Sullivan study indicates not only a social trend towards private care, but also a presence of inequality, as populations in the North and Northwest regions, specifically, have less access overall to public facilities,

when mapped geographically. Figure 4.3. demonstrates that the number of private facilities in Maceio is also drastically greater than what is available publicly, accounting for national, university, city and private healthcare facilities (IBGE 2005).⁵⁰ This data is further itemized in Appendix L.

Frost & Sullivan also point out in their study that a reduction in the number of hospitalizations on the public hospital side is not due to lack of illness in the population but because Brazil has been trying to reduce costs. The government does this by limiting the number of beds available at the hospitals. If there is no room, there is no hospitalization (Frost & Sullivan 2005).

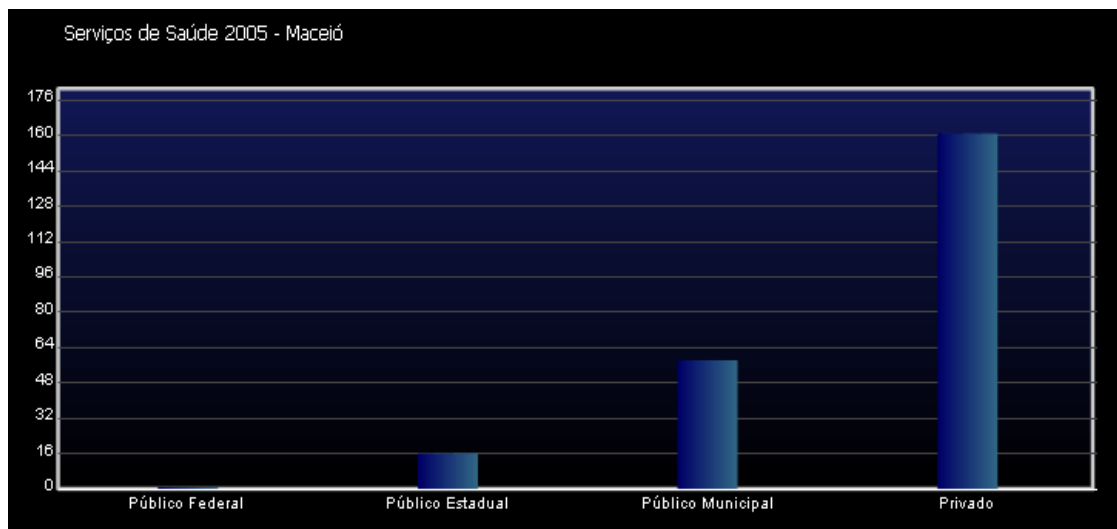


Figure 4.3. Trend of Healthcare Services in Maceio (IBGE 2009).

Using this as a foundation, it is obvious that resources for the poor are strained, but they are available, assuming one can get to the hospital and there is a bed available.

If there are such constraints, is it really accessible?

In *Infections and Inequalities*, Paul Farmer, a physician and anthropologist who has studied the contrasting availability of healthcare for rich and poor, as well as the cultural connections to persistent infections, particularly in Haiti, views access as a social dilemma for the poorest people. Farmer observes⁵¹ that when faced with a choice between feeding a family versus paying for both gas to travel to a clinic and paying for medications, a poor person often chooses the former (Farmer 1999, 187-188). In Farmer's example, Jean, a man from a small Haitian village who began coughing regularly, was faced with such an unfortunate decision. Farmer, who was primarily studying tuberculosis among the poor, says there was no clinic in Jean's village, and traveling to an outside facility was too costly. Because of the financial responsibility that Jean had to the family, instead of seeking medical care, Jean drank tea. Eventually, Jean was treated for tuberculosis and cured, but not until after nearly dying, being sent to a sanatorium, taking only half of the prescribed medication, and destroying his left lung (Farmer 1999, 187-189). During his fieldwork, Farmer observed that caring for oneself is a deeply conflictual decision for the poor. Jean literally had to choose between feeding his family and obtaining treatment for his life-threatening disease.

Farmer asserts, if there is a clinic located within a community but medical services are costly, it may not fit the definition of accessibility. If there is a free clinic available, but it is across town, it is not really accessible either. Governments offering accessible services seem to discount a person's ability to pay for travel to a facility

(Farmer 1999, 187-188), and when both convenient and affordable healthcare are available, it is often of very poor quality. This was also the case in Maceio.

Although most of the lower class population has access to hospitals in Maceio, those facilities often do not meet “minimum quality standards,” common in Brazil’s infrastructure (Thomas 2006, 119-121). Yet, administrators of Maceio’s public hospitals say their level of care is the best that the poor can hope for, acknowledging that the quality is not necessarily equal to that found in private care. In our conversation on July 6, 2009, a representative at Maceio’s largest public hospital, Hospital Geral do Estado or “HGE,” says that the lack of quality at the public hospitals is not a deliberate effort to discriminate against the poor. It is simply the level of care that is available at the lowest cost.

Inequities of a Public Hospital

I predicted upon arrival at HGE for my visit on July 6, 2009, given the crowd outside of the hospital, that the inside of the facility was likely packed. The dilapidated cosmetic conditions outside and inside of the facility are also immediately noticeable. The overall aesthetics are poor, especially since construction for much-needed improvements was halted nearly a year before, because the hospital administration ran out of money. The Brazilian government has not sent any new funds.

There was not enough room in triage or in the waiting room for patients, so people were on stretchers, thin mattresses and blankets on the floor of the waiting room. Beyond the waiting room and inside the corridors, patients were on hospital beds or standing against the wall, throughout the hospital hallways. Some people were walking

around with open wounds, carrying their own I.V. bags. Many people had their own sheets and pillows, brought from home. Every bed was full in the infirmarias, or “inpatient wards,” which are the large rooms with multiple beds. In HGE, every room is an infirmaria. There are no private rooms.



Figure 4.4. Waiting outside of the public hospital (Snyder 2009).

Family members were sitting and standing everywhere, and there appeared to be a very low ratio of doctors and nurses to the sick. Patients with various afflictions and disease, with varying degrees of pain and urgency, were in both the waiting areas and the

hallways. There were several security guards, wearing flak jackets and guns, stationed at the front doors, elevators and access doors, to keep “the peace.”



**Figure 4.5. The rooms are full
(Snyder 2009).**

Incoming patients typically made their way to their hospital on their own, since this hospital has only three ambulances, which it shares with the other area public and

private hospitals. These ambulances are available only to transport patients between hospitals, not to pick up from private homes or rescue injured victims in the streets. The wait for Serviço de Atendimento Móvel de Urgência or “SAMU”, the ambulance service, is often longer than the time it takes to find a neighbor, family or friend to drive you to the hospital, one informant said.



**Figure 4.6. No beds at the public hospital
(Snyder 2006).**

In a conversation with a hospital informant at HGE on July 6, 2009, I was told that the hospital was, as usual, overcrowded. However, the current congestion was noticeably worse than usual, as HGE had to take in not only its own regular, government-insured patients, but also those from other hospitals. The other public hospitals, afraid of not being compensated for treating patients because of an ongoing strike between hospital administrators and staff and the responsible SUS insurance providers, the Ministry of Health and the Brazilian government, were turning away droves of sick. “However,” said the HGE hospital informant, “We have been told to stay open.”

It was clear that the constraints of overcrowding were taking their toll on the facilities. There were patients with every imaginable illness needing immediate care. The most common diseases at the hospital were linked to age groups. Children were affected most by diarrheal disease, dehydration, encephalitis and pneumonia. Adults suffered predominantly from cancers, [tuberculosis] and accidents, one administrator said. As the administrator described this, we passed by a severe stab wound patient and motor vehicle accident patient sitting in the hallway, bleeding and crudely patched up, waiting to be seen. “We are always full,” the administrator explained. “There is never a ‘good time’ to come.” (An itemization of hospital mortality in Maceio, including a breakdown of diseases, can be found in Appendix M.)

The facilities, although crowded and battered, were otherwise clean and seemed to have all necessary technology, such as MRIs, ultrasounds and x-rays. One basement room had a stockpile of old equipment,⁵² but the radiology department was set up similarly to a U.S. hospital. Even though there were hundreds of sick people, the hospital

environment was not chaotic. There seemed to be some sense of organization. It seemed that some people were actually content to be there, waiting. One reason may be because family members of patients were allowed to eat for free, with no limit to family size or identification required. “The cafeteria is always full,” said an informant at HGE. “Sometimes [the patient] will call cousins, aunts and uncles, who use [this opportunity] for a meal.” The line for the cafeteria was down the halls and out of the hospital’s back door.

For the most part, the hospital’s environment seemed to be one of indifference. Although there were patients flowing out into the hallways, there was no bustle of medical personal, hurrying to treat patients, so that the next one can be seen. This is not entirely different, of course, than the sensation one gets in the waiting room in an emergency room in the U.S., but Americans, myself included, tend to be a little vocal if they are not be attended to in some timely manner. In my two hours at HGE, I observed no one complaining, even the man holding his own I.V., with his arm in a homemade sling, bleeding from the head.

In his book *Vita*, referring to “zones of social abandonment” Joao Biehl sees in such places “a stillness, kind of relinquishment that comes from waiting, waiting for nothingness, a nothingness that is stronger than death” (Biehl 2005, 35). In his text, Biehl illustrates a Brazil where sick people are lying in the streets, abandoned, because their afflictions are too gross, or they are too poor, or they are refused treatment at the hospital, because their wounds are too great (Biehl 2005, 37-39). In my own observations in Brazil, these examples are not rare. There are ignored and ailing people,

begging, sleeping and dying in the streets in Maceio. Mostly, they are invisible to others. Perhaps they have become invisible to themselves. It seems as though an entire class of people has given up and others have given up on them.

Biehl has also documented the striking gap between the Brazilian government's rhetoric about its welfare programs for the poor and the services actually available to them. He points out that Brazil's healthcare structure is supposed to include all people, with all disorders, as is also my understanding of SUS, yet the reality is that precarious laws, lack of enforcement and lack of services means that the poor, and in Biehl's examples, the mentally ill, in particular, are being segregated. Paul Farmer calls this exclusion of the needy the "war on the poor."

Still, representatives from Brazil's public hospitals assert that every resource has been made available to those in need. "All services are available [to the poor] for free," the HGE representative added in our July 6 conversation, but the main difference between HGE and a private hospital is "sometimes they die in line." I thought she might be joking, but she was not.

Privileges of Private Care

The aesthetics and quality of the main private hospital in Maceio is vastly different from public facilities, aesthetically, and in terms of quality. During my fieldwork, one of my friends, Anna Fernanda Gomes Peixoto, gave birth to a child at an upscale private hospital. After spending a week visiting public clinics and private hospitals, I found myself interrogating the reasons for the sharp differences between them.



Figure 4.7. A private hospital in Maceio (Snyder 2009).

At the private hospital, rooms were clean and private, with at least three to five staff members responding to the needs of each patient. No one was waiting in the waiting room. The hospital was quiet and almost void of people. A sole security guard was posted at the front doors. There were clean and plentiful supplies, bright and clean décor and freshly painted walls, and visibly clean floors.

My friend was frequently visited by her doctors and nurses during both the day and evening. Patients were being attended to, individually, in various rooms, and absolutely no one was being treated in a hallway. The ambience was bright and cheerful with a sterile “smell,” and there were antibacterial soap dispensers on every wall. I

visited this hospital three times between July 9, 2009 and July 10, 2009 and found the environment to be the same each time, both during the day and at night. My experience compares to that in a private, suburban U.S. hospital.



**Figure 4.8. A happy, healthy family
(with permission, Snyder 2009).**

Community-Based Public Health

While in Maceio, I had the privilege to meet a large number of healthcare providers, who were willing to share their perspective on both the positive and negative attributes of public health in Brazil. In an interview on July 1, 2009, a representative from the city's Ministry of Health described the benefits and limitations of public health

in Maceio. For example, local public health clinics operate in communities to make it more convenient for people to get regular care for chronic diseases, but when there is not a clinic available, a resident will need to go to a public hospital.

There are a number of community-based clinics available to the residents in Maceio, namely neighborhood clinics and certain clinics run by Programa Saude da Familia (PSF) or “family health program,” which are government-sponsored. PSF is set up to cover the urban poor communities, with the exception of favelas (because, as discussed in previous chapters, favelas are not supposed to “exist” and the local, state and municipal government does not want to encourage them). Nevertheless, because of their geographic proximity to a clinic, approximately 27% of favelas in Maceio still have access to a facility in their community. Each area that PSF represents has a limited coverage of 4,000 people, and each associated clinic must have one doctor (a general medical practitioner), one nurse, two assistant nurses, four to six community health agents and one dentist. These agents need to visit a minimum of eight houses per day and must visit each house at least once per month.

The PSF agent’s job is to assess the wellness of a family by listening to their health complaints and recording family medical history information. The agent then makes an appointment for family members to see the doctor at the area clinic, to perform a physical and diagnose illness. The agent must assess every member of the household. Some households include as many as twenty people in a small dwelling. An example of the health intake form used by agents can be found in Appendix N. The form, which also

includes criteria specific to water and sanitation, is then entered into the computer at the local Ministry of Health.

In our conversation on July 1, 2009, the Ministry of Health representative said that although there is not much information produced by the Brazilian government on public health issues and virtually nothing on sanitation or hygiene, sometimes PSF and the local communities will produce their own materials based on information obtained in the health visits. If dengue fever is a common problem, for example, information about how to prevent mosquito infestation may be circulated.



Figure 4.9. A PSF van preparing to dispatch (Snyder 2009).

In an interview on July 2, 2009, USF-PSF administrator Eduardo da Silva⁵³ noted that public health publications targeted at disease prevention are scarce, but that there are some brochures available in his clinic about sexually-transmitted disease, child sex tourism/sexual exploitation (a problem in poor communities), dengue fever and tuberculosis (shown in Appendix J). The clinic provides condoms and condom “instruction” to both men and women, for the prevention of disease, and there are posters around the clinic about the symptoms of various diseases, and risk factors for disease, including obesity and smoking. With more than 12 years of experience as a healthcare worker, however, Senhor da Silva has never seen any government publications on the health implications of drinking unpotable water or having bad hygiene, nor has he seen anything published on proper sanitation habits. However, he thinks this information is needed.

Bearing in mind that a large portion of the urban poor cannot read, distribution of public health information in text form may not be helpful. To that end, as described in the next chapter, Cooperative de Planejamento Projetos e de Servicos, Profissionais Liberais (COOPLANES), a government contractor that focuses on the environmental health of the poor, particularly in terms of the new government housing project, is currently developing “picture book” type public health literature for the government-subsidized housing communities.

Senhor da Silva’s clinic covers 8,000 families, which are treated for widespread influenza, worms, syphilis, human papillomavirus, tuberculosis and scabies, all stemming from poor prevention practices relating to water, sanitation and hygiene, as well as unsafe

sexual practices. Residents of the community covered by his clinic, as well as a nearby favela, have illnesses and diseases of the poor, many of which are related to the living environment. Widespread influenza, tuberculosis, intestinal worms, scabies, syphilis and human papillomavirus are a problem in this community.



Figure 4.10. Outside of a PSF community clinic (Snyder 2009).

Influenza and tuberculosis, as mentioned previously, may be common because of the close-proximity that people live to one another in households, and intestinal worms and scabies may be related to poor prevention practices relating to water, sanitation and

hygiene. Due to the lack of knowledge and other circumstances, Senhor da Silva said diseases related to unsafe sexual practices are also a problem among the urban poor.

Poor hygiene practices are a problem in this area because of the lack of water and sanitation practices. They use water, which this community must take from the lagoon or steal from underground pipes, and they have no sanitation. Senhor da Silva echoed the same comments as Senhor de Franca Costa, from CASAL, about this population's water practices. "When people don't have water, they lay pipes from the nearest place that has public water, and then uses a series of hoses to get it from one house to another, or people go to their neighbor's house to get water," Senhor da Silva explained. "Mostly, [the residents] steal water from other houses, when no one is looking. They steal water from the new houses, and they steal from anywhere they can. They do it at night, or when no one is looking. If they get caught and someone removes the hose or pipe, they just put a new one," he said, illustrating the great need for water to the poor community. The need is so great that it appears that the community will go to great lengths, and at great risk, to obtain water.

Unfortunately, when residents from the nearby favelas get sick, they cannot be treated at Senhor da Silva's clinic. "PSF is meant to care for the people who are residential owners. The people have to carry a card that shows they are a legal resident of that neighborhood or homeowners," Senhor da Silva explained. Favelas are not legal, so the community members cannot prove any ownership." Although favela residents are not supposed to be treated at the PSF clinic, the medical professionals will, from time to time, treat emergencies, he says. "If someone in the favela gets shot, and they need to be

cleaned up, or get a new bandage for aftercare, [we can do that]. They have to go to the hospital for acute care, but we can do wound care,” Senhor da Silva said.

For the Brazilians that PSF can treat, Senhor da Silva feels the benefits are very good. There is no payment needed, and patients can leave with medicines in hand. The clinic has an on-site pharmacy and the ability to do x-rays and prenatal exams on location. Patients are treated fairly quickly, compared to attendance at the public hospital.

There is some public mistrust of PSF, however. Senhor da Silva said their biggest problem is getting people to the clinic. “[People] simply don’t believe that free healthcare exists,” he remarked. Patients are also skeptical about how the healthcare will work, and if they can trust the doctors. To combat the problem, doctors and nurses make house calls, and then, eventually, the skeptical patient(s) will go to the clinic. Several of the clinic’s medical professionals were on house-calls during the day of the interview, but with over 70% of the nearby favela residents not covered by community clinics, convenient services clearly do not reach everyone in need. The clinic can be seen from the favela, but residents cannot use it. If favela residents want medical care, they have to go to one of Maceio’s public hospitals, only a few of which appear to be within walking distance of any of Maceio’s dozen or so favela communities.⁵⁴

Since most residents in poor communities, particularly favelas, do not own cars, taking the bus to the hospital is one option for transportation. However, at 2 BRL (approximately 1.18 USD),⁵⁵ each way, that may be cost prohibitive, if the person is unemployed or, as noted previously, unable to pay because of household financial

commitments. Injured or ill Brazilians can call SAMU, but the wait for an ambulance is a bit of a local joke in Maceio. During my fieldwork, I witnessed several ambulances with lights and sirens on, trying to get to hospitals through the congested Maceio traffic, and literally no cars moved aside to let the ambulance pass.

Alternatives to Care

For lack of, or instead of modern care, Brazilians often find alternatives to pharmaceutical medicine that must be purchased or are inconvenient to obtain. Despite PSF's findings that the urban poor are mistrusting of the clinic's care, most of the Brazilians that I interviewed during my field study reported trusting medical professionals, when they had access to them, especially if a family member or a friend had a positive experience in a clinic or with a particular doctor. To promote health, however, most Brazilians take matters into their own hands. I found examples of homemade preventive remedies during both of my 2008 and 2009 stays in Brazil. Brazilians regularly drink coconut water. Residents from Feijao, Jatuica and Ponte Verde report that coconut water is good for intestinal problems and recommended by their doctors as a healthy drink. Coconut water is a regular addition to the weekly, if not daily, diet. Hot teas, such as those with hand-pressed garlic and lemon are regularly used to aid the common cold, and butter may be used to alleviate a burn.

Because of the inconvenience of overcrowded public clinics and hospitals, residents in poorer communities reported that they prefer folk remedies like homemade soda or I.V., teas and coconut water, whenever possible, and they often resort to self-treating instead of going to the hospital. Like many Americans, Brazilians self-treat for

diarrhea and other relatively minor illnesses. When an illness becomes more severe, it would be important to seek, immediate, professional medical care before the situation turns life-threatening. Although there are varied degrees of self-treatment, the tendency to unilaterally self-medicate for all illnesses, or the inability to know when a sickness is becoming life-threatening, is concerning. Self-medication is one reason why medical researchers believe that Mexico was initially the hardest hit with the H1N1 virus earlier this year, as the tendency to self-treat may not always be the optimal choice.⁵⁶

Finding Public Health Information

In the interviews with five participants from suburban Barra Nova and affluent Ponte Verde, it was fairly unanimous, using these interviews, as well as those from the poor communities, that people from a wide socioeconomic stratum desired more information about safe water, sanitation, and disease prevention. The thirteen Participants in Feijao say they have never been given any information about how to prevent parasitic infections, and most live with an infection for their entire lives.

Higher income participants fare better overall, with both respondents in Ponte Verde, and two others in upper Maceio, noting that they have adequate care with their private medical insurance. In our conversation on June 26, 2009, Anna Fernanda Gomes Peixoto said that because her father is a doctor, she grew up knowing that to stave off dehydration one should drink plenty of filtered water,⁵⁷ and take refreshing showers several times a day, to keep cool. She was taught that warm or hot water dehydrates skin, so the temperature of a shower should be cold. Fernanda also learned that although it was fine to brush her teeth with tap water, the water should not be swallowed, not even a

little bit, even for pill-taking. Fernanda, who grew up near Lagoa Mundau, the same lagoon shared by many poor communities, says the part of the lagoon they swim in is relatively clean. She was taught that it was fine to urinate in the water, but not defecate, and she believes most people in her immediate community think this as well.

After observing both private and public hospitals, visiting the Ministry of Health and examining PSF, it was evident that Maceio residents learn about disease prevention almost entirely on their own. Benedito Bentes residents say the availability of public health information is almost non-existent, and even when they receive medical treatment they are not given advice on how to prevent illnesses in the future. Some interviewees said that they have received verbal advice “here and there” about intestinal worms, such as to be careful to drink only filtered water and to wash hands often, but overall community knowledge about recurrent parasitism is low. Even using care and sharing knowledge with each other, many residents report they still get worms.

A main reason why Fernanda has remained fairly healthy, despite sharing water that may be contaminated, or living in an environment where giardiasis is the “norm,” may be because of her hydration practices. Several cool showers a day also means that Fernanda’s hygiene is better than average.

From my observations, I wondered if urban poor populations were more proactive about information gathering or information sharing, would they would know the same “easy tips” as those in the upper strata. I also wondered if, although often effective, there is an over-reliance on self-medication among the urban poor, and if this also contributes to the higher prevalence of disease among that group. Without additional research as to

when and how self-medication is used in a population, it is difficult to assert if, given the opportunity, the urban poor would seek more medical advice than at present, or if the population would continue to self-medicate for most ailments. Based on conversations with urban poor residents who regularly visit PSF and other area clinics, they consistently feel they do not receive enough advice on preventive care.

Public versus Private Care

To understand the differences between my observations on public and private care, I consulted Dr. Benedita Florio⁵⁸ at Sanatorio, a public/private hospital, which takes both private insurance patients and those on SUS, in Maceio. In our conversation on July 1, 2009, Dr. Florio said that the differences are many. One of the main differences between public and private hospitals, besides the level of funding, is that residents are deterred from using the public hospitals to care for chronic disease. Private hospitals will take chronic disease patients regularly, for both emergencies and follow-up care, but public hospitals do not have the manpower or the space for regular treatments. Santa Casa, for example, used to be a public hospital, but it is now a public-private entity. Even if you have public insurance, you cannot be treated there, unless the problem is acute, serious or an emergency. If you have private insurance, you can use the hospital for any reason, including chronic illness.

From a physician's perspective, Dr. Florio says hospitals such as the local University Hospital limit the treatment of chronic disease patients because it is a teaching hospital and students need to change patients to learn about different ailments. The University hospital administrators believe that seeing chronically ill patients over a

longer time period is not as advantageous for students as is seeing patients with a variety of illnesses. On the other hand, many teaching hospitals in the U.S. view treating the same diseases repeatedly as an advantage. If HGE were going by the same rule of thumb as the University Hospital, it would seem that, given the sheer number of people being treated or waiting to be treated each day at HGE, everyone has an acute illness.

However, since the representative at HGE also showed me rooms filled with stroke, encephalitis and cancer patients, despite the efforts of public hospitals to deter chronically-ill patients from using their services, people still go, and are accepted, for care.

Dr. Florio believes there are many options for care for the poor in Maceio. There is a public/private specialized tropical disease hospital that was established for the care of malaria and dengue fever patients. “Anyone can go there if they have been referred,” says Dr. Florio, and there is HGE. Although crowded, HGE cares for hundreds of people at a time and has a much higher capacity for patients than Sanatorio. At Sanatorio, however, Dr. Florio sees plenty of “diseases of poverty,” including the most prevalent diseases, those related to lack of access to water and sanitation. At Sanatorio, these frequently-seen illnesses are scabies, intestinal worms and diarrheal disease.

Previously with PSF from June 2007 to June 2008, Dr. Florio believes that the local government is making great strides in attending to the poor in the city. “In PSF, [qualified] residents see the doctor and obtain medications for free. The doctor will also recommend homeopathic treatment such as teas, salts, etc. If a doctor believes an ailment is something that can be treated without medication, they will do that, if the patient

prefers. [They also accommodate] cultural preferences. Maceio gave PSF a basic pharmacy, so that they can also make pharmaceuticals for typical/frequent diseases like pneumonia, sexually-transmitted diseases, urinary tract infections, and skin diseases,” she remarked.

When asked about access to PSF or other public health clinics for favela residents, however, Dr. Florio’s remarks indicated that favela residents have brought their lack of access on themselves by living on the outskirts of the city. This obviously discounts why people move to favelas, which is typically because they cannot afford to live within the city. Nonetheless, Dr. Florio stated, “None of the favelas are in the PSF [territory] because [the government is] trying to eradicate favelas, and these communities will hopefully go to permanent neighborhoods someday. So [the government] considers favelas to be temporary or mobile. These people come and go whenever they want; they grow as much as they want. PSF [clinics are only in] places that are permanent...they are fixed and don’t move for those residents.”

At her hospital, Sanatorio, similar to HGE, there is one main ward, the infirmaria, a large open room with many beds. At Sanatorio, chronic disease patients and overflow patients from other hospitals are able to stay in the big room. Therefore, the hospital believes there are options, even if they are not optimal. “If people don’t have money to go to rooms, they can stay outside or in beds in the hallways,” Dr. Floria added. This infirmaria *was* actually outside.

Dr. Florio admitted that, while the city has made improvements to access of public healthcare, there are still too many more people to reach. “The government

decides where [PSF and other public clinics] will be placed. There were 24 PSF clinics in 2007. [By] 2008, they were 68 PSF clinics, approximately, but that covers only one quarter of Maceio's poor," she said.

PSF does try to do additional outreach, Dr. Florio concluded, visiting schools to bring information and supplies, such as for dental care. "They bring toothbrushes, toothpaste, and a sink, and teach kids how to brush teeth," said Dr. Florio.

Despite shortcomings in the supply of healthcare services versus population demand, Dr. Florio says that lack of services in the favela communities, in particular, does not necessarily unfairly target the poor, believing that all populations need to be somewhat proactive in order to receive treatment. She believes that the poor need to take initiative for their own care, such as by obtaining treatment for the common parasitic infection, giardiasis. In an electronic communication on November 30, 2009 with Dr. Antonio Fernando Nunes Peixoto, my Brazilian sponsor, a general practitioner and a former hospital administrator at HGE, he confirmed that persons with parasitic infections can readily obtain and typically use a prescription drug called ivermectin. It is typically given in one or two pills, which are supposed to kill parasites within 48 hours of ingestion. Giamebill is the medication he commonly prescribes to treat giardiasis. In an interview on June 26, 2009, Anna Fernanda Gomes Peixoto, whose husband also works at a private hospital and lives in an upper-income apartment building said, "*Giardia* is considered to be normal among children. There is also a medicine to cure worms, and it is given routinely once every six months, for both preventative medicine and to cure.

Sometimes it is just one pill, or [if needed, a] second pill about seven days later. We were routinely given this as children,” she noted.

In fact, children in upper class families can obtain this pill routinely at the local private clinic as a safeguard against chronic infection, whereas some poorer populations must wait until they are symptomatic. At that point, however, the prescription is free. Both Dr. Florio, and the informant at HGE, asserted that these treatments are available, but the poor need to seek out the treatments and wait to receive them.

Healthcare Shortcomings

My observations in Brazil led me to understand the shortcomings of an underfunded nationalized healthcare system. While cheaper for the patient and relatively inclusive of treatments, the lack of privatization means that the quality of services is greatly diminished. It is no wonder that many Brazilians, as they can afford it, are switching to private care. For those who are in the bottom 75 percentiles of Brazil, there is no such luxury of choice. In 1981, the World Bank noted that amongst Brazil’s healthcare problems was a bias towards high-cost curative care, which is not easily accessible to the poor, and that Brazil has had a lack of success in reducing the incidence of certain endemic diseases. Despite many developments in Brazil since 1981 in healthcare, not much has changed regarding the prevention of recurrent diseases, and the issues raised by the World Bank still exist today (World Bank 1981, 43).

Although PAHO and the UN have made great efforts to reach urban outskirts and rural areas throughout Latin America with health-related programs aimed at assisting at-risk populations with hygiene and safe sanitation practices, counseling is still insufficient

in developing countries. The effectiveness of these programs often declines after a period of time due to lack of funding to keep support mechanisms in place, lack of long-term, sustainable planning, lack of access of healthcare professionals in isolated areas, needs outweighing available resources, and/or because the practice simply does not become second nature, due to brief training and lack of repetition (Roehmer 1976, 108-110).

Conversations with Dr. Peixoto, on both June 26, 2009 and July 16, 2009, confirmed that public programs often fall short. Dr. Peixoto, who has practiced both public and pro bono healthcare in several Brazilian states, such as Mato Grosso do Sul, Sergipe and Alagoas, said that he can typically diagnose a patient and the state honors the prescription(s), free of cost, for a patient. “I have not done much [personal healthcare] since 1988, but I liked it,” said Dr. Peixoto. “Many doctors stereotype working with the poor and prefer not to work with them because the people cannot pay enough. It is common for [the poor] to try and ‘pay’ with a chicken or a cake,” he added, laughing. He has been paid with many chickens.

Poor people trust doctors, though, especially if they have a good reputation. There is a saying, Dr. Peixoto shared, that “God is in heaven, my doctor is on earth.” He said that a doctor is sometimes revered as a hero, and if there is trust in a doctor, [he] is trusted by everyone in their family and is referred by them to others. This confirms the remarks made by members of the favela community, too, who said that when they found a doctor they trusted, they tended to feel more comfortable about returning to that doctor.

Doctors who work with the poor also have to be culturally sensitive. There are many common practices of folk medicine in Brazil, as well as various religious practices.

“The ‘black’ communities and the indigenous still use many traditional recipes or solutions for ailments, like teas or honey (for a cough),” said Dr. Peixoto. “[Many alternative medicines] are practiced here.”

Echoing the claims that many of the poor, both rural and urban, often feel isolated and suffer because of lack of attention, and reflecting upon his pro bono work among the impoverished, Dr. Peixoto said, “people needed the attention, and it was gratifying work...people would be explaining why they were sick, but just by my listening, half of their sickness would go away. The sickness would go away because someone was listening.” The power of empathy would then lead to trusted care of the ailment.

In his book, *The War Against the Poor*, Herbert Gans says that “persuading people that their fears are imaginary” is immensely difficult, and only possible with trust (Gans 1995, 77). Perhaps this is why Dr. Peixoto and many other doctors have had success in getting the poor to use medical services. Gans also notes that blaming the poor for their own poverty is ineffective and will not bring about the changes that are needed to improve behaviors or conditions (Gans 1995, 122). That is, although the poor exercise a type of social justification when they act or refuse to act, social understanding, as with cultural understanding of their value system, is imperative if one wants to help.

Few realize the importance of that aspect of care for the poor. Dr. Peixoto said that with public healthcare providers on strike, this has more sensitive implications for those in need. “[SUS has been on strike for] more than six months, but at least 30% of the hospitals/staff has to keep working. Right now, the dispute is over the price of an exam, which is 3.50 Reals (approximately 2.06 USD).⁵⁹ [Doctors] want more. A birth is

[compensated at] only 50 Reals (approximately 29.38USD). It's not enough to [pay doctors], but the government doesn't rush to change, because if doctors don't show up, there is no need to pay," he explained.

Now patients who had relatively easy access to healthcare must undertake additional travel to reach different hospitals and clinics to try to find a facility with coverage. Dr. Peixoto explained that the governor of Alagoas is trying to budget to compensate the hospitals fairly, but this makes him unpopular, something that I saw clearly during President Lula's address on July 13, 2009, in Maceio. "[The governor] is responsible for tightening the purse strings. Teachers are also on strike. [Government insurance] is on strike. The state's funding needs to go to salaries, so the governor is tightening the purse strings," he said. So hospital administrators, doctors, and nurses all "wait," remarked Dr. Peixoto. Lack of care is not to be misconstrued with lack of caring, he offered, but there is no money to provide that care.

When the system is working ideally, Dr. Peixoto said that the government insurance, SUS, is good insurance. "It is free insurance for anyone who needs care. Rich, poor, middle class, favela, anyone. You show up and get care. PSF, [for example,] is the welfare program for the immediate community, [but] PSF is from the Ministry of Health for very specific communities. SUS is government care. You go to the clinic, say you have a headache and get medicine. It's free. It's paid by the government," he summarized.

To explain more about how private health insurance works in Brazil, Dr. Peixoto said that people pay a monthly premium for insurance. Approximately 7% of Alagoas

state, where Maceio is located, has private insurance, he estimated, and 93% of the state's population uses only public or government-assisted insurance. In Brazil collectively, Dr. Peixoto estimated that 15% use private insurance with approximately 85% using public insurance. According to Dr. Peixoto, the public services are supposed to cover the same services as private insurance, including transplants, chemotherapy, and surgeries, with no treatment limits. Furthermore, he added, this "unique health system" has a great constituency. "For example, the population of Brazil is approximately 200 million people, and SUS has approximately 170 million members," he said. Dr. Peixoto's estimates are close, substantiated by the information given previously that approximately 80% of Brazil's population utilizes SUS. Again since everyone is eligible for Brazil's healthcare, even those in the favelas, a majority of the Brazilian population relies on continuous government funding for health insurance, which funding is apparently strained.

Dr. Peixoto said that, like U.S. private insurance, Brazilians can choose to pay via private companies for insurance. There is no real difference between what can be cared for or options for care, he said, but the difference is definitely the quality of care. In prior state governments, there was a little more empathy for the poor, said Dr. Peixoto. "Now, supplies are a little cheaper and doctors seem less responsible than at the private hospital," he remarked, "and care is a little slow." I observed this to be the case during my July 6 visit to HGE.

Still, some doctors choose to work at the public hospitals rather than private ones, and for a variety of reasons. "A doctor has retirement benefits from the government if he

works at the public hospital, as well as sick days. At the private hospital, they don't get paid when they are sick, and there are no extended benefits. Sometimes the doctors [at the public hospital] strike for a higher salary (like now), but when nothing happens, they go back to work," Dr. Peixoto explained.

With construction halted in September 2009, at HGE, Maceio's largest public hospital, this quality of care has become a little worse. HGE has been given no information about when the construction will start again, said Dr. Peixoto. "We were just told there is no more funding."

Even when there is money, Dr. Peixoto said that government-sponsored public health programs directed for the poor do not always operate ideally. "Many people are not working the way they should. Doctors like me are being used as administrators and directors, not doctors. Hospitals are reducing the number of beds because of funding, and there are not enough beds for who is sick. They have reduced the number of beds by half. There are also not enough nurses, but right now there is a state-wide effort to recruit nurses into the institutions," he said.

When specifically directed to questions about "diseases of the poor," Dr. Peixoto said, people in the poor communities are suffering from diseases, including water and sanitation-related illnesses and lack of nutrition that could be treated if there were more funds. He reports there is a correlation between access to water and sanitation, and to health. "The poor have a higher prevalence of *Giardia* because of lack of hygiene [and more] TB because of how they live." He continues. "If you have money, you put sanitation in your house, but if you are poor, you don't live that way. The state still

doesn't have a standard/law for everyone to have sanitation. If the poor had more money, they would eat better, they would have more education, they would have better healthcare. All are factors that lead to disease and suffering. There are big problems with nutrition and diabetes. All of these are from the way these people live."

Dr. Peixoto said that "because of lack of nutrition, immunity is lowered, so it leads to a host of other problems." This is a trend that has been present in Brazil since the early 1900s, when a typical diet, for example, consisted of mostly carbohydrates and fats, and healthier foods were synonymous with "whites" and higher income social classes (Pineo and Baer 225). Poor nutrition, in fact, is the root of many problems in Maceio, said the doctor.

When people in poor communities die, the doctor commented, it is from a wide range of diseases. "TB, because of the living environment, nutrition, aneurisms, diabetes (often genetic), juvenile diabetes, asthma and hypertension," Dr. Peixoto listed. "The poor do not have money for insulin, and the need is increasing; but the government is making a health center just...to manufacture insulin and pills...the problem is too widespread, the need is too great," he added.

The government is also planning to create health centers for asthma and hypertension, noted Dr. Peixoto, because the need for attention to those illnesses has increased as well. Turning planning into development and implementation, however, takes a lasting financial commitment from the government.

This financial commitment can be expensive, unfortunately, which may or may not explain Brazil's reluctance to spend more than roughly 7% GDP on the public

healthcare system.⁶⁰ As Egendorf notes, “compassionate healthcare is expensive healthcare,” (Egendorf 2003, 44), and that because of the exorbitant expense of such care, there have to be limits. Obviously, limited national healthcare is more cost-effective, and it is the government that has to set those limits. In Brazil, as in every other country, the government has to associate an “opportunity” with every dollar, and in Brazil there is a preference towards economic opportunities versus social ones (2003, 44-47).

Priority of Services to the Poor

In Brazil, arguments about ease of access to services for the poor are mixed. Brazilians believe that free services should be more widely available to them and feel that the government misunderstands their ability to pay for services and/or locate programs. The Brazilian government says they are making an effort to offer programs but that citizens either fail to make the partial financial commitment necessary for some services or do not take advantage of available services.

Scheper-Hughes describes the distinction between classes in terms of health and access, asserting that favela populations specifically lack equal access to resources. I found this to be true in Maceio. As Scheper-Hughes had also discovered in her fieldwork in Brazil, I found that many employees in public service feel that the grievances of the poor are greatly exaggerated (Scheper-Hughes 1992, 67, 92) and their lot is not as bad as it appears. In fact, certain employees in Brazil’s public service feel that the Brazilian government has made great progress towards providing social programs and public health services for the poor, even though some of their efforts have been badly implemented.

Looking again at Brazil's historical trends, in the early 1900s, this was the case when Rio de Janeiro's city government attempted to "help" the affected population by requiring mandatory tuberculosis immunizations, condemning unhealthy homes and moving shantytown groups out of urban areas. This "health movement" displaced approximately 20,000 people to the outskirts of the city, beyond the reach of city services. The immunizations were found to be ineffective, and most of the displacement appeared to be targeted at Afro-Brazilians, who after various protests were allowed to return to their homes. Despite the municipal efforts, the health problems still remained (Pineo and Baer 1998, 233). This is also echoed by Telma from COOPLANES, in Chapter 3. Even though the favela residents are being moved to better houses, many of their illnesses still remain because of their false sense of security about the water. The residents are still becoming ill from giardiasis, because the water, although cleaner than what they were using in the favela, is not okay for drinking. This is a great concern, because the two mothers I spoke to in Happy City said they felt very comfortable drinking water in their new community.

Farmer also echoes the concern over specific kinds of government responses and blanket unresponsiveness. Some government action (such as in Rio) is not always helpful, with certain prescribed vaccinations or treatments being ineffective or incorrect. Sometimes government response involves expired or recalled medication being shipped to needy populations in reaction to a "call for action." These are medications and therapies that have otherwise been banned or deemed unfit for consumption in other

populations. Unresponsiveness typically takes place when a government simply does not have the financial means to act but desires to save face (Farmer 1999, xi, 20, 54).

Farmer also notes that another failure of healthcare responders to truly meet the needs of an affected populations takes place when they “[impose] their standards of care” on others, instead of utilizing methods of care that may be more culturally-sensitive and medically-effective (Farmer 1999, 35-36), such as using a combination of folk medicines and modern treatments. That is, if the environment is not ideal, some healthcare workers refuse to act.⁶¹

Farmer takes this further by asserting that the lack of “social responsiveness” by healthcare providers (or the government) can also result in a lack of responsiveness in the population. That is, circumstances such as high turnover of physicians, lack of drugs and other supplies, lack of cultural sensitivity, and, in the case of Brazil, frequent strikes by doctors and hospital personnel, reduce the likelihood that a vulnerable population is going to trust those services, even when such free, public resources exist (Farmer 1999, 4, 27-28). This is especially true in the case of communities that have inadequate knowledge of modern treatments. An uneducated poor person may not understand a mammogram, an MRI or chemotherapy treatment, particularly if he or she does not regularly receive medical care and lives among others who are also not familiar with certain procedures. The prospect of an uncomfortable or painful treatment for an unfamiliar illness is surely scary to someone who considers modern medicine foreign.⁶²

In conversations in 2008 and 2009 with informant Amelia Regina Gomes Peixoto, I was told that in the Brazilian culture certain people still practice black magic, religious

or folk-based beliefs. These beliefs include the existence of faith that spirits are influential towards one's well-being. Such spirits can be influenced to cast spells and curses against other people. Thus, certain people can be skeptical about people or treatments that are foreign to them, when they are not familiar with the medical provider. When mistrust turns into lack of use of public services, this lack of responsiveness in a population is frequently misunderstood by governments. If a government is exacerbating the problem by hiring doctors who lack cultural sensitivity,⁶³ or limiting the public's use of public facilities by removing hospital beds, mistrust is not necessarily groundless.⁶⁴

In our conversation on July 7, 2009, Maria Elena Tenorio Costa, President of COOPLANES, explained that favela populations often mistrust the link between her company, its assimilation programs, and the Brazilian government. "They think they will be under some sort of government control, but that isn't the case," she said. "[The government] is allowing the favelas to retain their personalities, but the city is making decisions such as when to integrate different favelas. They want to mix communities, so that everyone is on equal footing, and there are no sections. However, the favelas (perhaps due to the increased comfort level with practices familiar with them) are keeping their leaders," she said. There will soon be four leaders in Happy City, with all taking equal part in helping the community. "The leaders don't want this, so they will compete against each other and have an election to choose one leader," remarked Senhora Costa.

Despite the sociopolitical complications of blending communities, Maria said that COOPLANES will continue to provide ways to help the poor help themselves. "We

provide free education, career training and shuttle kids to chorus practice. Don't think that the people who live in the favelas are all unskilled or uneducated, because some are college educated or college students," she explained. They simply could not afford housing. "We have computer classes available [to everyone in the community], and we have been surprised by how many people already know how to use a computer," she said. "Kids are offered classes on how to make candy or bread, so that they can make and sell it, to help with money for the home."

Whether it is a question of class, race, ethnicity or some combination thereof, "the lower end of the social ladder" has been the most affected by lack of suitable services (Farmer 1999, 185-186). Many populations, including the urban poor in Maceio, appear to have some access to social programs. Lack of personal income (perhaps due to being unemployed, earning a low-wage or earning a wage disproportionate to cost of living), in order to live within the reach of municipal services or to travel to healthcare facilities, more often than other than other factors, such as race and ethnicity, translates into inequitable access to quality services.

"Persistent poverty" and social inequality, whether it is associated with income or access, has been linked, among the impoverished, with overwhelming feelings of isolation and higher mortality, as an "outcome of social misery" (Farmer 1999, 202-204). When a person believes he or she cannot or will not be helped, because of his or her socioeconomic status, it can lead to an impression of lack of control of one's own health (Farmer 1999, 202-204), a sense of social abandonment (Biehl 2005, 35), and a fatalistic outlook on life.

5. Inequality and Development

The previous chapters establish that social inequity in Brazil increases the risk of contracting a waterborne disease. In addition, there is a higher occurrence of infections, related to insufficient hygiene and inferior living conditions, among the poor. While this risk leads to a greater need for healthcare, it is unclear whether public dependence on quality, available resources is a high priority for the Brazilian government. A look at how Brazil is responding to the needs of its citizens by observing access to resources and programs on a local level in Maceio, was imperative to my understanding of this problem. The UN and WHO have concluded that the inability of a government to provide basic needs, such as sufficient food, water and rights, to its citizens is a serious social injustice, especially if the government is spending money on development that will not directly benefit the largest portion of its population. My assessment of development in Brazil, from where it has been to where it is now, rounds out my field study about which populations are being reached and who remains at risk.

Lure of Development

Brazil has experienced many economic successes and setbacks, and it is challenged with trying to blend economic, environmental, human, and social capital. Brazil has experienced steady economic growth, and the ensuing development ideally

should also benefit the population by decreasing poverty via increased income opportunities from higher-paying jobs and more employment opportunities. Brazil's wealth, predominantly built upon the extraction of resources, has not been profitable to the poor.⁶⁵ Although Brazil has experienced sustainable economic development, social development has lagged. The seduction of development seems hard for the Brazilian government to ignore. As Brazil continues to build new roadways and shipping lines, to invite construction in the Amazon, and recently, to accept the bid to host the 2016 Olympic games, millions of the country's poor wait for social programs to catch up to the nation's economic aspirations.



**Figure 5.1. A Wal-Mart in São Paulo
(Snyder 2008).**

In the early 1500s, the Portuguese settled on indigenous territory and utilized a feudal system that encouraged a small group of wealthy landowners to develop large plots of land, using slave labor to create profitable plantations, typically growing sugar as the commodity. As was mentioned earlier, this “cowboy economics” approach of investors to claim and develop land regardless of ownership would become the norm for Brazil’s economic development throughout the years. The Dutch and French also laid additional claim to land, and a vast system of commodity exchange and slave trading began. By the mid 1700s, mining gold and diamonds also became successful enterprises, resulting in continuous rapid growth in this resource-rich country. Additional endeavors in the late 1800s and early 1900s, particularly the production of coffee and rubber, allowed Brazil to increase its export profits and expand market production by inviting both domestic and foreign investors to develop the Amazon. Through globalization, Brazil was able to modernize its shipping lines and expand national roads to link Amazonia to the rest of the nation, which quickly allowed this resource-rich region to become central to Brazil’s growing economy.

The growing economy benefited mainly a small wealthy class, however, as the economy grew, the social and financial differences that separated the poor from the wealthy also increased. Brazil soon became a land of contrasts between rich and poor, and master and slave (Owensby 1999, 18). Brazil, in short, had become a country rich in environmental resources whose development, paradoxically, depended on its destruction.⁶⁶ Brazil’s need to seek the instant gratification of extracted commodities would quickly outweigh long-term planning (Thomas 2006, 4).

Across the span of 350 years, Brazil's government shifted from being a monarchy to a military dictatorship. The country then moved from socialism to democracy. Most recently the country elected a working-class president, Luiz Inacio Lula da Silva, or "Lula" (Scott 1990, 18 and Almeida 2008, 83-84). Ideally, Lula would "transcend typical bourgeois democracy" and "provide economic relief to the majority of Brazil's population" (Arestis and Saad-Filho 2007, 9-13 and Owensby 1999, 128-129). Lula promised to rein in neoliberalism⁶⁷ by decreasing imports and privatization pressures and increasing social and national economic programs. Lula saw firsthand the "fractured legislature" of some states, where lack of organization and funding often retarded the social and economic programs aimed towards poor communities (Almeida 2008, vii, 4 and Scott 1990, 90-94).

Hoping to encourage Brazil to stand on its own, Lula decided not to renew the country's pending IMF loan and take on a large international debt of \$41.75 billion. However, expenses soon outpaced the government's ability to pay. Lula soon faced bankrupted states, and an inability to run many of the country's public services, such as energy and water, meant a renewed reliance on foreign investors (Thomas 2006, 20-21, Almeida 2008, vii). Investors came, but not to provide aid. Private investment in public services was coupled with the intention to maximize profit, at some social cost to the Brazilians. Companies came to take over water and sanitation in order to secure premium waterways for hydropower and shipping, diverting resources needed by vulnerable populations.

Foreign Investment, Not Foreign Aid

Although Maceio has not seen an influx of foreign investors like São Paulo or Rio de Janeiro, the appearance of international department stores like Wal-Mart and McDonald's hints at the city's growth potential. However, lack of basic services like water, sanitation, electricity and Internet means that Maceio's infrastructure is not yet fully prepared for growth. In recent years, foreign investors have pulled out of beachfront construction because the municipal infrastructure cannot keep up, meaning neoliberalism has led to a false sense of hope,⁶⁸ as the population is given glimpses of advancement, the infrastructure is not able to sustain the changes. Still, many Brazilians remain hopeful. In a conversation on July 16, 2009, Dr. Peixoto said that Brazil has developed quickly, thanks to companies interested in investing. "[Brazil] is offering bigger interest rates to encourage development. Last December, there were more dollars leaving Brazil than were coming in. Now there are more dollars coming in than out. Last year, there was about 5% development growth. This year there is only 4% projected for growth, but Brazil hasn't suffered. Brazil is growing slowly, and this means our economy doesn't crash like the U.S. [economy] has, but Brazil's issues involve corruption, so we never quite get ahead," he said.

The Brazilian government's reputation for improperly allocating funds means that economic growth is not often seen by the populations needing the most assistance. In Maceio, it is obvious that development, increases in population, physical water flow and lack of funding are all taxing the growth of sanitation services, especially, which is creating a great risk to health. Combating Maceio's sanitation problems means a hefty

price tag, and CASAL expects the government to respond through consistent program grants, Programa de Aceleracao do Crescimento, or PACS. If the government subsidies do not come, CASAL will not see privatization as the right option. As Senhor de Franca Costa indicated earlier, the private investors do not seem to have the same goals as the public manager. Since CASAL's overall goal is to increase access to the people, not to maximize profits for investors, the water manager will keep looking for options that benefit a broader population.

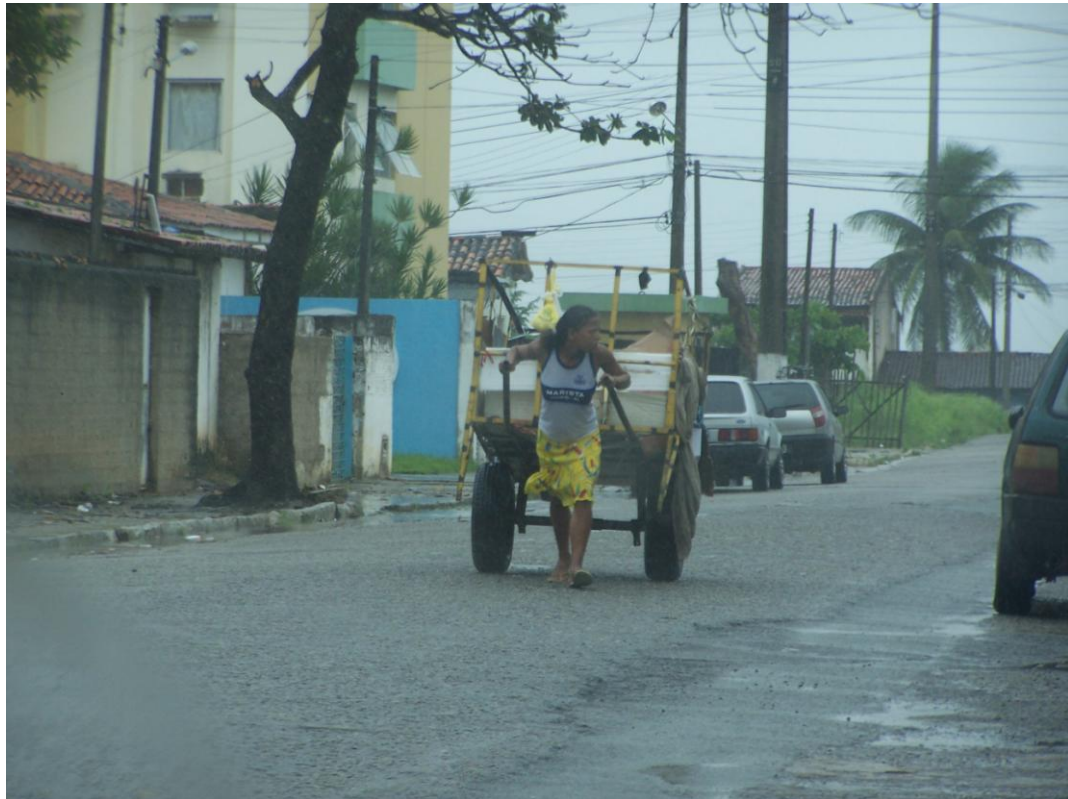


Figure 5.2. A pedi-cart vendor in Maceio (Snyder 2009).

Social Implications of Development

Development in Brazil does not seem to mean the same thing to the poor that it does to the rich.⁶⁹ Although development has meant the creation of jobs, a considerable percentage of Brazil's poor live in urban areas where access to quality services is beyond their income. In circumstances where the poor can barely pay for housing, transportation and food, services like water and sanitation become a luxury. Brazil's rapid urban growth from the early 1900s to the present has resulted in a current population of approximately 190 million people, with nearly 82 percent living in urban areas. Access to resources such as education and healthcare is not the same for the poor as it is for the wealthy (Thomas 2006, 4, 30-42, 119-121, Owensby 1999, 18).

In conversations on July 13, 2009, with two administrators at the Department of Social Assistance, representatives were hard-pressed to convince me that the government is closing this gap. I was told that the agency provides "health services, education, housing, sport and recreation, cultural events, and [they assist] families with both money and support." The agency believes that these services are not only available to favela communities, but they are also convenient. I was also told that the communities widely use available social programs and that there is no prejudice or neglect of the poor. "[There are currently construction projects] for the favela residents to move to the general population. These communities also get projects to educate them about work, salaries, and anything else they never knew in life before [the move], so they know how to use whatever they are not used to. [These are called] 'assimilation programs,'" one representative said. With more than 50% of Maceio's population below poverty level,

agents at the Department of Social Assistance believe they have improved the livelihood of this socioeconomic group over the past 10 years because of their many social programs.



Figure 5.3. A local skills class
(with permission, COOPLANES 2009).

“[We] work to make the community conscious of the community rights and norms or what someone must do. [For example], a child must go to school. It’s the law. It’s your civilian responsibility. [Our] mission is to ease the access of community to their rights,” said one administrator, who believes that the poor are typically conscientious of their rights and social responsibility. In the above context, I am not sure that the agents

were describing rights in as much as they were describing laws, which are obviously two different things. Because of this particular conversation, I also understood how certain people in the population could be leery of the government's intention through "assimilation." On the one hand, the agency talks about a person's rights, but then they refer to educating the population about the laws by which they should abide. Still, the agency continues to describe the program benefits. "The poor can change through human and social promotion. They can improve with education [and a job]. They might not change their status but they might change their quality of life," shared one social worker.

The Department of Social Assistance also admits that additional improvements can be made, especially in terms of the prevention programs. "[We] have basic prevention and protection programs. [We have] educational directives with children...and family registration. This is basic, [but we also have special programs such as] when there are kids in the street who don't have family, when [kids] are working and shouldn't be working, or when they are drug addicts. [We have] a special protection program that will bring the kids to [safe houses], but [we] need to improve [our prevention programs] most. It is easier to do prevention than to do the correction once it's all messed up," an administrator shared.

I was told that this income gap has been partly minimized for the working poor, due to recent grants from Alagoas state to provide government housing for the working poor. The justification for providing government housing was so that fishermen from favelas could live in water-accessible communities where they could dock their boats,

and so that domestic and blue collar workers from favelas could live closer to municipal transportation services to get them into the city for work.



Figure 5.4. A community-based children's choir program in Maceio (with permission, COOPLANES 2009).

In our conversation on July 16, 2009, Dr. Peixoto also explained this trend to close the gap for the poor. “There are four classes of people in Alagoas...A, B, C, D. A is rich, B is middle class, C is poor and D is the miserable class. In recent years, C went to B. It is harder for B to get to A. It is harder for B to keep up,” he said. This analogy was echoed by many people who identify themselves with the working class. There also

seemed to be a general consensus that President Lula and his appointees have a particular interest in helping the “very poor” but have “forgotten” about the middle class.



Figure 5.5. A row of government houses in Happy City (Snyder 2009).

Two representatives from the Department of Habitat say the focus on the very poor is not unusual, as just about all of Lula’s programs are meant to help the socioeconomic group that is furthest behind. In a conversation on July 13, 2009, Adriana,⁷⁰ a government contracts manager at the Department of Habitat, and Jacque⁷¹, a social worker who works with both the Department of Habitat and the Department of

Social Assistance, said the new program to house the poor by moving communities from favela areas to government-planned “cities” has had many challenges, but that the program is working. The idea is to offer vulnerable populations better than substandard living, they explained, so that these people might be encouraged to contribute to the national economy. “There is a national standard for setting up these communities. When a favela is moved to a ‘city,’ there are national standards like school, houses, healthcare place and sanitation. We conduct research about a group of people, before we build, to be sure we are meeting their needs. For example, if a favela has many fishermen, their new ‘city’ will have a marina,” Jacque explained. All of this is aimed to provide opportunity for an otherwise ignored population, who will hopefully, in turn, give “back” to the government who has helped them.

The biggest challenges in meeting the needs of the poor with this housing program are two-fold. First, many people in the poor communities are used to having to be resourceful and some utilize the opportunity of having access to new ownership of a tangible good to make a “quick buck.” In our conversation, Jacque said that many people will try and sell their new government house in order to have a tangible cash flow. “They have the illusion that they will make a lot of money, so they will sell the house like for 5,000 BRL (approximately 2,902.83USD),⁷² [but then], they don’t even have enough money to re-buy a house in the slum,” she said.

This was an unexpected problem for the Department of Habitat, but now the houses and families are registered in a database at settlement, and the government is now offering the housing as a “one time only deal.” Families get a “free house” only one

time, said Adriana. “If they sell the house and try to get another one, they will not be able to,” she explained. Most families appreciate their new housing and plan to stay, she noted. “Most people are very excited and get quite emotional when they see the new house.”

The second problem is that many favela residents are resistant to change, which reiterates the previous issues raised by public mistrust of public services. “Sometimes,” said Adriana, “they don’t want to move.” Adriana shared a story about a recent mayoral election in Jaragua. “The favela close to the beach in Jaragua has been there for 20 years. During an election for mayor, the [preliminary] votes were tabulated and one man was winning by 98%. That was a Saturday. But in his final election speech, he said he would take down all of the favelas on Jaragua [to improve the view of the beach]. On Monday, when the results were read, he lost. [The population, even the favela residents, turned out and voted]. People want politicians to resolve their problems, but they don’t want to be erased. The favela [residents] want their problems to be fixed, not have their population eradicated,” she said.

I heard similar sentiments from two mothers that I sat down with in Happy City, where for the first time they are able to provide a home with solid walls for their children with electricity, running water, and a living and eating area partitioned from the bedroom. They were looking for a change only if it was truly for the better. Now, with a bathroom with a flush toilet, sink and shower, and their own water containment tank so they never run out of water, that change has clearly been beneficial. In our conversation on July 3, 2009, Dona Sonia⁷³, a mother of four, said that when she hung pictures on the walls and

watched her children playing in the streets well into the evening, without gunfire or danger, she knew that making a home in the new community had been the right choice. For the first time in her life, she said she feels safe.



**Figure 5.6. A safer place to play
(Snyder 2009).**

Dona Sonia's positive sentiment about the new housing is not unusual. Representatives from the Department of Housing believe that everything is going as planned. Members of Happy City, when asked in Housing Department questionnaires

about their new access to resources, from water to sanitation, including the quality of that access, and how they felt about their sense of security, rated the new amenities at mostly “good” to “excellent.” Additional questionnaires are planned for the future, so that the agency can gauge resident needs.

Still, Adriana at the Department of Habitat knows they have a long way to go. In our conversation on July 13, 2009, she said that the government excels in some areas and lags in others. “[The government] is giving money for housing the poor, but the social part - the health and education - is not as developed as habitation. The government is prioritizing for housing, but not for the social programs. Social issues are of great interest to politicians, but not much happens,” she shared.



Figure 5.7. An empty favela in Cidade de Lona to be torn down (with permission, COOPLANES 2009).

It will also take a long time to eradicate the favelas in Maceio. “In 2001, there were 135 favelas,” Adriana estimated, “now, there are still over a dozen,” but the decrease has already been a great improvement.

Favelas in urban areas, however, have a tendency to grow back. Adriana explained, “There is always a possibility that the government program will not work. The current inhabitants of favelas being moved, however, are conscientious that if they lose their house and move out of the community, they will lose their chance of getting a new house again. Also, once the favela is eradicated, the city will build a school or other project on that land, so the favela cannot regrow there. Where Cidade de Lona (City of Black Plastic) used to be, they are building new houses. So those who moved to Happy City cannot return to that area. [The people] need to stay where they are, or they will not have a place to live,” she explained.

For many families, the new government housing is their only hope of ever owning land or a home. In order to qualify for housing, a family has to be earning less than the federal minimum wage, between all household wage-earners, and they must be living in a substandard situation. There is an additional list of requirements in order to qualify for financial aid. Families who move to the new communities can qualify for a “scholarship plan” that provides money for food and clothing for each child who is school-aged (approximately 65 BRL or 37.74 USD per child, up to a maximum of 5 children), so for the first time ever, many families are being paid benefits that can directly increase the health and welfare of their children. “These people are caring for their homes. They take pride in them,” said Jacque. Each duplex building is 30 square meters, with 7 meters x

18 meters of land that they can use for gardening, animals or domestic use. Each house has 2 bedrooms, 1 living room, 1 bathroom, and 1 kitchen, and residents can build additions onto the homes later, if they wish. The houses, which cost the government approximately 10,000 BRL (approx. 5,805.65 USD) per family, often accommodate 5-10 people per house.

The two agents with the Department of Habitation feel that, through this program, the government is trying to “hear” the poor. “Access to housing, water, sanitation and healthcare are strategic and political in Brazil,” said Adriana, just as “social programs are strategic and political,” and she feels as though the government planned ahead for transition difficulties for the urban poor, as they moved from favelas to the new government projects. The government called upon Cooperative de Planejamento Projetos e de Servicos, Profissionais Liberais (COOPLANES), a government contractor that focuses on the environmental health of the poor, to oversee the transition. Emmanuella Tenorio Lopes (Manuella), a community instructor with the company, explained how COOPLANES works, while showing me around Happy City on July 3, 2009. Manuella’s main responsibility is in the area of environmental standards, new standard of living, and the family living environment. She works mainly with children and mothers.

COOPLANES’ approach is culturally sensitive and recognizes the characteristics of each favela community, even the ones that are not necessarily part of the mainstream government approach. “One thing that favelas have in common is that [they] have a leader. This leader decides who will get into the favelas and who will not. [Among other things], [the leader] decides on the drug dealers, if the favela will take them, what kinds

of drugs and if any protests are necessary. This leader will also decide if even social workers are allowed.⁷⁴ One person decides for the entire community. This leader is chosen politically, based on a type of campaigning. They campaign by [touting] their connections to the city government and, based on these connections, what they can do for the favela. Even if the leader does not make good on promises, the favela never seems to change leaders. The leader makes people believe in them,” said Manuella. The leaders do seem to wield some type of power in Maceio. Happy City’s leader went to city officials to complain when 102 families had been inadvertently left off of a moving roster. The leader gathered the families together and went to the city officials and complained. This proactivity resulted in the families being able to move immediately to the new government housing. The community regards this leader as a kind of “saint,” Manuella explained, but residents will complain if they are dissatisfied with a decision the leader has made.⁷⁵

Still COOPLANES’ approach to helping residents of favelas assimilate and move is more or less the same for each favela. Their responsibility is to offer programs, but they know not everyone will take advantage of what is offered. Per Manuella, it is the hope of COOPLANES that all residents feel they can find some improvement in their quality of life via new government housing community. There are extra buildings available for bicycle repair shops, seamstresses, hairdressers and upholsterers, and COOPLANES offers classes and workshops on everything from how to be a manicurist to how to properly bag groceries at a supermarket. COOPLANES will even provide a course completion certificate and write a letter that can be used with a prospective

employer. It is not a letter of recommendation, said Manuella, but a certification of skills or a testimony that a class has been completed. But COOPLANES will even go as far as delivering an employment application for a resident who does not have a car. Manuella said they have a deep commitment to help the residents succeed.



Figure 5.8. Moving to Happy City
(with permission, COOPLANES 2009).

Part of this success is due to the use of pre-move workshops. Before the move to new housing, COOPLANES holds classes for both children and adults. These workshops educate the community about the new houses, how they should live in them, how to use

the facilities in the house, how to care for the cosmetic construction of the house, how to keep up with or clean the house, and how to, in general, live normally within their new home. COOPLANES set ups tents to train families how to use the toilets and the showers and to instruct them on the sanitation. In the old favela, residents did not have any bathrooms, toilets or running water, so many are learning how to use these utilities for the very first time.



Figure 5.9. Piped water and a reserve tank inside of the Happy City home (Snyder 2009).

To attract participants to the workshops, COOPLANES delivers colorful pamphlets throughout the favelas, filled with bright drawings from local children, whom

they have recruited to help them interpret what a better environment will mean to them. COOPLANES posts flyers about the workshops and will even recruit participants, one on one. Examples of the notices and literature, announcing the government housing projects, as well as flyers and brochures regarding the assimilation programs, can be found in Appendix O.

Still, there are many community members who do not take advantage of free services. “There are many who are lazy or used to life the way it is already, and don’t want to change. There are those who don’t believe they, themselves, can change, and there are many, many alcoholics,” Manuella said.

Voice of the Poor

Many Brazilians are glad to see that some effort is being made to assist the impoverished, who are often stereotyped by their appearance or actions, or lack thereof. As mentioned previously, citizens in Cochabamba, Bolivia, were criticized and looked down on for being dirty, asked how else they could look when they have no feasible means to wash clothes, clean themselves or improve their daily hygiene. In her autobiography, Benedita da Silva, a favela resident turned state senator, also notes that the poor have just as much pride in their appearance and their homes as wealthier people but they are unable to maintain their cleanliness in the manner they wish. This inability is frequently a lack of money to purchase water and sanitation services, and the time it takes to fetch water burdens the day, leaving little time for other chores (da Silva 1997, 7, 79, 85). Again, to that end as previously mentioned, social movement spokesperson,

Oscar Olivera, stated that the restoration of water in Cochabamba, as access to water is for any community, a restoration of dignity.



**Figure 5.10. A favela of fishermen
(Snyder 2008).**

Based on my review of literature and observations in Brazil, it seems as though the poor do suffer from a poverty of rights and a belief in them, yet in our conversation on July 16, 2009, Dr. Peixoto also said that people do seem to be more aware of their rights “these days,” stating that they will go to the Ministry of Health if they feel they are not getting what they deserve. The poor are being increasingly vocal about their

inequality, refusing to be pushed aside by those who can pay. There are others, however, who feel the poor still have a long way to go in having a true voice in the community.

In correspondence on July 22, 2009, with Beth Marques, a volunteer with NGO Institute Vila Flor, she said that her volunteerism in the favelas creates only a small dent in what needs to be done. “I volunteer in a project of education for a culture of peace, prevention of drug use and do training courses to instruct how to make handicraft products,” Beth explained, also adding that more programs need to be enacted.

During my pilot study in January 2008, Beth took me to a favela and introduced me to a family she often assists with food and medical supplies. With both parents in that household terminally ill, the oldest child, a 9-year old, had taken over care of her two younger brothers. The burden of poverty weighs heavily on some of the community’s youngest residents. This family also had to resort to locking their teenage daughter out of the house at night, because she was stealing food to sell for drugs. The need for training and outreach, noted Beth, is colossal.

“The slums are completely unattended,” she said, particularly in terms of healthcare. “PSF (the neighborhood clinics) considers the families in favelas temporary and does not address their problems. That is why they depend on [outside health clinics], and that takes 2-3 months to make an appointment,” she explained. The average length of time that it takes to be seen by a medical professional, if you need to go to a public clinic or hospital, was not examined during my fieldwork, but it would also be important to know.

Beth, an outspoken critic of the lack of social programming said that there is plenty of research available about diseases that could be avoided in the slums if there were more public health programs. “There is no sanitation in most neighborhoods, there is very little access to health care, and [the poor] are neglected and abandoned,” she asserted. Beth believes that this neglect is a big mistake, because she believes the poor can change their status with education. She adds that most of the area’s poor do not avail themselves to the services, because they do not believe a better future exists.

The outskirts of Maceio are also a haven for the landless, who work in the miles of sugar cane for low wages. Although not a part of the urban landscape, but the rural one, this group is one of the most vulnerable populations in Brazil, if not the most vulnerable. As of now, there are no plans to bring services to this community.

Moving the urban favela residents, however, appears to be a win-win proposition for both the government and the poor. The government here, as in Rio, feels that favelas diminish the picturesque views of Maceio. With no place to go, favela residents need the help of government services to relocate. This relocation, while inconvenient and uncomfortable for a population who may be both mistrusting and fatalistic, does ultimately result in a solid home with both water and sanitation services. It also means a neighborhood with a healthcare clinic.

In a conversation on July 14, 2009, Mario Escada,⁷⁶ a local policeman, candidly talked about the stereotypes of the poor. The poor have a greater tendency towards violence than other populations, he said, “because of where they live and how they live.” As Scheper-Hughes also suggests, Mario says the poor are more suspicious and people

are more suspicious of them, but they shouldn't be. "[The way they are] is their culture," he said. "The public is suspicious of [the poor] because of what [the poor need]. Police and favelas don't trust each other, because the government doesn't have enough programs for health and education or security, so the favela communities have to band together to protect themselves. They view the government like dogs. They believe that the police will come and take whatever they have. [Other communities] are suspicious of the poor, because they know they have a reason to steal. Suspicion is both ways," he explained.

As mentioned previously, this violence comes from justification based on their circumstance, or moral relativism (Scheper-Hughes 1992, 22). In Maceio, Mario says, the poor justify stealing because they need to eat. "People steal cars to sell for parts. They are not stealing the car to be violent to the person driving," he explained, "but sometimes there is violence out of necessity and lack of education." Mario asserted, this is just a way of life.

"The poor in Maceio used to just stick to robbery to make money," Mario shared, opting to "flash nap"⁷⁷ at ATMs or steal unoccupied cars to sell for parts, but drugs have become, as in the "big city" favelas in Rio and São Paulo, the substance of choice for both copping and selling, he said – though Mario also cautioned that the problem does not just belong to the poor, a theory also supported by Benedito da Silva. "The problem spans all classes. If a person is addicted, they need to get drugs. Both rich and poor people will sell it. Violence and murder happen between the drug dealers over drugs and territory. Drug selling is a way to make ends meet for some, and for others, it is to feed

addiction. Often people have to steal the drugs they sell. The most widespread drug right now is the newest drug in Maceio. It just got here. It's crack. Other drugs here are cocaine, marijuana and heroin," Mario said.

Mario also explained that the poor in Maceio are not "stupid" or "backwards," the same assertion shared by Maria at COOPLANES. "They go to the Internet cafes to get online; they have [pay-as-you-go cellular phones] to keep in touch. They may not have a car, a house or anything to eat, but they have a phone," said Mario, "and it is a necessary tool."



**Figure 5.11. Making clothing to sell
(Snyder 2008).**

Repeatedly, this idea of moral relativism, or one's internal logic based on socioeconomic factors, in particular, explained through Scheper-Hughes, influences how the poor live in Maceio, and it is an important theory to consider. Even though there are available resources and programs, as well as creative means, including the illegal ones, to make money, the poor seem to be stuck in their persistent poverty.

Even with government housing, families may still fail to thrive. In her book *City of Walls*, Teresa P.R. Caldiera, says that the favelas create their own adaptation of reality, taking advantage of the ambiguity of laws to create a life of crime in order to thrive (Caldeira 2000). Those without jobs are chronically hungry, without savings or any margin of income for investment in their future (Sachs 2005, 54-55). It is easy to see why many Brazilians live "day to day" and may not pursue long-term healthcare, skills workshops or job opportunities. They simply cannot see themselves that far ahead. Reflecting upon the conversation with Dr. Peixoto, offered earlier in this chapter, about the mobility of the bottom classes, from D to C to B, I noted my own observations during fieldwork. In my examination, I did not find the outlook for the poorest populations to be hopeful. Other than being given the opportunity to move to a solid home with piped water and sanitation, which, of course, should not be discounted, there did not seem to be a plethora of social or job opportunities for the poor, or for anyone in any class. Skill workshops offered by COOPLANES are a commendable step towards encouraging the upward mobility of the poor, but only if there are jobs available to for the newly skilled person. My Brazilian friends, who consider themselves to be "middle class," are currently having a difficult time finding employment, with an array of skills and

experience, such as college education, conversational English skills, transportation, public speaking, accounting, sales and marketing. While anyone can embark on an entrepreneurial venture selling items in and around the city, particularly in the slums,⁷⁸ here is no real guarantee of income.

In his book, *Golden Age: the Coming Revolution against Political Corruption and Economic Chaos*, Ravi Batra asserts that the poorer classes limit their own opportunities because of social breakdowns and bad decisions. Batra suggests that lack of discipline, arrogance towards crime, disregard for law, the low status of women, a subculture of fear and the allowance of exploitation by the wealthy in order to make money (through drug deals and artisanship) leads to cycle of persistent poverty, as well as a lack of initiative towards something sustainable (Batra 2007, 62-63). Although there are gradations of opportunities in Brazil, the best appear to be limited for all but the wealthiest citizens.

Lack of personal commitment to change also may feed into lack of community proactivity. If we think back to earlier chapters on water and sanitation, citizens would need to desire a healthy outcome, convince others to participate, lead by example and commit to long-term goals. In Brazil, this seems improbable. When the attitude of a culture is to live day-by-day and the idea of a better future seems hopeless, it is difficult to motivate people.

In a conversation in March 2008, Dr. Peixoto said “Brazil’s problem is the Brazilians,” remarking that the daily actions of citizens do not help their own outcomes. When residents pollute lagoon shores with waste, use rainwater canals for sanitation and compromise clean water with pathogens, due to lack of hygienic practices, it is easy to

understand why management companies like CASAL cannot get ahead. In addition to lack of government funding, it is difficult to move ahead with new projects, even with funding, if they are constantly fixing old ones.

This can also be said for healthcare. In his book, *Democracy without Equity*, Kurt Weyland says Brazil had once made a push for preventative care and basic services instead of costly treatments, but the big business of medical insurance and providers quashed this effort (Weyland 1996, 160-161). The medical lobby also appears to have great influence in Brazil. To effect change against such political power will require citizen representation, social movement or government action.

Clearly, there are ways to bring about change. Political strategy, community-driven regulation, and collective action are all processes towards achieving real, sustainable, urban livability. Yet, achieving such action requires motivation, trust, and a belief that change is possible (Evans 2002).

Social Movement or Community Proactivity

Citizens of Latin America have had a long history of small and large-scale reaction to injustice. Maceio had once been the center of backlash against disgraced President Fernando Collor, as he attempted to run for state governor, and annual protests of the landless regularly fill in the streets. There are frequent strikes by faculty at Maceio's University Federal, and a protest recently took place there against CASAL. Citizens seem to know that reaction, in large numbers, yields results.

In their book, *Cultures of Politics, Politics of Cultures: Re-Visioning Latin American Social Movements*, Sonia Alvarez, Evelina Dagnino, and Arturo Escobar,

explain that, in Latin America, social movements⁷⁹ have been an effective, somewhat successful way of drawing attention to a problem, particularly if there are a large number of participants, articulate representatives for the cause, and/or influential or international support or attention (Alvarez, et. al. 3).

During fieldwork, I learned that there are cycles of “strikes” and movements in Maceio, particularly among the working class. Public workers, especially in healthcare and education, occasionally strike for higher wages or better facilities. If the protesting does not work, they simply go back to work and try again later.

Because demand outweighs supply in almost every regard in Maceio, from sanitation to social programs, vulnerable populations in the municipality often need to be vocal. Although the cutting off of water to the grotto in Maceio was due to a faulty pump, and CASAL was waiting for a part to come in from São Paulo, the community’s June 29 protest against CASAL yielded almost immediate restoration of water services to keep the peace. CASAL found an alternative to meet the needs of those people. In our conversation on July 14, 2009, Mario, the local policeman, said that protests are actually rather effective in Maceio. “As policemen, we cannot interfere,” he explained. “People have the right to protest, [and they know that], so unless there is a threat or it becomes physical, we do not step in.”

To keep the waterways healthy in Maceio, it will also take “the village”⁸⁰ to enact change. In correspondence on July 17, 2009, author and community activist, Alder Flores, who wrote a book about the inefficiencies of water quality in Alagoas, said he believes there is a major lack of information about water potability, especially how the

environmental quality of water changes over time. Senhor Flores, who believes that access to sanitation in Maceio is of particular concern, says the current sewage infrastructure is insufficient to serve all of the communities and inarguably puts the community at risk for exposure to fecal coliforms. He also believes that most of the municipality does not practice safe water handling. “I hope that in the near future this situation can be reversed, because the lack of sanitation leads to a series of social problems, as well as [deficiencies in] education and public health,” he said, noting that it is especially the “periphery” of the city, or the slums on the outskirts, that have unequal access to water and sanitation.

In Brazil, it has also almost always been individuals, non-governmental organizations (NGOs), and political parties, through protests and social movements, which have been the most important actors in affecting positive change in water management. Corporations will push for improvements to serve their purposes, but private citizens push for livability (Keck 2002, 166-167). Community success stories regarding cooperative community water, in particular, point to pride in ownership, representation to resolve conflict, a spirit of togetherness, and a sense of responsibility (Schouten and Moriarty 2003, 88-89). In my observations, it seems that Maceio’s vulnerable communities are a long way from this type of dynamic.

In fact, there are many NGOs and individuals offering assistance in poor communities. Maria de Lourdes Gomes Peixoto is one such volunteer, who has worked in an adoption house, the Catucaba community, Caique, and a favela in Benedito Bentes. In conversations between June 29 and July 26, 2009, Senhora Peixoto commented that

there were definitely not enough social services for the poor. “The government should create more social programs, and not just create, but [provide them to the communities] only when they are [fully operational, adequate for the demand] and ready to be used by the communities”. Having worked in the past to set up artisan cooperatives for women, to prevent their exploitation by wealthy Brazilians, Senhora Peixoto is sensitive to those working poor who are paid less than they should be because they lack education. “[Brazil] says there is no discrimination of the poor, but in real life, we do deal with it,” she says.

Believing that in Maceio there are four socioeconomic groups: “miserable,” poor, middle, and rich, Senhora Peixoto feels that the gap between each of these classes is large, yet, as others have remarked, can be changed. “[The poor] take pride in their family and [their community]. They take good care of their people. They can improve their status if they study and work hard,” she said. There are many examples of Brazilians who have moved from favela life into a life of success or prosperity, with initiative. Benedita da Silva saw a need for representation among the favela’s poor and, despite the constraints of being an Afro-Brazilian woman, became a senator (da Silva 1997). In her autobiography, da Silva says that families who prioritize education, or move where there are jobs, can often affect a positive future for their children, which is also noted by others who offer similar stories of upward mobility (Levine and Crocitti 1999, 411-414).

Change is possible with proactivity. In Cochabamba, Bolivia, local citizens organized a passionate social movement to fight for their right to low-cost access to

water, resulting in the return of water management to a cooperative, and, ultimately, new government leadership (Bennett 2005, 72-90). In Brazil, civilians have an even greater presence at local council meetings, voicing their opinions on labor, education and health care reform (Thomas 2006, 101-107).

A Burden of Responsibility

While Brazil will need to place an economic priority on social reform, insofar as it is able, the citizens may want to review where Brazil has been and where development is going. There have been improvements in government programs, housing, and water access nationwide, but large spending, for example, on the Olympics, have many Brazilians questioning why President Lula will be spending 50 million (USD) for a sporting event and not for social projects. While waiting for this relief, Brazil's citizens need to be proactive about their own health as well. From taking care to drink only filtered water to being vigilant about keeping wastes away from where foods are prepared, families can limit the probability of infection from water-related diseases that require use of their less-than-adequate healthcare. By dumping wastes into only approved receptacles or areas, and educating themselves about unsafe practices, accessible water can be cleaner, and gastrointestinal illnesses associated with water contamination may be decreased.

Residents who are not doing so already need to seek information when it is not provided, and they should share information with others. This community-based method of public health information dissemination is known to be quite effective, especially in order to understand the differences of perception, within and between different

socioeconomic strata, regarding theories of illness. People may be construing an illness as a casualty of poverty in general, or as a result of inadequate healthcare, versus a highly-preventable disease, if their water-usage and sanitation habits can improve. Knowledgeable people can share what they know with the community, especially those who are leery of attending “assimilation programs.”

Urging the Ministry of Health to continue reviewing the living conditions is another way that the poor can draw attention to the diseases affecting their population. Both individual responsibility and public health outreach are the only way to ascertain whether or not the poor are prioritizing healthcare as secondary to feeding a family, or, alternatively, if the population has decided that the diseases affecting their population are simply the accepted norm.

Senhora Costa at COOPLANES said that there should not be a “norm” for the urban poor that enables them to settle for substandard living. In a conversation on July 7, 2009, Maria said “the poor deal with diseases that are definitely specific to the way that they live, like diarrhea, flu, and worms. The poor are behind, but lately the municipal projects have been to help the poor.”

Despite providing free services, there is still a great lack of participation, and a general discomfort with change. “There is lack of motivation [to attend classes],” said Senhora Costa, or to have a truly fresh start. “When families moved to the new government housing, they were surprised how many of them wanted to take trash or even scrap metal with them,” Maria shared. “Yet, we had respect for all of the things that families wanted to take with them. If they wanted to take their water storage container,

even when there was a new one provided for them at the new ‘city,’ we let them. If they wanted to take some belongings with them, even if it was ‘trash,’ we let them take it. We were respectful about their animals. One man did not want to leave his donkey. He wanted to travel with it, so we made accommodations for him to travel with his donkey. One man’s horse did not want to get on a truck, so he rode the horse alongside of the moving van. In any case, whatever was important to the family, COOPLANES treated it as important to them,” Maria explained, but the residents have to be willing to look towards the future too.

Programs are available for everyone, said Maria, and no one is left out. “We offer the workshops to everyone, but people then have to choose whether or not they want to go, and many choose not to participate.” This lack of proactivity is one hindrance to health improvement, too, Maria asserts, believing that many of the diseases of the poor she works with, such as dysentery and lice, are due to lack of hygienic practices. These diseases will continue to spread in the new housing, if people do not take advantage of the workshops available to them, she said. “Lice are a problem, because of lack of baths and showers,” she explained, “and [they are] spreading the flu is because they don’t wash hands.” Perhaps it is also because they also live so close together, often with numerous people living in one home.

Progress will be slow, but the families who catch on will be the model families used to help others on a community level, Senhora Costa of COOPLANES explained. “Living in the new housing is very different for them. They used to have one room, put their beds on the floor and then move them during the day, so they can make a kitchen,

then put them back at night, and so on. Now, they have a bedroom with beds in the same place. The kids have their own space. They have a living room. The kids are able to go to choral lessons and fieldtrips, and the mother doesn't worry [about their safety]. They can play outside until late at night and do activities without fear. The new community is more family-oriented, and there seems to be glimpses of that everywhere. The kids are cleaner, and they have clean clothes. They like to stay in the neighborhood and play there. They are having fun," said Senhora Costa, whose company stays in the communities even after the move.

"We will keep bringing back career and skill training programs and continue checking in on the living environment," Senhora Costa explained, hoping that perhaps with the greater urban poor community seeing that the government housing project and related social and health programs are for the "long run," they will begin to trust the change.

Final Thoughts

As I wrapped up my fieldwork in Brazil in July 2009, I realized the underlying themes of apathy, discontent and mistrust came through in each interview, whether it was a private citizen or a public representative. A few participants expressed satisfaction or hope, albeit with a disclaimer. Everyone seemed to recognize that Brazil was a long way from social success. Although the government has made changes, many since just the 1980s, particularly in terms of access to water and healthcare, the general consensus among participants was not one of faith in the system.

Because of this lack of faith, I assert that many residents in poor communities do not take advantage of programs and assistance, and not everyone is using SUS healthcare. These issues are problems of access, convenience and trust. Access to clean water and adequate sanitation was a big problem throughout Maceio, but careful use of contaminated water through filtration or dumping of sanitation properly are both ways that local citizens can lessen the likelihood of diseases. Yet, despite having knowledge of these practices, they often fail to use them. The poor may fail to recognize that both apathy and acceptance can lead to disease. When community members are proactive and teach their children relatively safe water practices, but shrug off their children's lack of use, instead considering giardiasis and intestinal parasites a "normal part of childhood," it is clear that this society has faced too many disappointments to truly believe their circumstances can change. Based on my observations during fieldwork, I believe the poor consider their diseases as a circumstantial, unquestionable norm. In many conversations with Brazilians, I was told that "[their life] is what it is."

Trust issues were also shared among the working or "middle" class, who were vocal about their views of the current Brazilian government. Most in the middle class feel that there is no more middle class, and that those who were a part of the middle class are in danger of joining the poor, if the government does not find a way to help them keep up, particularly through employment opportunities. The government's long-standing reputation of corruption and providing inadequate funding is compounding the public's trust issues.

Hospitals are in decay, water pipes are corroded, sanitation projects are halted, and everyone waits for funding. Watching the government spend money on sporting events and development are indeed a matter of pride for Brazilians (I know, I had to endure the tongue-in-cheek Brazilian soccer team's win against the U.S., with a roomful of Brazilian friends in my tiny Maceio apartment), but after the event is over or the development fails (either structurally or by failing to bring prosperity to the lower social strata), the social shortfalls still remain. My observation is that Brazilian government spends money on what it *wants* to spend money on, not on what it *needs*.

The social program allocations that are coming from the government are taken as far as possible, and quickly, because agencies do not know when funding will end. Proof of progress is the only chance that organizations have of receiving continuous funding, but it is never a sure thing.

As an optimist, leaving the fieldwork behind was difficult, with no real satisfaction that change will come easily or soon for Brazil's poor, and even for my better-off Brazilian friends. There is so much to be done. From a cultural perspective, I believe that this feeling of overwhelming inequality of life around them is why, perhaps, festivals like São João and Carnaval, evenings full of bonfires, food, drinks and friends, are more the norm than community service and skills workshops. Perhaps due to the need to escape the surrounding despair, festivals and traditions are the great Brazilian escape (Scheper-Hughes 1992, 491).

Certainly, the Brazilian government, and, specifically, the Ministry of Health, has much to do in order to disseminate public health information and work towards its goals

of eradicating preventable endemic diseases, but as I stood in a favela, a few days before leaving, I could not help but wonder how, if public health information exists but a community lacks access to that information, this global power of knowledge we have about hygiene and safe drinking and sanitation can ever eradicate the preventable diseases of poverty. How can Brazil globalize economically, but not benefit from the globalization of social and health advances, too?

In Maceio, signs of both progress and failure are everywhere. It is easy to see why upper class residents and foreign tourists paint an idyllic view of the local beaches and culture. In the hotels on the beach strip, there are brochures with bright pictures and maps about the wonderful sights Maceio has to offer. Maceio is beautiful, and the local culture is fascinating. However, the notion that Maceio's environment includes only the acceptable parts of the community is strongly misguided and imaginary.

Maceio's culture includes the good, the bad and the ugly, and the latter does not refer to its people, but instead the looming inequality between those who have money and those who do not. Money is the current through which access to resources flows in Maceio, as in other cities throughout the world, whether it is water, sanitation or healthcare. In my fieldwork, I found that there was an absolute lack of access to potable water throughout the city of Maceio, and that access had no socioeconomic face. For rich and poor, the quality of water in Maceio, although flowing, was too unhealthy to drink, due to waterborne pathogens. Meanwhile access to potable water requires money to buy the gallons of filtered, safe bottled water.

Lack of basic sanitation was also widespread and crossed the socioeconomic strata, yet those on the water management network fared best, with the ease of sewage outflow through pipes to the water treatment plant. For those without sanitation, there were two paths: pay for private sewage or dump household waste outside of the home. For the poor, the choice is the latter. It is simple, inexpensive, and convenient, as well as possibly life-threatening. However, the poor are really without a choice, without money. This lack of control over a healthier standard of living is leading to disease, requiring access to adequate, quality healthcare. Here, there is also a great incongruity, with the very poor having an outlook of uncertain longevity, compared to those who can afford private care. This trend, which has not changed in decades in Brazil, is disturbing, considering the number of people relying on the government-subsidized SUS insurance. The government's lack of willingness to fund social programs, when there is money for special events, such as the Olympics, cannot be considered anything but negligent.

Finally, while I found all of the poor communities that I studied in my fieldwork to be at risk for greater infection and, unfortunately, inferior treatment, the most vulnerable populations are those located outside of the reach of "everything." Situated on the outskirts of development, favelas are unarguably Maceio's most vulnerable urban population. Their access to municipal resources is nonexistent, their prevalence of disease is predictably higher, and their access to care is undeniably compromised. As can be found across other studies, whether it is in rural reaches of São Paulo, the violent shanties of Rio or the beautiful shores of Maceio, the poor are getting sick more often,

and it is inequitably and unjustly difficult for them to find treatment (Farmer 1999, 4, 27-28, Scheper-Hughes 1992, 31 and Adamo 1998, 233).

ENDNOTES

¹ Additional photos from my fieldwork experience in Brazil are located at www.thewaterhealthblog.com.

² Favelas refer to the term used to describe a single shanty house or a shanty community in Brazil.

Brazilians use this term for “slum,” but note that it is different than a ghetto, which typically denotes a neighborhood deemed to be dangerous or inferior, due to safety concerns or racial coloration. Favelas are typically on the urban outskirts of a city, but they can also be located within a municipality. They are considered to be illegal and temporary communities, not eligible for city services such as water and sewage. Urban residents typically live in favelas because they cannot afford homes in other communities, but many favelas are set up like organized communities, complete with a school and services such as repair shops and beauty shops, as well as small artisan cooperatives that are often run by the women within the area.

³ The investor built the wall and front gate, but pulled out before developing the residence. After the tidal wave of 2006 at Lagoa Mundau, many home developers pulled out.

⁴ IBGE document translated from Portuguese to English using Google Translator.

⁵ IBGE document translated from Portuguese to English using Google Translator.

⁶ Obviously, bribery to get out of a fine or pulling strings to get a job are not practices unique to Brazil, but it’s spellbinding to a foreigner how far a few dollars can go to get ahead. Although bribery is illegal, the laws against it are largely unenforced, and so it seems that there is an underlying current of corruption even among the locals. In the markets, prices are often unmarked, and the shopkeeper may name the price depending on the customer. Foreigners certainly get a different (higher) price than locals, and a well-dressed local will be named a higher price than someone with a disheveled look and no shoes, if that person is acknowledged at all. When I was particularly interested in an item, I let my Brazilian friends ask the price for me. There was typically a price difference of about \$5.

⁷ Portuguese to English translation using Google Translator.

⁸ In 1992, following a fervent protest by students, in particular, in painted faces, former Brazilian President Fernando Collor de Mello was impeached on grounds of corruption and peddling. Corruption in this study does not only imply “bribery,” but also the misuse or misappropriation of government funds. “Corrupt” or “corruption” are the words that the Brazilians that I spoke to use to characterize their government, when funds run out for social and health-related programs and development. In the study, there are comments from interviews that use the word “corrupt” to describe Brazilian President Lula, among others, who “take money for themselves.” In her book *Blue Covenant*, Maude Barlow says one of the reasons that third world countries have become candidates for privatization is due to government corruption -- the word here, again, meaning mismanagement of funds versus bribery (Barlow 2007, 43).

⁹ For the period of 1970-2000, infant mortality for Brazil declined by 72% (IADB 2005). However, in 2005, the World Health Organization (WHO) estimated that a half-million women died globally from maternal health complications. 4,100 of these deaths were in Brazil, with a disproportionate number of women at risk residing in Northern regions. To draw attention to Brazil’s poor record of maternal health, in November 2007 the Center for Reproductive Rights (the “Center”), cooperatively with Advocaci, a Brazilian NGO, filed a law suit against the country of Brazil before CEDAW, the UN Committee on the Elimination of Discrimination Against Women. This case, on behalf of a deceased 28-year old Brazilian woman, cited that the woman, who was of Afro-Brazilian decent, died of complications during pregnancy, due to misdiagnosis at a local health care center. The article further asserts that Brazil’s health care system

is negligent and disproportionately ignores the rights of the country's poorest women, and that racial inequities, particularly in regard to Afro-Brazilians, who, account for approximately 60% of the country's indigent, are a factor in restricting access to adequate care. The Center further states that the cost of adequate care can be relatively low, and that most maternal mortality is preventable with skilled care. However, according to the Center, despite a public commitment in 2000 to reduce maternal mortality, and despite other health care improvements in the country, Brazil's government had, as of 2008, yet to affect change in the area of maternal care. In addition, Brazil's Multi-Year [Health] Plan for 2004-2007 failed to list maternal health as a top priority. The Center reports that the WHO and "others" have criticized Brazil's lack of effort to improve maternal health programs, considering the country's capabilities and resources. Brazil, on the other hand, says that they are making an effort. However, the Center notes, any improvements are typically in middle income areas instead of in poorer populations. In a 2007 Health in the Americas's report by PAHO, the organization further illuminated Brazil's social inequities.

In summary, Brazil is not a poor country, but it is an extremely inequitable one, in which a great many people continue to face enormous difficulties in exercising their citizenship. It is a fundamentally urban country, in which the urban poverty rate did not decline to the same extent as the rural poverty rate during the period 1990-2003, and in which labor force growth has outpaced job creation.

Women's rights and issues in Brazil, like most third-world countries, are still a new priority in a country that is traditionally not focused on social and human issues versus agricultural or economic concerns. Reproductive health and maternal health are behind the curve in Brazil, however, and without government advocacy, Brazil's neediest population may not be able to move too far ahead (CFRR 2007).

¹⁰ Due to the sensitive nature of his job, my data collector and informant has asked to keep his identity private.

¹¹ In March 2008, the United Nations Children's Fund (UNICEF) announced that its community-based hygiene programs were working well to decrease illness in certain populations, using the example of School 57, a high school in Tajikistan. This school is a UNICEF-supported site that provides health, hygiene and public health education services to over 400 families, as a result of a call to action report by UNICEF. A typical family in this community lives together without indoor plumbing. Through this program, students learn a new seminar topic each week, ranging from home sanitation to personal hygiene. Student volunteers then "spread the word" through the student body, via relatable media such as puppet shows and songs. The project has been successful in reducing water-borne illnesses in the community. One student volunteer states that, as a result of student-led water testing, the community was surprised to learn how contaminated their water was, and they learned to boil water before use. UNICEF believes the rewards of this program have been multifaceted, since they have achieved other milestones that were secondary to the program's purpose, such as decreasing infant mortality and increasing the participation of girls in education programs in Tajikistan, which has otherwise been limited. UNICEF supports over 300 student-supported programs, and the overall assessment is that the peer-led education has been very successful. With 2008 named as the Year of Sanitation by the WHO, and the UN Millennium Development Goals, aiming to increase universal education, as well as increase efforts to improve child and maternal health, it is encouraging that governmental and NGOs are trying various formats of outreach programming. Teaching a select group of students, who then lead peer-group education, is an especially approachable way for girls to be comfortable with sensitive or personal subject matter, which may also be new to their culture. In addition, it's possible that learning from a peer may be more effective than the retention of information between adult/child, since peer bonds are often strong and influential, especially if something "works." In addition, reaching out to children in an educational setting, and then entreating those children to go home to teach their families about hand washing, hygiene and sanitation, is being used by other organizations, such as the CDC, and it is universally meeting with success. When any effort is made to improve hygiene and sanitation in a community, such as to decrease water-borne disease, that improved hygiene and sanitation will often have other effects on the population. Finally, when any program sets out to accomplish one goal and ends up achieving many, it should become a model for other

public health goals (UNICEF 2008). This type of approach is the type of model being used, on a very small scale, through the assimilation programs in Maceio, and may be worth further implementation into community health clinics and schools.

¹² In addition to being necessary for human survival and ecology, water is also symbolic and plays an important role in many cultures (Miller 2007, 37).

¹³ In 1854, Dr. John Snow made a historic epidemiological discovery, determining that water was the catalyst for the cholera epidemic in London during that time. He determined that a water pump, where local citizens frequently fetched water, was contaminated, thereby spreading the deadly disease (Hopkins et. al. 1970, 129-130).

¹⁴ In Spring 2009, I did a public health practicum with The Water Project, Inc. (TWP), a 501(c)(3) non-profit, public, charitable organization, which provides solutions for water-scarce communities by connecting donor funding with relief workers in the field. TWP's mission is to bring relief to developing communities in Africa and India that suffer needlessly from a lack of access of clean water, by funding freshwater wells and other water catchment projects. It strives to work with non-governmental organizations and implementers, who share their same vision, by providing the financial means necessary to build sustainable water solutions. Importantly, TWP narrows its focus to supporting communities that have demonstrated a commitment to their own long-term development. For more information, see www.thewaterproject.org.

¹⁵ In March 2008, the Food & Water Watch, a non-profit consumer group, released a press statement, expressing disgust at their organization over the U.N. Human Rights Council's refusal to "once again" define access to water as a basic human right. The director asserts that the lack of pro-activity on the part of the UN is due to its protection of influential corporate interests. Food & Water Watch outlines the WHO's statistics regarding the number of people who are without clean water and adequate sanitation, and it states that by 2025 over 40 countries will face severe water shortages. The statement urges nations to take their own necessary action to define water as a basic right and applauds the several countries that have already taken steps to ensure public access to water. The director's statement asserts, in summary, that the UN "buckled" under pressure by U.S. and Canadian corporate interests to "water down" the definition of basic rights remove specific references to water. This article demonstrates how strong and persistent the water issue is, including concerns that influential utility lobbies are preventing necessary humanitarian change (Food & Water Watch 2008).

¹⁶ Published in Water Policy in 1999, Peter Gleick of the Pacific Institute submitted a paper that argues that billions of people, particularly in underdeveloped countries, suffer due to lack of clean water and proper sanitation each day. Gleick defines water as a basic need, even though he passionately demonstrates that international and governmental organizations have been slow to properly highlight the importance of water on a global, humane scale. Gleick defines key issues and terms with regards to water, and provides details on the scale of illness and death caused by water-borne and water-related diseases, especially cholera. Gleick acknowledges that, although some public-private partnerships have stepped up efforts to participate in sustainable solutions for water. However, he notes that more aggressive strategies cannot be accomplished until certain factors related to water are addressed, such as the indicator that water may be a basic right, a human right or a legal right and if the latter, an indicator of who is responsible for its distribution, policy and governance. To this end, the paper details the negligence of the UN and the UNHCR to specifically name or explicitly define water as a basic need or right, which has led to the current state of crisis, and he calls to action individual governments to define water as such. Gleick provides details regarding water as a necessary component of human sustenance and outlines how much water is needed per person for survival. He also provides a comparison of how much water a person is averaging per day in various countries. The paper also summarizes the consequences of not providing water to populations, in terms of dollars lost, due to water-related illness and death, and suggests a legal obligation for governments to provide necessary water to its populations, as the lesser expense. He highlights that international organizations are readily available to provide assistance. As a further note, although it is believed that the UN and UNHCR intended for water to be included as a part of "food" in their basic human need definition, without the specific designation of water, separately, clean water advocates believe

that the current water crisis has arisen and will spread rampantly with no level of responsibility on the part of public or private groups to be a part of the solution. Despite close achievement to a universal mandate that designates water as a right, such as with verbal declarations (i.e. in a speech in 2001, the Secretary General of the United Nations declared that water is a “basic human right”), no formal documentation or amendment has been issued stating such on paper and mandating its availability to all populations. An official declaration of water, instead of a verbal one by advocacy groups or NGOs, as Gleick confirms in his paper, would necessitate a legal obligation on the part of international and national governments to provide clean water to all populations in quantities that will provide both sustenance and disease prevention, as well as consequences for not doing so.

¹⁷ In 2008, I published an article with The Water Project on the concerns of water scarcity and children, including the chore of searching for potable water. Fetching potable water is a daily chore for over 2 billion women and children across the globe, who spend many hours each day hauling water from pumps and basins to their homes. In what is sometimes described as a “six hour journey,” this population, predominantly girls, spend their day fetching water instead of attending school or playing with siblings or friends. In addition, children who are consistently exposed to hazardous, unpotable water or exposed to pumps or water sources that have been contaminated by water-borne bacteria, contract diseases, such as cholera, and they are often affected by life-threatening diarrhea from parasites in unclean water. Not only does the work of transporting water inhibit a child’s ability to access education, but it is also “back-breaking” work. With endless household chores, such as caring for livestock, siblings, washing, cooking, cleaning and storing, the need for obtaining water never ends, from morning to night, every day. The heavy water, fetched in containers that vary in size, is carried on a child’s head for many miles, and with children carrying an average of one gallon or more, this water (plus the container) can weigh up to 10 pounds or more, which can also cause physical damage to a child’s body. The older the child, the more water they typically carry, with adolescent girls and women carrying up to 45 pounds of water (roughly the weight of a kindergartner) on their head. Lack of sanitation and clean water often means that girls, who are fortunate to be in school, must stop their education at puberty, because of lack of proper resources during menstruation. Lack of sanitary facilities in schools for this purpose, and the lack of any sanitary facilities along waterways, means that children expose themselves to human waste on a daily basis, whether it is by relieving themselves while traveling or wading in waters with high coliform levels (Snyder 2008). The entire article can be viewed at http://thewaterproject.org/water_scarcity_and_children.asp

¹⁸ In 2008, I published an article regarding the resource demands of bottled water via The Water Project. It stated that privileged consumers are in a romance with the bottled water industry. However, consumers should beware that there are no uniform standards for the potability of bottled water, and that the product lacks both environmental and safety regulations (Snyder 2008). The entire article can be viewed at http://thewaterproject.org/bottled_water_resource_usage.asp.

¹⁹ By the early 1990s, hydropower had degraded much of the Amazon’s pristine basins and other rivers, like the Tocantins and Xingu, followed suit. This degradation resulted in loss of biodiversity (including fish and other aquatic foods to eat, trees for nuts and fruits and roots for medicine) as well as loss of easy public access to potable water. As basins began to decline downstream, 41% of the country’s poorest people began to settle in the Northeast and the region also had a steady migrant “outflow” of skilled workers to urban areas like San Paulo, where potable urban water supplies were just as limited.

²⁰ In our conversation on June 30, 2009, Dona Gil, a middle-class resident, says that she uses a private water company. A representative from the water company turns the water on each day from 5am to 11pm. During that time, Dona Gil also fills two reserve tanks in her home, a roof tank and a ground tank, so that they have water after 11pm. Dona Gil says she also religiously fills the tanks because sometimes the water pressure from the service is low, and the additional water supplements the pressure. Filling the reserve tanks is also necessary, because sometimes the “guy doesn’t show up for a few days.”

²¹ Rooftop collection is considered to be a highly effective and low-cost means of promoting access to water, provided that the container is adequate to supply a family with water, there is sufficient rainfall to promote collection, and that there is a reliable method to keep the water clean (Miller 2007, 93).

²² Figure 2.25 shows a photo of the emissary in Maceio. The emissary is a pipeline that plunges treated wastewater from the city into the ocean floor.

²³ Although Maceio is listed on this table, it was not adequately assessed during this study. There are 53 districts in Maceio, not one, and according to CASAL, many districts are without sanitation or portions thereof. However, one can see that there are many districts in the greater Alagoas state without sewage. According to this study, there are 74 districts in Alagoas out of 114 without sewage. One can also see the ratio for both the Northern region and the nation. For some reason, this chart was published incomplete.

²⁴ Many favelas have community names, typically given to themselves via an elected leader. The name often denotes the trade the favela is known for, such as beans or fish, or it can mean a location, such as the beach or city center. This name has been changed to protect the privacy of the individuals who participated in the study.

²⁵ Despite the police presence, I observed the security for the president to be very lax. There were two or three federal security agents milling about, but they spent most of their time talking with each other or people in the grandstands. Most of the police were outside of the tent, observing locals and controlling traffic into the area. There were a number of unsecured apartment buildings and areas along the beach, and although I had to go through a metal detector to go into the main tent, there was a flimsy open metal fence between myself and those who had not gone through the metal detectors. People easily climbed over this fence for hours, buying food or using the facilities, and there were no police posted in this area. In the U.S., this would have been a secret service nightmare.

²⁶ Conversion rate on November 22, 2009.

²⁷ Conversion rate on November 22, 2009.

²⁸ This family's septic tank is deep, and it should be noted that it is the practice of most Brazilians, even in large cities, not to flush toilet paper down the commode. They use a hose and sprayer attached to the wall behind the toilet to clean. The importance of noting this is two-fold. First, septic tanks are not filled with extra refuse such as toilet paper, which means the tank's volume does not increase as quickly as in septic tanks in the U.S., and the lack of extra material makes the natural breakdown of bacteria easier. This family has only had to have their septic tank pumped twice in the past 7 years, which cost 60 BRL (approximately 35 USD each time). Based on this information, the burden of cost is not too much of a hardship for this family, which makes 1500 BRL, as noted in the text, but based on a different sized family, a different sized septic tank and lower income, the cost burden would be higher. Secondly, the method of cleaning oneself after defecation raises a concern about hygiene-related diseases that I often pondered when traveling to Brazil. At private homes in Brazil (for those that have toilets), the homes of my friends, and in my rented apartment in Maceio, there is a water hose attached to the wall. This is for cleaning oneself after defecation, a method that is, for many Westerners, disconcerting. My daughter and I were told that if we did not want to use the "hose," we could clean ourselves and wrap up the tissue and throw it in the trash can. In hotels, Westerners are often told it is "okay" to flush small amounts of toilet paper down the commode, but there are also hoses near every toilet in these hotels for those who also prefer to clean with a hose, and to encourage use of the practice, so as to not clog the water pipes. At airports and shopping malls, there is typically paper available and no hoses, but bathroom users are still encouraged to throw paper away in trashcan and not flush them. For those persons who prefer to clean using the hose, this is done by spraying and by washing with a bare hand. As I develop the relationship between hygiene practices and disease in Brazil, it was my concern that users of this method should understand the importance of making sure hands are carefully and thoroughly washed after going to the bathroom, especially before touching one's mouth or food items. I chose not to ask about this practice in detail, concerned that I would offend interview participants, who did not know me well enough to discuss such private matters, but Brazilian friends generally find this practice to be "fine" and "normal," as long as vigorous hand washing is used afterwards. It should be noted, however, that hand washing is typically done using a mild bar soap and not an anti-bacterial liquid. While, I did not explore the possible relationship between this hygienic practice and disease, or what type of soap would be necessary to adequately remove fecal coliforms, this culturally-diverse practice of "cleaning oneself" in different countries would be an important one to explore. It is reasonable to conclude that because of this practice,

that there is a possible increase in exposure to fecal matter left on hands after going to the bathroom. For some, it may be less of a concern, as there are varied cultural practices governing which hand one eats with or shakes others hands with, based on which hand is used for cleaning in the bathroom. This was not a part of my study, but it bears further examination. Increased prevalence of disease in Brazil could also relate to the lack of barrier between hands and fecal matter. A photo of the hose in the bathroom.



²⁹ This discussion regarding septic tanks brings to mind my previous research on the public health implications of improper residential septic maintenance. Although my study centered on homeowners in the U.S., the implications are similar for Brazil, if not more problematic. In the U.S., there is a standard for septic tanks, including distance from the home, gravitational flow and a certain number of meters that the tank must be set into the ground. Most septic systems include a drainfield and a series of valves or stoppers to prevent backflow or overflow, when possible. In Maceio, the septic tanks are quite literally holes in the ground, covered by a slab of concrete. In addition, pumping every 7 years, as is the case for one of my informants, may or may not indicate improper maintenance. However, if Brazilians are trying to save money, they may often wait until a problem arises (such as an overflow into a home) before pumping. Approximately one-quarter of residential homes in the U.S. utilize septic systems. Homeowners may not be aware of the significant public health implications of poorly maintained septic systems to themselves, their family and community, including gastrointestinal illness, intestinal worms, eye infections, respiratory illness and Hepatitis A. I found that in the U.S., as in the favelas of Brazil, there was a general lack of public health knowledge among homeowners about proper septic maintenance, and among those homeowners who conceded a lack of regular maintenance, cost was often a factor. Homeowners across the United States flush household waste into their backyards, instead of centralized city or county facilities, every day. Septic systems are typically a well-designed, “silent” mechanism. Regular maintenance of a home septic system is often forgotten because the system is underground and out-of-the-way, and upkeep can be expensive. Septic pumping can run approximately \$250 per system, and if homeowner waste flow overwhelms the system (i.e., if the system was built for 3 people and a family of 6 moves in), a new, larger system can cost up to \$100,000. These may be some of the reasons for poorly maintained systems and system failure. Although septic systems are an effective way of disposing of household waste, even a new, upgraded system can fail or prove hazardous. Hazards include backup of wastewater into the home, which can lead to the presence of fecal material and bacteria in bathtubs, showers and sinks, surface water contamination and sediment, and even poisonous odors. The primary concern is that exposure, due to lack of public health knowledge and cost prohibition of septic maintenance, is occurring, and it is preventable.

Information about proper maintenance is readily available, through the Internet and most local health departments, but many homeowners may not be aware of how to care for their systems and prevent illness.

³⁰ Conversion rate on November 24 2009.

³¹ All information, other than cost, was blacked out, to secure the identity of the family.

³² My rented apartment was in the Ponte Verde area, and I, too, had my drinking water delivered in 5-gallon bottles.

³³ Conversion rate on November 24, 2009.

³⁴ Some of the information used within this chapter was summarized from published articles that I wrote for The Water Project, between 2008 and 2009. Links to those articles can be found at www.thewaterproject.org.

³⁵ Despite the more pristine waterways, early settlers who moved into more populated areas also suffered from water-related diseases, such as cholera and malaria, and they often lacked adequate knowledge about safe sanitation practices (History 2009 and Tumwater 2005).

³⁶ Clean water sources are also strained by natural disasters and climate change. Developing countries, including Brazil, affected by monsoons and hurricanes, struggle with lack of government response and humanitarian aid to bring water and sanitation to inaccessible areas. Response by the United Nations and non-governmental agencies simply cannot meet the overwhelming demand for supplies. In October 2009, for example, Oxfam International responded to the devastating floods in Southern India by providing drinking water and oral rehydration tablets, hygiene kits, and temporary latrines to approximately 13,000 families. However, the number of people affected by the floods is said to be over 5 million, so much more assistance is needed in order to combat probable illness and disease, due to unpotable water and lack of sanitation (Oxfam India 2008). In Maceio, a large tidal wave and subsequent floods devastated most of the lagoon communities and businesses. Many of those businesses have been slow to rebuild. Devastating floods in April 2009 also damaged neighborhoods near Lagoa Mundaó, bringing serious adverse health problems, which will be discussed later in the chapter.

³⁷ I did not receive authorization to publish his name.

³⁸ In August 2009, the New York Times introduced the “Toxic Waters” new series, in both their printed and online news, to share water-related issues plaguing the U.S. These issues include discussions regarding the recent increase of chemical pollutants in water, like herbicides, the rise agricultural pollutants, such as from farming, and the rise in industrial by-products, such as coal, all of which are leaching into U.S. waterways and causing serious health effects from cavities to cancer. Investigative reporters are pointing a finger at U.S. legislators to do a better job at enforcing EPA regulations, such as the Clean Water Act, the Clean Air Act and the Safe Drinking Water Act. Investigators believe that enforcement of environmental health violations has fallen behind. For an online link to these news stories, see <http://projects.nytimes.com/toxic-waters>.

³⁹ According to the Population Reference Bureau, the population for Latin America and the Caribbean is 579,624,000 for 2009 (PRB 2009).

⁴⁰ The “landless” are communities of migratory people who set up and move their homes to follow the availability of seasonal work, such as working in the sugar cane fields.

⁴¹ Length of canal provided by former Maceio mayor, Katie Borne, on November 22, 2009.

⁴² During my fieldwork, I collected twelve water samples from various taps and freshwater sources, including the Riacho Salgadinho canal and Lagoa Mundaó. I provided these samples to the GMU chemistry laboratory for testing, as well and kept a few samples to test on my own, using a home testing kit, as would be used to test my own residential water supply. While the GMU laboratory was primarily concerned about the presence of arsenic in the water, I was interested in finding out about fecal coliforms. Both water samples tested positive for fecal matter, which would be supported by my own observations about how both waterways are utilized in Brazil. There are pipes and ditches from toilets leading directly to the canal. Furthermore, during my pilot study in January 2008, I saw feces floating in an otherwise crystal clear area of the lagoon. That discovery is what prompted not only a very thorough shower, but the motivation to do this research. As I have discovered, clear water is also not a sure sign of healthy water. Colorless raw waste and pollutants like pesticides and herbicides are sometimes discharged into relatively

pristine waterways from point and non-point sources, and even the most pristine of waters can contain fecal coliforms from nearby agriculture or recreational users. In the U.S., the problem is widespread. Sixty percent of shallow wells in U.S. agricultural areas have tested positive for pesticides, and 21% of groundwater wells exceed the federal allowance for nitrates (EPA 2008). Public pools, lakes and waterparks are at risk for *E. coli* and *Cryptosporidium* pathogens. In Maceio, where the shallow water is clear and picturesque, it is relatively common to find feces and trash along the shore of the lagoon, as well as at the public beaches, such as Ponte Verde.

⁴³Wastewater is defined as any water that has been used, such as for household or industry use, and contains waste products. These waste products are most often liquids or solids and can be biological, chemical or radioactive. In addition to having adverse health implications, wastewater contamination can also have ecological effects. These may include the degradation of ecosystems, such as a decrease in important aquatic plants that help preserve the condition of waterways, or biodiversity loss, such as loss of aquatic life like fish and crustaceans, which are an important part of both animal and human diet (EPA 2008). In a large waterway, such as a river or stream that has a continuous flow and a renewable source of fresh water, a small amount of contaminant may not have much impact, as there is a natural process of bacteria breakdown if water temperature, dilution and solar radiation are optimal. Streams and rivers, which wind through rocks, pebbles, gravel and sand, also have a natural filtration system that can help to break down contaminants. Although a certain amount of nutrients are actually helpful in the growth process of aquatic plants, excessive nutrients can also hasten algae growth which then leads to a decrease in dissolved oxygen. This overgrowth of algae clouds the water and prevents sunlight from permeating, leading to the destruction of important organisms, plant and animal life. Nearly half of the U.S. fresh water resources, for example, currently show a disturbance of aquatic species (EPA 2008).

Heavy, slow-moving, degraded water, filled with an excess of contaminants, can also create a sludge, which may contain pathogens such as fungi, worms and toxins. Sludge can also contain fecal bacteria and blood borne viruses. (Gerardi and Zimmerman 2005). A portion of this was published by The Water Project (Snyder 2009).

⁴⁴The reports given to me by the Ministry of Health are all in Portuguese and in PDF files, making it difficult to cut and paste into online translators, and for which translation for hire would be extremely expensive. However, while in Brazil, my translator gave me a summary of the reports. I do not attach these reports in the Appendices, even in Portuguese, because while I have permission to use the information contained therein for my study, I did not obtain specific permission to publish.

⁴⁵There is a concern that experiencing such a dramatic change between having no access to piped water and sanitation to a now constant flow of water may give a false sense of security. CASAL does not recommend its water for drinking, and most residents in Maceio purchase the filtered, bottled water. With Happy City residents citing that they feel "good" about drinking from the tap, there may still be a prevalence of diseases, such as *Giardia*, indefinitely present among this community.

⁴⁶Driving through Maceio, I saw dozens of kids walking alone, along long expanses of road, some selling beans and candy and others just playing with dogs or sticks. There is no age range for this "freedom." As an American mother, I was constantly surprised to see children as young as 3-4 years old, wandering down a sidewalk or playing at a distance from supervision. Occasionally, a mother or grandmother would run after a child, but children ages 7 and up are everywhere, without supervision. There are children operating fruit stands alone, all along the beach highway. There are stands with one or two children operating them, with no other stands, or any adults, for 400 feet to a mile apart. Some of these stands had a 9-10 year old girl working there, holding a baby, with one or two younger siblings in the stand with her. Again, there were no nearby adults. When I asked about the risk factors relating to a child operating alone without a supervising adult, one informant said, "Who is going to steal a poor child?" In her book *Death Without Weeping*, Nancy Scheper-Hughes speaks to this theory of mothers being particularly lax or indifferent towards the whereabouts or safety of their children. Although I have observed both mothers who are protective of their children, and those who appear more carefree, in the poor communities in Maceio, it bears reflection that, for those who seem indifferent, that moral relativism may play a role. This internal logic, congruent to one's circumstances, may result in the letting of one's children to wander off to their

own devices, or necessitates utilizing children to help make money to provide for the family. Parents with children may be busy, opting to send their children off to play or collect cans. For children who are older, there is definitely a common need to have them help make money. Children are on street corners spraying windows and wiping them down for a few coins, and children rush up to cars at stop lights to try and sell feijao or beans.

This practice of having children participate in money-making schemes is considered normal in Brazil, and as will be described in Chapter 4, COOPLANES offers workshops in the favela to teach kids how to make candy and breads to sell. However, there is a more sinister and harmful aspect to using children to make money in poor communities, and at one urban health clinic that caters to the very poor, there are flyers and pamphlets distributed by World Vision about the problem of child exploitation. Poor people will resort to “pimping” their children to make money, just as young girls, mothers and wives utilize prostitution to put food on the table. Sadly, one brochure with a child pictured on the front reads, translated, “I am not a tourist attraction.” At night, prostitutes are easy to spot along urban streets, in alleys, on street corners and around gas stations. To this end, the health clinics have added picture brochures, especially helpful to the illiterate, about sexually-transmitted diseases and the ease and proper use of both the male and female condoms. Most neighborhood clinics have these condoms available and free to the community. Examples of these brochures can be found at Appendix J.

⁴⁷ On October 23, 2008, I took a tour of the Fairfax Water Treatment Plant in Lorton, Virginia. The process of filtering and sterilizing water in the U.S. facility is similar to that found in Maceio, Brazil, with one exception: at the Fairfax treatment facility, sterilization includes chlorine and ozone, whereas in Brazil, the final treatment is chlorine. In a conversation on July 17, 2009, CASAL’s water treatment facility manager said that treatment with ozone is unnecessary, since the water is not reused, but that the use of ozone would be cost prohibitive anyway.

⁴⁸ Although I was not clear as to why water was not reused, I sensed from talking to CASAL plant managers on July 17, 2009, that Maceio does not have the infrastructure to adequately filter and sterilize the water and recycle it back through to consumers. The water treatment plant is already pushed past capacity. I was told that the use of chlorine is already expensive for them, much less ozone. Filtering “clean” water from surface water sources and underground aquifers already poses a challenge for CASAL, which must filter water that has not been “used,” yet is already compromised. As far as other methods of obtaining water, the plant manager did discuss the future possibility of using the readily-available ocean water, but development and equipment cost for desalination in Maceio is, as in many parts of the world, cost prohibitive.

⁴⁹ In her book, *Death without Weeping*, Nancy Scheper-Hughes explores the relationship between culture to medicine, specifically, the “transforming qualities” that medicine, medical knowledge and pharmaceuticals may have on the body or to a person. She asserts that, prior to modern medicine, many populations associated illness with death, and new medical knowledge could now be associated with a level of freedom, sense of relief or hope (Scheper-Hughes 1992, 196). On the other hand, Scheper-Hughes also shares that in Bom Jesus da Mata, where she did her fieldwork for the ethnography, this level of trust was sometimes misguided, as healthcare workers often gave mothers pseudomedicine to treat their dying children. These children, ailing of malnutrition, were given a few vitamin drops or a small dose of rehydration powder, and given back to their mothers, who, when possible, placed much hope in this smallest dose of “miracle solution” (Scheper-Hughes 1992, 210). During my fieldwork, I observed that the do-it-yourself mixtures of water, salt and sugar “prescribed” by medical professionals, were found to be effective, particularly for dehydration, but it bears further investigation as to whether there is an overreliance on this type of solution. Are patients monitored closely so as to know when these solutions are not enough and a hospital stay with an I.V. necessary? And how often are healthcare workers sending patients home with little more than a recipe versus an adequate biomedical prescription? This could mean that, as Scheper-Hughes suggests, medical professionals may be acting in bad faith.

⁵⁰ 2005 healthcare statistics for Maceio are the most recent data available.

⁵¹ Paul Farmer, as well as many other anthropologists mentioned in this study, such as Scheper-Hughes, Bastien and Ong, are associated with the field of anthropology called Critical Medical Anthropology, or

CMA. Other CMAs include Philippe Bourgois and Jeff Schonberg, who explore the relationship between homelessness and drug addiction in their book *Righteous Dopefiend*. This school of anthropology argues that social inequality plays a key role in determining the frequency of illness in a population, a connection that I also observed in my fieldwork. Although I initiated my study with the desire to find some of the same healthcare inequality commonalities in Brazil that Farmer found in Haiti, it bears noting that there are many critics of Farmer. These critics believe that his work generalizes the conditions of healthcare for the poor and that his theories are more assumptive, versus grounded, in epidemiological study. However, for the purposes of my thesis, I am utilizing only the arguments that are fitting to my study and observations.⁵² Obviously, many hospitals likely have old equipment sitting around, but seeing the piled high machines, some of which looked very new, raised questions, such as whether the equipment has fallen into disrepair. Also, because of the expense and difficulty of obtaining parts, have they become useless or, due to infrastructure problems, does the hospital not have the energy to run these machines? In the September 9, 2008 lecture at PAHO, Dr. Beato said that development does not always work well in third-world countries, and westerners, intending to do well, often fail to realize that modern appliances, such as x-ray machines, are not always appropriate. Citing an example, Dr. Beato said that a wealthy Texan woman, who had been traveling in Latin America and had broken her arm, was astonished that there was no x-ray machine within a reasonable distance from her location. Although eventually satisfied with the level of care she received abroad, when she returned home, she sent an x-ray machine, as a gift, to the remote hospital. Excited about their new apparatus, the hospital plugged it in, thereby wiping out the electricity in the entire town. The fancy new machine is now in a closet, unable to be used.

⁵³ Name has been changed.

⁵⁴ Since some favelas are temporary housing communities, versus those neighborhoods that have been in existence for 10-20 years, the number of favelas in Maceio can often change.

⁵⁵ Based on November 10, 2009 conversion rate.

⁵⁶ On May 5, 2009, the Washington Post published a newspaper article suggesting the link between poverty and the increased number of H1N1 influenza cases in Mexico, citing the tendency of the poor to self-medicate, instead of going to healthcare facilities, such as hospitals. This self-medication refers to the ability of Mexicans to buy drugs at the local pharmacy that would, for Americans, for example, only be available with a prescription. Self-diagnosing and self-medicating, the article asserts, means that a person with a serious illness loses “precious time” to be treated by a doctor (Partlow and Booth 2009). This is also substantiated by Farmer in the example of “Jean,” provided in Chapter 4.

⁵⁷ I found that the most common practice for drinking filtered water was by purchasing the 5-gallon water bottles. Smaller water bottles are also available, but not readily. On the go, people will drink cans or cups of coconut water, mineral water or soda. I did not find the practice of boiling water for drinking to be common, but it was deemed safe for cooking.

⁵⁸ Name has been changed.

⁵⁹ Conversion based on November 11, 2009 rate.

⁶⁰ By comparison to other middle-income countries, Brazil is spending more per capita on healthcare. Unfortunately, while more should be spent on public healthcare in Brazil, the country has limited resources. My argument, however, is that Brazil does not always spend wisely, so the money that is not being spent on healthcare is not necessarily going into other social programs either, such as education, nor is it always going to support community-based infrastructure, such as water and sanitation. The country still has a problem with funding allocations and corruption.

⁶¹ Addressing the stereotypes of certain ethnicities, races or culture, Farmer says that a healthcare provider must put his or her own preferences for treatment plans aside and consider an individual’s perception of that treatment. That is, culture should be considered not as a hindrance but rather as a gateway to understanding how best to treat a particular patient, with the further understanding that an individual may not be able to comply with a recommended lifestyle change that is beyond his or her means. That is, a healthcare provider must understand that it is possible that a poor person may not follow the assigned care plan or purchase or take all of their medication (Farmer 1999, 188-191). However, this “stereotype” is based on a different problem – it is not apathy but access and affordability. Therefore, a healthcare

provider, or even government planners, may need to construct a substandard plan of care which affects the cost, not quality (Farmer 1999, 249-259).

⁶²In his book, *Drum and Stethoscope*, Joseph Bastien refers to this phenomenon as “integrating ethnomedicine and biomedicine,” the former being one ethnic group’s possible belief system in health interventions, such as through sorcery or shamanism, and the latter being the new worldwide system of treating ailments across all groups with like therapies, medicines and antibiotics (Bastien 1992, xi). The introduction of new medical technology or treatments, even complimentary ones (in terms of cost), are sometimes not met with a positive reaction from prospective patients. Those persons who believe in a “tried and true” “old wives tale” approach of curing an ailment may feel a biomedical treatment is unnecessary or inappropriate. Bastien suggests, as does Farmer, that integrating biomedicine into a culture requires a sensitive approach. One possibility is to have a blended approach to treatment, perhaps by having a trusted ethnomedicine specialist introduce biomedicine to their patient, particularly if it is a necessary treatment, such as an organ transplant. Trust is a crucial element, and the blended approach allows a biomedical doctor to gain the confidence of a new ethnic group, because of the respected approach to their belief system, by including a part of their familiar one (Bastien 1992, 8). In addition, as is suggested by both Scheper-Hughes and Farmer, other conditions, both structural and ideological, create barriers between certain populations and optimal healthcare. These can be due to classification, racialization or social constructions. The conflict of biomedicine and ethnomedicine has colonial roots, with western physicians living in colonies and touting their therapies as superior to the practices of the indigenous and mixed populations. The ethnomedical practices were often as “tame” as consumed blends of herbs or combinations of prayers, but these were given degrading labels like “black magic,” denoting certain inferiority to the “white” way (Bastien 1992, 11).

⁶³Using one’s own belief system to make determinations for another person is a problem, not just in medicine. Water activists also struggle with providing wells and water filtration systems in communities that may not be ready for the responsibility of undertaking modern solutions. In addition, certain populations may have strong adherence to beliefs that others do not understand and may even consider detestable or taboo. Cultural sensitivity also implies that is not for us to decide what the norm is for another culture. In her article “Arrogant Perception,” for example, Isabelle Gunning asks the question of whether, as a Western feminist, she has the right to perceive the act of female genital surgeries, a common procedure in many countries, as wrong and whether human rights laws can stretch to abolish a cultural practice.

⁶⁴There are comparative examples of this problem in the developed world. In the U.S., there is the assertion that “racial and ethnic minorities tend to receive a lower quality of healthcare than non-minorities, even when access-related factors...are controlled,” and that certain racial and ethnic groups, such as African Americans and Hispanics, are less likely to receive “routine medical procedures” and may have a lesser quality of care than white Americans, even if they have medical insurance. That is, these studies show that even when controlling for insurance, education and other socioeconomic factors, as well as health factors such as age and cell count, racial and ethnic minorities, particularly those afflicted with diseases such as HIV/AIDS, cardiovascular diseases and cancers, are often less likely to receive certain types of therapies and medications, such as transplants and chemotherapy (Smedley, et. al. 2003, 1-5). In an attempt to explain reasons for such disparities, researchers note a few key factors which affect both the healthcare provider and the patient, namely that a) healthcare providers are often working with limited information and under time pressure and/or b) they also may have “prejudice or bias” (including stereotyping and attitudes towards certain racial groups). Alternatively, patients may have delayed their own care for various reasons and may also respond with “mistrust and refusal” of a recommended course of care. Patients may also “perceive” discrimination while receiving treatment, while some healthcare providers may “assume” that a minority patient is less likely “to comply with medical advice.” Despite anti-discrimination laws in the U.S. and public support for “equality,” researchers have found that discrimination remains an obstacle in U.S. healthcare (Smedley, et. al. 2003, 160-179). This discrepancy may also affect other socioeconomic or demographic groups, not just those defined race or ethnic origin, but also by class. A poor “white” person from Appalachia, for example, may also face the same healthcare

provider bias and react similarly to a recommended course of care. Farmer also notes in his writing that he has met caregivers who, on one hand, are uncomfortable about treating patients in more primitive settings, because they do not want to lower their own “standards of care” when certain equipment, supplies or medications are not available, or they feel they are acting in some unethical way by providing substandard care, such as giving a medication that may be less effective than another more optimal (but unavailable) treatment. Although various countries may lack technology or certain therapies, it may be a still be a physician’s responsibility to adjust the treatment plan to work with what is available. For, as mentioned before, a caregiver’s failure to treat (in any capacity) may hurt overall support for public health (Farmer 1999, xvii-xviii, 242-244), even though the professional, ethical requirement to treat likely differs greatly from country to country.

⁶⁵ One of the clearest authorities on the shortcomings of extraction in Latin America is Stephen Bunker, whose texts on extractive economies provide a lens into both the environmental and social devastation in Brazil. In his 1985 text, *Underdeveloping the Amazing: Extraction, Unequal Exchange, and the Failure of the Modern State* and his 2005 work with Paul S. Ciccantell, *Globalization and the Race for Resources*, Bunker mentions that Brazil was excited about modernity and anxious to join the world’s markets as a significant competitor. In addition, foreign investment was one way that Brazil could develop its technology and join the globalized world. The country began to transform, and it quickly demonstrated its ability to modernize by transforming enough water into energy through hydropower to support most of the country. In his book, *Globalization: A Short Introduction*, Manfred Steger, like Bunker, asserts, however, that globalization and modernization often come at a cost. The development of hydropower meant the destruction of both land and basins due to damming, causing major displacement of populations living along the areas in direct route to the dams. The majority of these affected populations were poor, including indigenous tribes and migratory groups made up of predominantly Afro-Brazilians. They were forced to leave the lands because of flooding. Dams also diverted surface water resources relied upon by communities. Basins dried up, and the lack of water downstream destroyed food sources for hundreds of villages. In addition, important species of flora and fauna, including roots and plants for medicines, were also destroyed by either flooding or drought, a significant cost of hydropower. In the most significant environmental extraction in Brazil, deforestation has been the tool of choice, and the significant decrease in rainforest has resulted in an increase in greenhouse emissions. Proponents of climate indicators charge that Brazil single-handedly added to the effects of climate change, and signs of degradation are everywhere in Amazonia. Aside from the displacement of wildlife species, very few indigenous people have a permanent village, with most communities on the move. The consequences seem high when deforestation was never meant to be a permanent extraction, but Brazil purposely designated the Amazon for economic purposes. As Bunker also notes there was also a gross overestimation of the value of Brazil’s deforested land and of the value of ranching. There has also been, he asserts, an irresponsible lack of control, as investors took cues from the Brazilian government’s eagerness to seduce and appease them and treated the Amazon like an “empty frontier.” Much like coltan extraction, as James Smith and Jeffrey Mantz offer in their article, “Do Cellular Phones Dream of Civil War: The Mystification of Production and the Consequences of Technology Fetishism in the Eastern Congo,” leaders in developing countries seem eager to visualize themselves as part of the modernized, high-tech world, but the transnationals who profit from the production of the poor are not really there to help. Their purposes are self-serving, and developing nations are easy targets. The desire to compete globally grossly ignores the human cost of production of commodities.

⁶⁶Development began in Latin America in the late 1500s when sugar became a promising commodity. Widely exported until the early 20th century, the sugar industry met international market competition, and Latin America turned to rubber tapping in the Amazon as the next profitable export. Not wanting to lag behind in development, Latin America scrambled for an entrance into the global market in the 1960s, particularly in oil. Modernization, however, particularly disregarded the environmental effects of overusing and over-developing resources, with effects that are still unknown over the longer term. In his text, Torras (2003) states that when Malaysia became a major rubber producer at a cheaper price, Latin America, which was also experiencing high inflation and pressure to repay international WorldBank and

IMF loans, needed a new export. Various countries in the region turned to new environmental commodities, taken from the vast Amazonian rainforest.

⁶⁷ Part of Lula's campaign platform was to appeal to the "every man," in Brazil, which was primarily the worker. In their book, *Latin America After Neoliberalism*, Eric Hershberg and Fred Rosen say that Brazil was trying to move into the modern era without resolving the perennial issues of inequality, and Latin Americans no longer wanted to be passive (Hershberg and Rosen 2006, 140-141).

⁶⁸ As I offer arguments against globalization and neoliberalism, it is important to mention the literature that considers the positive aspects of allowing developing countries to participate in the global markets. Among these arguments are that neoliberalism helps to reduce world poverty by allowing developing nations to recreate the same economic achievements that other countries have, and that it decreases global inequity (Balkin 2004, 167-174). While this may be conceivable, it does not guarantee that a nation's prosperity will be passed down to the populations with the greatest need.

⁶⁹ In his article, "How to Judge Globalism, Amartya Sen presents several ways to judge "globalism" or globalization. He illustrates that globalization is something that has been evolving since the world began. Sen notes that, even though globalization is often called the "western curse," it did not even start in the West, and if we look at periods of time in history, such as the Renaissance, the period of Enlightenment, the Industrial Revolution, we will find that around 1000 A.D., paper, printing press, gunpowder and other items were brought by China to other parts of the world. India and the Middle East exposed the world to mathematics and the decimal system and the first printed book was a joint global effort. However, Sen moves further to discuss poverty as it relates to globalization. Sen also brings justice, trade, family, mores, social groups and institutions into the equation, in an attempt to take what we may already be thinking or judging about globalism and giving us instead a more objective view. It seems as though Sen is urging readers to not "misdiagnose" globalization and to avoid rejecting it or overcrediting the West for its influence. However, he encourages readers to look at the issues surrounding globalization (i.e., economic ideals) from different perspectives and to compare what is happening here to previous history and different countries. Sen decides that poverty related to globalization is not uniform either, and it depends on the region and economic indicators. Sen also defines "standard of living" or "development" in terms of criteria that have to do with quality of life, rather than GDP.

⁷⁰ Name has been changed.

⁷¹ Name has been changed.

⁷² Based on November 11, 2009 conversion rate.

⁷³ Name has been changed.

⁷⁴ In a gesture of diplomacy, a representative of COOPLANES sought permission from Happy City's leader for me to come and "tour" the grounds and talk to the community members.

⁷⁵ Although, for the purposes of this study, I did not explore the concept of favela leadership, it may more complex than has been suggested here. In many cases, favela leaders stay in power because they are gang leaders, who create and control a type of oppositional order in the absence of the state in the favelas, a concept supported by my conversations with Mario, the federal police officer. When favela community members complain, some complaints are entertained, but those that do not fit with the agenda of the gang and leader, are ignored. Other complaints may result in harm to the complainant or even execution.

⁷⁶ Name has been changed.

⁷⁷ "Flash napping" is a term used to describe a crime frequently committed in Latin American countries, where an aggressor temporarily kidnaps a victim, who is then forced to drive to an ATM machine to withdraw funds. The victim is then left, typically, unharmed. The crime is done quickly and is usually well-planned.

⁷⁸ The business of conducting business in the slums can be lucrative, but again, leaning on the argument of moral relativism, not all entrepreneurial efforts are ethical. In Caldeira's book, the drug culture in Rio's favelas provides a steady income on which many people are able to live, and in many countries, such as India, the network of businesses in the slums provides a sustainable economy for the community (Polak 2008, 160-161). The favelas in Maceio have also set up this economic culture, and most favelas in Maceio have businesses such as a bicycle repair shop, a hairdresser, an artesanato (or craft cooperative), operated

solely by residents of the slum. The new government housing project has also been set up to encourage this economy, with sets of buildings reserved for everything from repair shops to a crèche (daycare).

⁷⁹ The readings about social movements provide insight into Latin American examples of small and large-scale reaction to injustice, economy, politics and other (perceived or actual) oppression. Brazilians have coped with political regimentation for decades, previously within an authoritarian regime and sometimes now within a democratic one, saying that even with a president from the working class, Brazilians are not completely satisfied that cultural concerns (particularly with regard to class, race and gender) are an integral part of government decision-making (Alvarez, et. al. 53-55). Nevertheless, Brazilians in the working-class in particular seem both at times willing and at other times exhausted in trying to push the government to make change.

⁸⁰ Refers to the reference, and book, by former First Lady, Hillary Rodham Clinton, *It Takes a Village*, which suggests that children are not only raised by their parents, but also by those members of society around them, namely church members, teachers, neighbors, as well as the influences of businesses and the government.

APPENDIX A DISTRICTS WITHOUT SEWAGE DISPOSAL SYSTEMS

Table 46 - Districts, total and without sewage disposal system, the main alternative, by Major Regions, Federative Units, metropolitan areas and capitals - 2000

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts without sewage disposal system						
		Total	Septic tanks and sinks	Home workaround				
				Sewage management	Open pits	Release watercourses	Other	Not stated
Brazil	9 848	5 751	2 776	2 431	197	143	185	19
North	607	572	182	284	85	14	4	3
Rondônia	76	71	60	11	--	--	--	--
Porto Velho	12	11	11	--	--	--	--	--
Acre	22	19	12	2	--	1	2	2
Rio Branco	1	--	--	--	--	--	--	--
Amazon	81	80	--	--	80	--	--	--
Manaus	1	--	--	--	--	--	--	--
Roraima	15	13	2	11	--	--	--	--
Boa Vista	1	--	--	--	--	--	--	--
Pará	232	217	57	146	3	9	2	--
Bethlehem	8	4	4	--	--	--	--	--
Region Metropolitana de Belém	13	8	8	--	--	--	--	--
Amapá	30	25	--	21	--	4	--	--
Macapá	5	4	--	4	--	--	--	--
Tocantins	151	147	51	93	2	--	--	1
Palmas	3	2	--	2	--	--	--	--
Northeast	3 084	2 151	1 026	865	94	53	113	--
Maranhão	244	238	179	39	5	5	10	--
St. Louis	1	--	--	--	--	--	--	--
Greater Metropolitan St. Louis	5	4	2	2	--	--	--	--

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts without sewage disposal system						
		Total	Home workaround					
			Septic tanks and sinks	Sewage management	Open pits	Release watercourses	Other	Not stated
Piauí	221	218	201	10	3	3	1	--
Teresina	1	--	--	--	--	--	--	--
Ceará	760	652	264	251	51	8	78	--
Fortaleza	5	--	--	--	--	--	--	--
Fortaleza Metropolitan Region	73	61	14	47	--	--	--	--
Rio Grande do Norte	186	133	75	21	5	17	15	--
Christmas	1	--	--	--	--	--	--	--
Metropolitan Christmas	8	3	3	--	--	--	--	--
Paraíba	283	152	6	146	--	--	--	--
Joao Pessoa	1	--	--	--	--	--	--	--
Pernambuco	381	121	32	87	--	2	--	--
Recife	1	--	--	--	--	--	--	--
Metropolitan Region of Recife	24	10	6	4	--	--	--	--
Alagoas	114	74	19	54	1	--	--	--
Maceio	1	--	--	--	--	--	--	--
Metropolitan Maceió	11	5	--	5	--	--	--	--
Sergipe	83	33	20	6	4	3	--	--
Aracaju	1	--	--	--	--	--	--	--
Bahia	812	530	230	251	25	15	9	--
Salvador	1	--	--	--	--	--	--	--
Salvador Metropolitan Region	17	8	7	--	1	--	--	--
Southeast	3 115	571	146	312	10	52	40	11
Ontario	1 568	354	57	260	3	26	4	4

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts without sewage disposal system						
		Total	Home workaround					
			Septic tanks and sinks	Sewage management	Open pits	Release watercourses	Other	Not stated
Belo Horizonte	3	--	--	--	--	--	--	--
Metropolitan area of Belo Horizonte	65	12	4	8	--	--	--	--
Paste Metropolitan Region of Belo Horizonte	32	10	3	7	--	--	--	--
Metropolitan Steel Valley	7	--	--	--	--	--	--	--
Paste the Metropolitan Metropolitan Steel Valley	39	4	--	4	--	--	--	--
Holy	249	78	27	9	4	17	15	6
Victoria	2	--	--	--	--	--	--	--
Metropolitan Vitória	19	8	--	2	4	--	--	2
Rio	276	65	37	16	3	9	--	--
Rio	1	--	--	--	--	--	--	--
Metropolitan Region of Rio de Janeiro	44	12	9	--	3	--	--	--
Sao Paulo	1 022	74	25	27	--	--	21	1
Sao Paulo	96	--	--	--	--	--	--	--
Metropolitan Region of São Paulo	162	2	--	--	--	--	2	--
Metropolitan Santos	11	--	--	--	--	--	--	--
Metropolitan Campinas	24	--	--	--	--	--	--	--
South	2 342	1 841	1 234	555	8	24	17	3

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts without sewage disposal system						
		Total	Home workaround					
			Septic tanks and sinks	Sewage management	Open pits	Release watercourses	Other	Not stated
Paraná	748	592	238	343	1	1	8	1
Curitiba	1	--	--	--	--	--	--	--
Metropolitan Region of Curitiba	46	32	25	6	1	--	--	--
Metropolitan Londrina	18	13	8	3	--	--	2	--
Region Metropolitana de Maringá	14	8	--	8	--	--	--	--
Paraná	447	351	298	20	4	18	9	2
Florianópolis	12	9	9	--	--	--	--	--
Metropolitan Center of the Metropolitan Region of Florianópolis	25	17	17	--	--	--	--	--
Expansion Area Metropolitan Metropolitan Region of Florianópolis	24	18	13	--	--	5	--	--
Metropolitan Center of the Metropolitan Region of Vale do Itajai	6	--	--	--	--	--	--	--
Expansion Area Metropolitan Region Metropolitana do Vale do Itajai	14	6	2	2	--	--	--	2
Metropolitan Center	4	2	1	--	1	--	--	--

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts without sewage disposal system						
		Total	Home workaround					
			Septic tanks and sinks	Sewage management	Open pits	Release watercourses	Other	Not stated
Metropolitan Region North / Northeast Santa Catarina								
Expansion Area Metropolitan Metropolitan North / Northeast Santa Catarina	27	23	23	--	--	--	--	--
Rio Grande do Sul	1 147	898	698	192	3	5	--	--
Porto Alegre	1	--	--	--	--	--	--	--
Metropolitan Region of Porto Alegre	59	27	24	3	--	--	--	--
Midwest	700	616	188	415	--	--	11	2
Mato Grosso do Sul	163	139	32	99	--	--	8	--
Campo Grande	3	2	--	2	--	--	--	--
Ontario	227	207	109	96	--	--	2	--
Cuiabá	4	2	--	2	--	--	--	--
Goiás	309	270	47	220	--	--	1	2
Goiania	2	1	--	1	--	--	--	--
Region Metropolitana de Goiânia	13	9	3	6	--	--	--	--
Distrito Federal	1	--	--	--	--	--	--	--
Brasilia	1	--	--	--	--	--	--	--
Region Integrated Development of the Federal	35	28	--	27	--	--	--	1

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts without sewage disposal system						
		Total	Home workaround					
			Septic tanks and sinks	Sewage management	Open pits	Release watercourses	Other	Not stated
District and surrounding areas								

Source: IBGE, Department of Research, Department of Population and Social Indicators, National Sanitation 2000.

APPENDIX B
AVAILABILITY OF WATER AND SANITATION, BY DISTRICT

Table 1 - Districts, with a total and basic sanitation, by type of basic sanitation, by Major Regions, Federative Units, metropolitan areas and capitals - 2000

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts with no basic sanitation				
		Total	Type of service			
			General network of water distribution	Sewage disposal system	Street cleaning and garbage collection	Urban drainage
Brazil	9 848	9 262	8 656	4 097	8 381	5 758
North	607	549	512	35	512	245
Rondônia	76	56	43	5	54	22
Porto Velho	12	3	3	1	1	1
Acre	22	22	22	3	22	11
Rio Branco	1	1	1	1	1	1
Amazon	81	72	62	1	71	30
Manaus	1	1	1	1	1	1
Roraima	15	15	15	2	15	4
Boa Vista	1	1	1	1	1	1
Pará	232	209	200	15	183	125
Bethlehem	8	8	8	4	8	8
Region Metropolitana de Belém	13	13	13	5	13	13
Amapá	30	25	24	5	23	6
Macapá	5	4	4	1	3	1
Tocantins	151	150	146	4	144	47
Palmas	3	3	3	1	3	1
Northeast	3 084	2 871	2 550	933	2 714	1 417
Maranhão	244	218	204	6	204	109
St. Louis	1	1	1	1	1	1
Greater Metropolitan	5	5	5	1	2	2

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts with no basic sanitation				
		Total	Type of service			
			General network of water distribution	Sewage disposal system	Street cleaning and garbage collection	Urban drainage
St. Louis						
Piauí	221	221	200	3	217	211
Teresina	1	1	1	1	1	1
Ceará	760	624	470	108	551	145
Fortaleza	5	5	5	5	5	5
Fortaleza Metropolitan Region	73	63	38	12	57	19
Rio Grande do Norte	186	175	166	53	171	14
Christmas	1	1	1	1	1	1
Metropolitan Christmas	8	8	8	5	7	3
Paraíba	283	277	252	131	268	191
Joao Pessoa	1	1	1	1	1	1
Pernambuco	381	371	315	260	359	251
Recife	1	1	1	1	1	1
Metropolitan Region of Recife	24	24	24	14	23	21
Alagoas	114	114	113	40	113	92
Maceio	1	1	1	1	1	1
Metropolitan Maceió	11	11	11	6	11	10
Sergipe	83	82	80	50	80	73
Aracaju	1	1	1	1	1	1
Bahia	812	789	750	282	751	331
Salvador	1	1	1	1	1	1
Salvador Metropolitan Region	17	16	16	9	16	14
Southeast	3 115	3 080	3 008	2 544	2 846	2 256
Ontario	1 568	1 551	1 522	1 214	1 396	922
Belo Horizonte	3	3	3	3	3	3

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts with no basic sanitation				
		Total	Type of service			
			General network of water distribution	Sewage disposal system	Street cleaning and garbage collection	Urban drainage
Metropolitan area of Belo Horizonte	65	64	63	53	63	52
Paste Metropolitan Region of Belo Horizonte	32	31	29	22	29	21
Metropolitan Steel Valley	7	7	7	7	7	7
Paste the Metropolitan Metropolitan Steel Valley	39	39	39	35	39	29
Holy	249	241	231	171	236	199
Victoria	2	2	2	2	2	2
Metropolitan Vitória	19	18	17	11	16	16
Rio	276	274	244	211	273	236
Rio	1	1	1	1	1	1
Metropolitan Region of Rio de Janeiro	44	44	34	32	43	37
Sao Paulo	1 022	1 014	1 011	948	941	899
Sao Paulo	96	96	96	96	96	96
Metropolitan Region of São Paulo	162	162	161	160	162	158
Metropolitan Santos	11	11	11	11	11	11
Metropolitan Campinas	24	24	24	24	24	24
South	2 342	2 127	1 967	501	1 746	1 503
Paraná	748	691	663	156	619	515
Curitiba	1	1	1	1	1	1
Metropolitan Region of Curitiba	46	39	38	14	38	26
Metropolitan	18	15	15	5	15	15

Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts with no basic sanitation				
		Total	Type of service			
			General network of water distribution	Sewage disposal system	Street cleaning and garbage collection	Urban drainage
Londrina						
Region Metropolitana de Maringá	14	14	14	6	14	12
Paraná	447	418	363	96	376	361
Florianópolis	12	12	12	3	12	11
Metropolitan Center of the Metropolitan Region of Florianópolis	25	25	23	8	25	24
Expansion Area Metropolitan Metropolitan Region of Florianópolis	24	14	14	6	14	13
Metropolitan Center of the Metropolitan Region of Vale do Itajai	6	6	6	6	6	6
Expansion Area Metropolitan Region Metropolitana do Vale do Itajai	14	14	11	8	14	13
Metropolitan Center Metropolitan Region North / Northeast Santa Catarina	4	4	3	2	4	3
Expansion Area Metropolitan Metropolitan North / Northeast Santa Catarina	27	27	22	4	21	26
Rio Grande do Sul	1 147	1 018	941	249	751	627
Porto Alegre	1	1	1	1	1	1

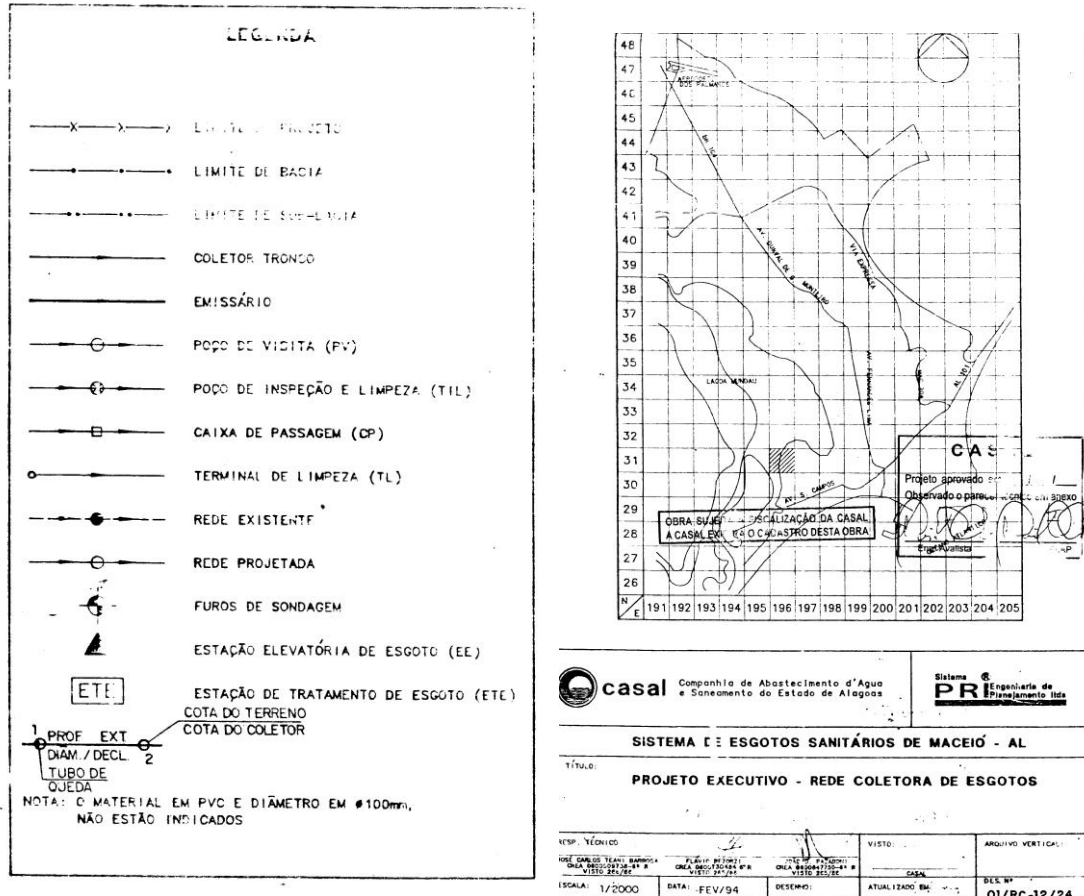
Major Regions, Federative Units, metropolitan areas and capitals	Total district	Districts with no basic sanitation				
		Total	Type of service			
			General network of water distribution	Sewage disposal system	Street cleaning and garbage collection	Urban drainage
Metropolitan Region of Porto Alegre	59	57	39	32	57	45
Midwest	700	635	619	84	563	337
Mato Grosso do Sul	163	142	141	24	118	78
Campo Grande	3	3	3	1	3	1
Ontario	227	195	186	20	158	107
Cuiabá	4	4	4	2	3	3
Goiás	309	297	291	39	286	151
Goiania	2	2	1	1	2	1
Region Metropolitana de Goiânia	13	13	12	4	13	8
Distrito Federal	1	1	1	1	1	1
Brasília	1	1	1	1	1	1
Region Integrated Development of the Federal District and surrounding areas	35	32	32	7	30	15

Source: IBGE, Department of Research, Department of Population and Social Indicators, National Sanitation 2000.

Note: The same district may submit more than one type of service sanitation.

APPENDIX C

LACK OF ACCESS OF LAGOA MUNDAU FAVELAS TO SERVICES. SERVICES ARE SEPARATED BY A 4-LANE MEDIAN. FAVELAS ARE SITUATED ON THE WIDE SHORELINE BETWEEN THE WATER AND THE MEDIAN. PAST THE MEDIAN ARE, AT A MINIMUM, WATER SERVICES.



Translation of legend, in the order shown above.

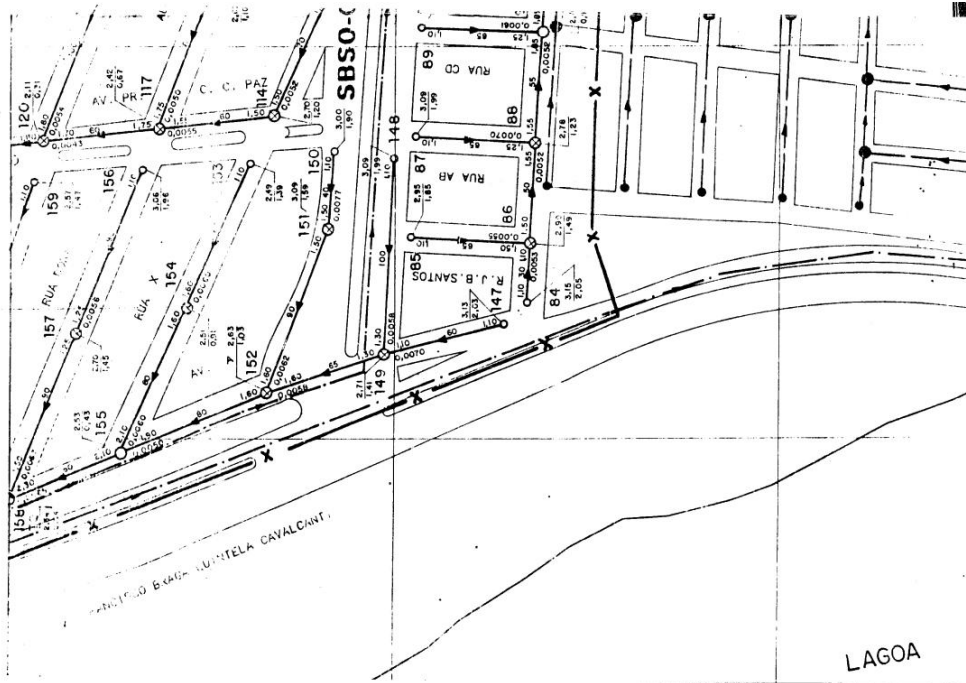
- Projects Limit
- Basin Limit
- Sub-Basin Limit
- Collector
- Emissary
- Post
- Post for Inspection and Cleaning
- Pass-through Box
- Terminal
- Existing

- PVC pipes that are 100mm are not indicated

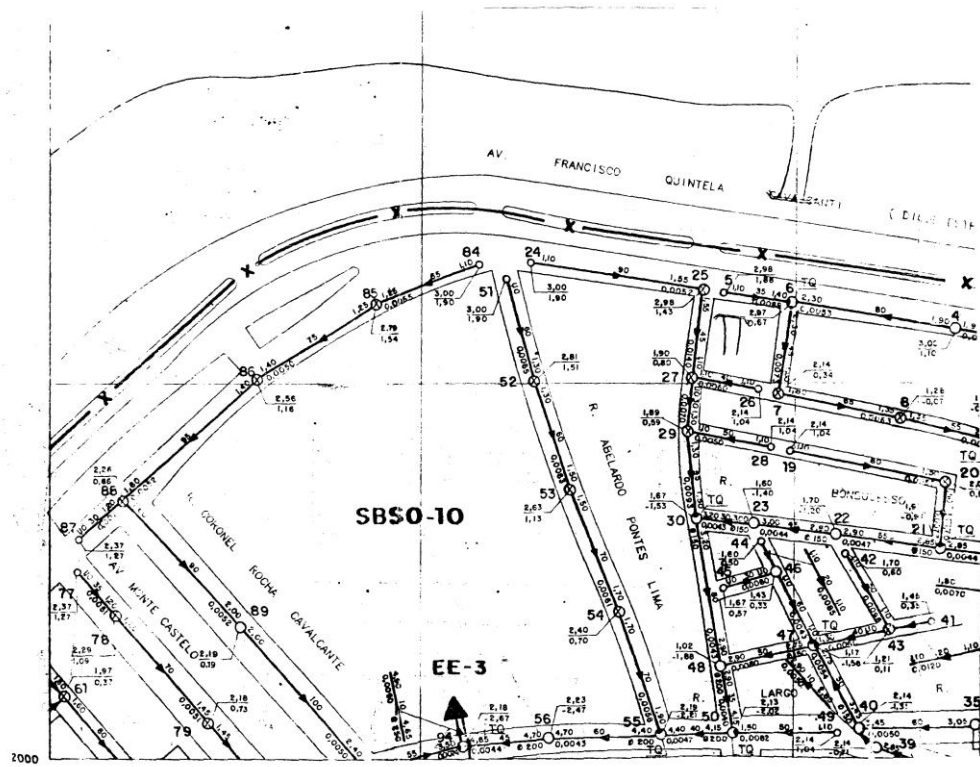




JNDAU



LAGOA

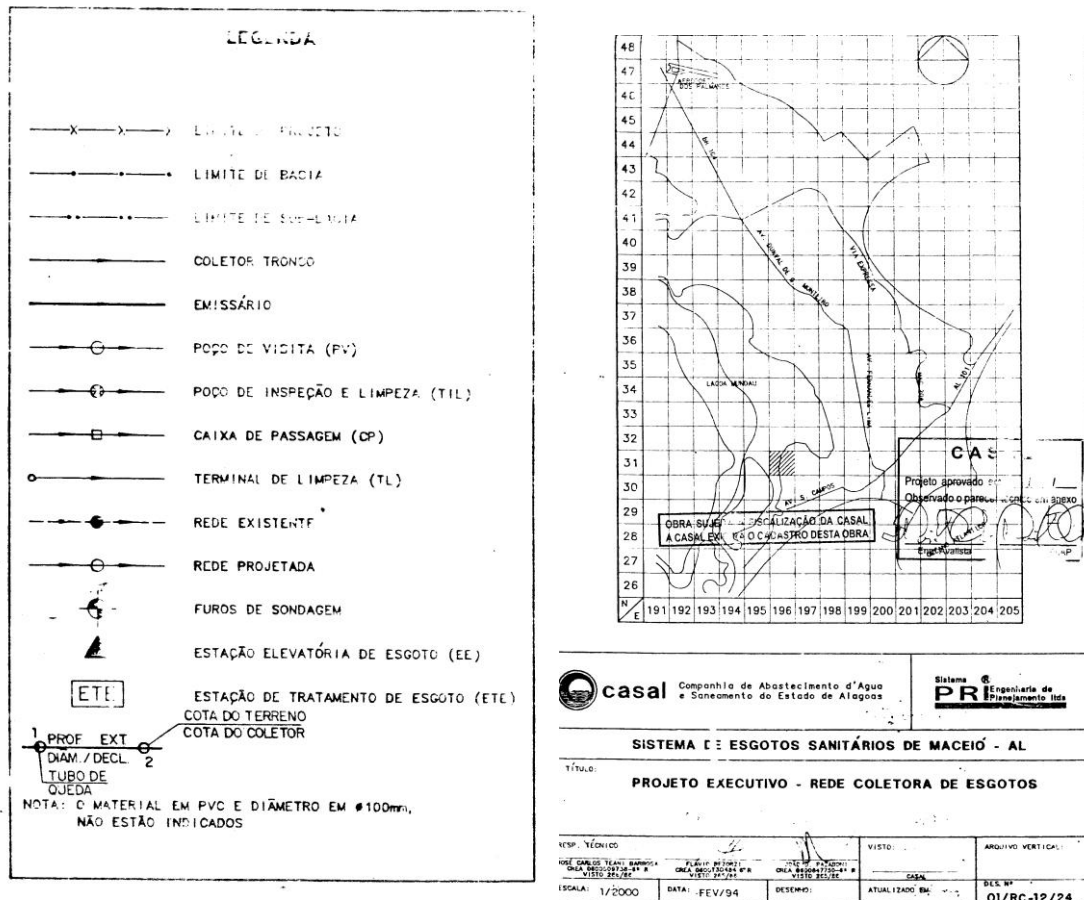




(CASAL 2009)

APPENDIX D

COMMUNITY NEAR LAGOA MUNDAU (ACROSS FROM FAVELA) WITH ACCESS TO WATER, BUT NO ACCESS TO SANITATION. DARKENED CIRCLES INDICATE EXISTING SANITATION PIPES. HOLLOW CIRCLES INDICATE FUTURE, PROJECTED SANITATION.



Translation of legend, in the order shown above.

- Projects Limit
- Basin Limit
- Sub-Basin Limit
- Collector
- Emissary
- Post
- Post for Inspection and Cleaning
- Pass-through Box
- Terminal


- PVC pipes that are 100mm are not indicated





(CASAL 2009)

APPENDIX E
ADDITIONAL CASAL WATER BILL



COMPANHIA DE SANEAMENTO DE ALAGOAS
 Rua Barão de Atalaia, 200 - Centro - Maceió - AL CEP 57.020-510
 C.N.P.J. 12.294.708/0001-81 INSC EST. Nº 24.008.146-3.

FATURA

CLIENTE/ENDEREÇO DE ENTREGA						M										
						MÊS/ANO 11/2009										
RESPONSÁVEL																
DATA LEITURA	LEIT ANTERIOR	LEIT ATUAL	CONSUMO	MÉDIA	CONS. RATEADO											
05/11	2248	2281	33	24												
ENDEREÇO DO IMÓVEL						MACEIO										
SA	SE	ECONOMIAS				SECTOR	SUBSETOR									
3	7	1	0	0	0	08	0390									
	RES.	COM.	IND.	PUB.												
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CÓDIGO	DESCRIÇÃO	VALOR														
	AGUA	117,73														
	ESGOTO	94,18														
VENCIMENTO						TOTAL A PAGAR										
30/11/2009						211,91										

HISTORICO DE CONSUMO

MES/ANO	LEITURA	OL	OC	CONSUMO	MES/ANO	LEITURA	OL	OC	CONSUMO
10/2009	2248	00		28	04/2009	2081	00		22
09/2009	2220	00		25	03/2009	2059	00		16
08/2009	2195	00		29	02/2009	2043	00		13
07/2009	2166	00		26	01/2009	2030	00		16
06/2009	2140	00		26	12/2008	2014	06		16
05/2009	2114	00		33	11/2008	1998	00		16

Nº AMOSTRAS	TURBIDEZ	COR	COLORO	pH	COLIF. TOTAIS	E.coli
MINIMO EXIGIDO	37	37	145	37	145	0
REALIZADAS	115	115	115	115	115	0
QUE ATENDERAM A LEGISLAÇÃO	80	112	84	98	112	0
OBSERVAÇÃO						

APPENDIX F

EPA DRINKING WATER REGULATIONS



National Primary Drinking Water Regulations

Contaminant	MCL or TT ¹ (mg/L) ²	Potential health effects from long-term ³ exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) ²
OC Acrylamide	TT ⁴	Nervous system or blood problems; increased risk of cancer	Added to water during sewage/wastewater treatment	zero
OC Alachlor	0.002	Eye, liver, kidney or spleen problems; anemia; increased risk of cancer	Runoff from herbicide used on row crops	zero
R Alpha/photon emitters	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation	zero
IOC Antimony	0.006	Increase in blood cholesterol; decrease in blood sugar	Discharge from petroleum refineries; fire retardants; ceramics; electronics; solder	0.006
IOC Arsenic	0.010	Skin damage or problems with circulatory systems, and may have increased risk of getting cancer	Erosion of natural deposits; runoff from orchards; runoff from glass & electronics production wastes	0
IOC Asbestos (fibers >10 micrometers)	7 million fibers per Liter (MFL)	Increased risk of developing benign intestinal polyps	Decay of asbestos cement in water mains; erosion of natural deposits	7 MFL
OC Atrazine	0.003	Cardiovascular system or reproductive problems	Runoff from herbicide used on row crops	0.003
IOC Barium	2	Increase in blood pressure	Discharge of drilling wastes; discharge from metal refineries; erosion of natural deposits	2
OC Benzene	0.005	Anemia; decrease in blood platelets; increased risk of cancer	Discharge from factories; leaching from gas storage tanks and landfills	zero
OC Benzo(a)pyrene (PAHs)	0.0002	Reproductive difficulties; increased risk of cancer	Leaching from linings of water storage tanks and distribution lines	zero
IOC Beryllium	0.004	Intestinal lesions	Discharge from metal refineries and coal-burning factories; discharge from electrical, aerospace, and defense industries	0.004
R Beta photon emitters	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation	zero
DBP Bromate	0.010	Increased risk of cancer	Byproduct of drinking water disinfection	zero
IOC Cadmium	0.005	Kidney damage	Corrosion of galvanized pipes; erosion of natural deposits; discharge from metal refineries; runoff from waste batteries and paints	0.005
OC Carbofuran	0.04	Problems with blood, nervous system, or reproductive system	Leaching of soil fumigant used on rice and alfalfa	0.04
OC Carbon tetrachloride	0.005	Liver problems; increased risk of cancer	Discharge from chemical plants and other industrial activities	zero
D Chloramines (as Cl ₂)	MRDL=4.0 ¹	Eye/nose irritation; stomach discomfort; anemia	Water additive used to control microbes	MRDLG=4 ¹
OC Chlordane	0.002	Liver or nervous system problems; increased risk of cancer	Residue of banned termiticide	zero
D Chlorine (as Cl ₂)	MRDL=4.0 ¹	Eye/nose irritation; stomach discomfort	Water additive used to control microbes	MRDLG=4 ¹
D Chlorine dioxide (as ClO ₂)	MRDL=0.8 ¹	Anemia; infants, young children, and fetuses of pregnant women: nervous system effects	Water additive used to control microbes	MRDLG=0.8 ¹
DBP Chlorite	1.0	Anemia; infants, young children, and fetuses of pregnant women: nervous system effects	Byproduct of drinking water disinfection	0.8
OC Chlorobenzene	0.1	Liver or kidney problems	Discharge from chemical and agricultural chemical factories	0.1
IOC Chromium (total)	0.1	Allergic dermatitis	Discharge from steel and pulp mills; erosion of natural deposits	0.1
IOC Copper	TT ⁵ ; Action Level = 1.3	Short-term exposure: Gastrointestinal distress. Long-term exposure: Liver or kidney damage. People with Wilson's Disease should consult their personal doctor if the amount of copper in their water exceeds the action level	Corrosion of household plumbing systems; erosion of natural deposits	1.3
M <i>Cryptosporidium</i>	TT ⁷	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero

LEGEND

D Disinfectant

IOC Inorganic Chemical

OC Organic Chemical

DBP Disinfection Byproduct

M Microorganism

R Radionuclides

Contaminant	MCL or TT ¹ (mg/L) ²	Potential health effects from long-term ³ exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) ²
IOC Cyanide (as free cyanide)	0.2	Nerve damage or thyroid problems	Discharge from steel/metal factories; discharge from plastic and fertilizer factories	0.2
OC 2,4-D	0.07	Kidney, liver, or adrenal gland problems	Runoff from herbicide used on row crops	0.07
OC Dalapon	0.2	Minor kidney changes	Runoff from herbicide used on rights of way	0.2
OC 1,2-Dibromo-3-chloropropane (DBCP)	0.0002	Reproductive difficulties; increased risk of cancer	Runoff/leaching from soil fumigant used on soybeans, cotton, pineapples, and orchards	zero
OC o-Dichlorobenzene	0.6	Liver, kidney, or circulatory system problems	Discharge from industrial chemical factories	0.6
OC p-Dichlorobenzene	0.075	Anemia; liver, kidney or spleen damage; changes in blood	Discharge from industrial chemical factories	0.075
OC 1,2-Dichloroethane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC 1,1-Dichloroethylene	0.007	Liver problems	Discharge from industrial chemical factories	0.007
OC cis-1,2-Dichloroethylene	0.07	Liver problems	Discharge from industrial chemical factories	0.07
OC trans-1,2-Dichloroethylene	0.1	Liver problems	Discharge from industrial chemical factories	0.1
OC Dichloromethane	0.005	Liver problems; increased risk of cancer	Discharge from drug and chemical factories	zero
OC 1,2-Dichloropropane	0.005	Increased risk of cancer	Discharge from industrial chemical factories	zero
OC Di(2-ethylhexyl) adipate	0.4	Weight loss, liver problems, or possible reproductive difficulties	Discharge from chemical factories	0.4
OC Di(2-ethylhexyl) phthalate	0.006	Reproductive difficulties; liver problems; increased risk of cancer	Discharge from rubber and chemical factories	zero
OC Dinoseb	0.007	Reproductive difficulties	Runoff from herbicide used on soybeans and vegetables	0.007
OC Dioxin (2,3,7,8-TCDD)	0.00000003	Reproductive difficulties; increased risk of cancer	Emissions from waste incineration and other combustion; discharge from chemical factories	zero
OC Diquat	0.02	Cataracts	Runoff from herbicide use	0.02
OC Endothall	0.1	Stomach and intestinal problems	Runoff from herbicide use	0.1
OC Endrin	0.002	Liver problems	Residue of banned insecticide	0.002
OC Epichlorohydrin	TT ⁴	Increased cancer risk; stomach problems	Discharge from industrial chemical factories; an impurity of some water treatment chemicals	zero
OC Ethylbenzene	0.7	Liver or kidney problems	Discharge from petroleum refineries	0.7
OC Ethylene dibromide	0.00005	Problems with liver, stomach, reproductive system, or kidneys; increased risk of cancer	Discharge from petroleum refineries	zero
M Fecal coliform and <i>E. coli</i>	MCL ⁶	Fecal coliforms and <i>E. coli</i> are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Microbes in these wastes may cause short term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, and people with severely compromised immune systems.	Human and animal fecal waste	zero ⁶
IOC Fluoride	4.0	Bone disease (pain and tenderness of the bones); children may get mottled teeth	Water additive which promotes strong teeth; erosion of natural deposits; discharge from fertilizer and aluminum factories	4.0
M <i>Giardia lamblia</i>	TT ⁷	Short-term exposure: Gastrointestinal illness (e.g., diarrhea, vomiting, cramps)	Human and animal fecal waste	zero
OC Glyphosate	0.7	Kidney problems; reproductive difficulties	Runoff from herbicide use	0.7
DBP Haloacetic acids (HAA5)	0.060	Increased risk of cancer	Byproduct of drinking water disinfection	n/a ⁹
OC Heptachlor	0.0004	Liver damage; increased risk of cancer	Residue of banned termiticide	zero
OC Heptachlor epoxide	0.0002	Liver damage; increased risk of cancer	Breakdown of heptachlor	zero
M Heterotrophic plate count (HPC)	TT ⁷	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment	n/a

LEGEND

D Disinfectant	IOC Inorganic Chemical	OC Organic Chemical
DBP Disinfection Byproduct	M Microorganism	R Radionuclides

Contaminant	MCL or TT ¹ (mg/L) ²	Potential health effects from long-term ³ exposure above the MCL	Common sources of contaminant in drinking water	Public Health Goal (mg/L) ²
OC Hexachlorobenzene	0.001	Liver or kidney problems; reproductive difficulties; increased risk of cancer	Discharge from metal refineries and agricultural chemical factories	zero
OC Hexachlorocyclopentadiene	0.05	Kidney or stomach problems	Discharge from chemical factories	0.05
IOC Lead	TT5; Action Level=0.015	Infants and children: Delays in physical or or mental development; children could show slight deficits in attention span and learning abilities; Adults: Kidney problems; high blood pressure	Corrosion of household plumbing systems; erosion of natural deposits	zero
M <i>Legionella</i>	TT7	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems	zero
OC Lindane	0.0002	Liver or kidney problems	Runoff/leaching from insecticide used on cattle, lumber, gardens	0.0002
IOC Mercury (inorganic)	0.002	Kidney damage	Erosion of natural deposits; discharge from refineries and factories; runoff from landfills and croplands	0.002
OC Methoxychlor	0.04	Reproductive difficulties	Runoff/leaching from insecticide used on fruits, vegetables, alfalfa, livestock	0.04
IOC Nitrate (measured as Nitrogen)	10	Infants below the age of six months who drink water containing nitrate in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	10
IOC Nitrite (measured as Nitrogen)	1	Infants below the age of six months who drink water containing nitrite in excess of the MCL could become seriously ill and, if untreated, may die. Symptoms include shortness of breath and blue-baby syndrome.	Runoff from fertilizer use; leaching from septic tanks, sewage; erosion of natural deposits	1
OC Oxamyl (Vydate)	0.2	Slight nervous system effects	Runoff/leaching from insecticide used on apples, potatoes, and tomatoes	0.2
OC Pentachlorophenol	0.001	Liver or kidney problems; increased cancer risk	Discharge from wood-preserving factories	zero
OC Picloram	0.5	Liver problems	Herbicide runoff	0.5
OC Polychlorinated biphenyls (PCBs)	0.0005	Skin changes; thymus gland problems; immune deficiencies; reproductive or nervous system difficulties; increased risk of cancer	Runoff from landfills; discharge of waste chemicals	zero
R Radium 226 and Radium 228 (combined)	5 pCi/L	Increased risk of cancer	Erosion of natural deposits	zero
IOC Selenium	0.05	Hair or fingernail loss; numbness in fingers or toes; circulatory problems	Discharge from petroleum and metal refineries; erosion of natural deposits; discharge from mines	0.05
OC Simazine	0.004	Problems with blood	Herbicide runoff	0.004
OC Styrene	0.1	Liver, kidney, or circulatory system problems	Discharge from rubber and plastic factories; leaching from landfills	0.1
OC Tetrachloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from factories and dry cleaners	zero
IOC Thallium	0.002	Hair loss; changes in blood; kidney, intestine, or liver problems	Leaching from ore-processing sites; discharge from electronics, glass, and drug factories	0.0005
OC Toluene	1	Nervous system, kidney, or liver problems	Discharge from petroleum factories	1
M Total Coliforms	5.0 percent ⁴	Coliforms are bacteria that indicate that other, potentially harmful bacteria may be present. See fecal coliforms and <i>E. coli</i>	Naturally present in the environment	zero
DBP Total Trihalomethanes (TTHMs)	0.080	Liver, kidney or central nervous system problems; increased risk of cancer	Byproduct of drinking water disinfection	n/a ⁵
OC Toxaphene	0.003	Kidney, liver, or thyroid problems; increased risk of cancer	Runoff/leaching from insecticide used on cotton and cattle	zero
OC 2,4,5-TP (Silvex)	0.05	Liver problems	Residue of banned herbicide	0.05
OC 1,2,4-Trichlorobenzene	0.07	Changes in adrenal glands	Discharge from textile finishing factories	0.07
OC 1,1,1-Trichloroethane	0.2	Liver, nervous system, or circulatory problems	Discharge from metal degreasing sites and other factories	0.2
OC 1,1,2-Trichloroethane	0.005	Liver, kidney, or immune system problems	Discharge from industrial chemical factories	0.003
OC Trichloroethylene	0.005	Liver problems; increased risk of cancer	Discharge from metal degreasing sites and other factories	zero

LEGEND

D Disinfectant	IOC Inorganic Chemical	OC Organic Chemical
DBP Disinfection Byproduct	M Microorganism	R Radionuclides

NOTES

1 Definitions

- Maximum Contaminant Level Goal (MCLG)—The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
 - Maximum Contaminant Level (MCL)—The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
 - Maximum Residual Disinfectant Level Goal (MRDLG)—The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
 - Maximum Residual Disinfectant Level (MRDL)—The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
 - Treatment Technique (TT)—A required process intended to reduce the level of a contaminant in drinking water.
- 2 Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (ppm).
- 3 Health effects are from long-term exposure unless specified as short-term exposure.
- 4 Each water system must certify annually, in writing, to the state (using third-party or manufacturers certification) that when it uses acrylamide and/or epichlorohydrin to treat water, the combination (or product) of dose and monomer level does not exceed the levels specified, as follows: Acrylamide = 0.05 percent dosed at 1 mg/L (or equivalent); Epichlorohydrin = 0.01 percent dosed at 20 mg/L (or equivalent).
- 5 Lead and copper are regulated by a Treatment Technique that requires systems to control the corrosiveness of their water. If more than 10 percent of tap water samples exceed the action level, water systems must take additional steps. For copper, the action level is 1.3 mg/L, and for lead is 0.015 mg/L.
- 6 A routine sample that is fecal coliform-positive or *E. coli*-positive triggers repeat samples—if any repeat sample is total coliform-positive, the system has an acute MCL violation. A routine sample that is total coliform-positive and fecal coliform-negative or *E. coli*-negative triggers repeat samples—if any repeat sample is fecal coliform-positive or *E. coli*-positive, the system has an acute MCL violation. See also Total Coliforms.
- 7 EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to (1) disinfect their water, and (2) filter their water or meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:
- *Cryptosporidium*: 99 percent removal for systems that filter. Unfiltered systems are required to include *Cryptosporidium* in their existing watershed control provisions.
 - *Giardia lamblia*: 99.9 percent removal/inactivation
 - Viruses: 99.99 percent removal/inactivation
 - *Legionella*: No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated according to the treatment techniques in the surface water treatment rule, *Legionella* will also be controlled.
 - Turbidity: For systems that use conventional or direct filtration, at no time can turbidity (cloudiness of water) go higher than 1 nephelometric turbidity unit (NTU), and samples for turbidity must be less than or equal to 0.3 NTU in at least 95 percent of the samples in any month. Systems that use filtration other than conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTU.
 - HPC: No more than 500 bacterial colonies per milliliter
 - Long Term 1 Enhanced Surface Water Treatment: Surface water systems or ground water systems under the direct influence of surface water serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (e.g. turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
 - Long Term 2 Enhanced Surface Water Treatment: This rule applies to all surface water systems or ground water systems under the direct influence of surface water. The rule targets additional *Cryptosporidium* treatment requirements for higher risk systems and includes provisions to reduce risks from uncovered finished water storage facilities and to ensure that the systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts. (Monitoring start dates are staggered by system size. The largest systems (serving at least 100,000 people) will begin monitoring in October 2006 and the smallest systems (serving fewer than 10,000 people) will not begin monitoring until October 2008. After completing monitoring and determining their treatment bin, systems generally have three years to comply with any additional treatment requirements.)
 - Filter Backwash Recycling: The Filter Backwash Recycling Rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.
- 8 No more than 5.0 percent samples total coliform-positive in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or *E. coli*. If two consecutive TC-positive samples, and one is also positive for *E. coli* or fecal coliforms, system has an acute MCL violation.
- 9 Although there is no collective MCLG for this contaminant group, there are individual MCLGs for some of the individual contaminants:
- Haloacetic acids: dichloroacetic acid (zero); trichloroacetic acid (0.3 mg/L)
 - Trihalomethanes: bromodichloromethane (zero); bromoform (zero); dibromochloromethane (0.06 mg/L)

National Secondary Drinking Water Regulation

National Secondary Drinking Water Regulations are non-enforceable guidelines regarding contaminants that may cause cosmetic effects (such as skin or tooth discoloration) or aesthetic effects (such as taste, odor, or color) in drinking water. EPA recommends secondary standards to water systems but does not require systems to comply. However, some states may choose to adopt them as enforceable standards.

Contaminant	Secondary Maximum Contaminant Level
Aluminum	0.05 to 0.2 mg/L
Chloride	250 mg/L
Color	15 (color units)
Copper	1.0 mg/L
Corrosivity	noncorrosive
Fluoride	2.0 mg/L
Foaming Agents	0.5 mg/L
Iron	0.3 mg/L
Manganese	0.05 mg/L
Odor	3 threshold odor number
pH	6.5-8.5
Silver	0.10 mg/L
Sulfate	250 mg/L
Total Dissolved Solids	500 mg/L
Zinc	5 mg/L

For More Information

EPA's Safe Drinking Water Web site:
<http://www.epa.gov/safewater/>

EPA's Safe Drinking Water Hotline:
 (800) 426-4791

To order additional posters or other ground water and drinking water publications, please contact the National Service Center for Environmental Publications at :
 (800) 490-9198, or
 email: nscep@bps-lmit.com.



EPA 816-F-09-004
 May 2009

APPENDIX G
MAXIMUM ALLOWABLE CONTAMINANT CHART FROM CASAL

IMPORTANTE: (V.M.P.) - Valor Máximo Permitido (Portaria 518 do Ministério da Saúde - 25/03/2004) Esses valores são permitidos na rede de distribuição.				
Nº	Discriminação	V.M.P.	Resultado	Unidade
1	pH	6,0 - 9,5		---
2	Cor	15,0		mg/L Pt
3	Turbidez	5,0		mg/L SiO ₂
4	Condutância Específica	---		µhms/cm
5	Acidez	---		mg/L CaCO ₃
6	Alcalinidade OH ⁻	---		mg/L CaCO ₃
7	Alcalinidade CO ₃ ⁻²	---		mg/L CaCO ₃
8	Alcalinidade HCO ₃ ⁻	---		mg/L CaCO ₃
9	Dureza Total	500,0		mg/L CaCO ₃
10	Dureza (Carbonatos)	---		mg/L CaCO ₃
11	Dureza (n/ Carbonatos)	---		mg/L CaCO ₃
12	Cálcio	---		mg/L CaCO ₃
13	Magnésio	---		mg/L CaCO ₃
14	Oxigênio Consumido	---	---	mg/L O ₂
15	Cloretos	250,0		mg/L Cl ⁻
16	Sílica	---		mg/L SiO ₂
17	Sulfatos	250,0		mg/L SO ₄ ⁻²
18	Amônia	1,5		mg/L N
19	Nitratos	10,0		mg/L N
20	Nitritos	1,0		mg/L N
21	Ferro Total	0,3		mg/L Fe
22	Sódio	200,0		mg/L Na ⁺
23	Potássio	---		mg/L K ⁺
24	CO ₂ (graficamente)	---		mg/L CO ₂
25	Sólidos Totais	1000,0		mg/L
Observação:				
Chefia (GECOQ)		Chefia (SEANA)		DATA

(CASAL 2009)

[illegible]

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APPENDIX I

DIARRHEAL DISEASE FACT SHEET



Fact sheet N°349
August 2009

Diarrhoeal disease

Key facts

- Diarrhoeal disease is the second leading cause of death in children under five years old. It is both preventable and treatable.
- Diarrhoeal disease kills 1.5 million children every year.
- Globally, there are about two billion cases of diarrhoeal disease every year.
- Diarrhoeal disease mainly affects children under two years old.
- Diarrhoea is a leading cause of malnutrition in children under five years old.

Diarrhoeal disease is the second leading cause of death in children under five years old, and is responsible for killing 1.5 million children every year. Diarrhoea can last several days, and can leave the body without the water and salts that are necessary for survival. Most people who die from diarrhoea actually die from severe dehydration and fluid loss. Children who are malnourished or have impaired immunity are most at risk of life-threatening diarrhoea.

Diarrhoea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual). Frequent passing of formed stools is not diarrhoea, nor is the passing of loose, "pasty" stools by breastfed babies. Diarrhoea is usually a symptom of an infection in the intestinal tract, which can be caused by a variety of bacterial, viral and parasitic organisms. Infection is spread through contaminated food or drinking-water, or from person-to-person as a result of poor hygiene. Diarrhoeal disease is treatable with a solution of clean water, sugar and salt, and with zinc tablets.

There are three clinical types of diarrhoea:

- acute watery diarrhoea – lasts several hours or days, and includes cholera;
- acute bloody diarrhoea – also called dysentery; and
- persistent diarrhoea – lasts 14 days or longer.

Scope of diarrhoeal disease

Every year there are about two billion cases of diarrhoeal disease worldwide.

Diarrhoeal disease is a leading cause of child mortality and morbidity in the world, and mostly results from contaminated food and water sources. Worldwide, around 1 billion people lack access to improved water and 2.5 billion have no access to basic sanitation. Diarrhoea due to infection is widespread throughout developing countries.

In 2004, diarrhoeal disease was the third leading cause of death in low-income countries, causing 6.9% of deaths overall. In children under five years old, diarrhoeal disease is the second leading cause of death – second only to pneumonia. Out of the 1.5 million children killed by diarrhoeal disease in 2004, 80% were under two years old.

In developing countries, children under three years old experience on average three episodes of diarrhoea every year. Each episode deprives the child of the nutrition necessary for growth. As a result, diarrhoea is a major cause of malnutrition, and malnourished children are more likely to fall ill from diarrhoea.

Dehydration

The most severe threat posed by diarrhoea is dehydration. During a diarrhoeal episode, water and electrolytes (sodium, chloride, potassium and bicarbonate) are lost through liquid stools, vomit, sweat, urine and breathing. Dehydration occurs when these losses are not replaced.

The degree of dehydration is rated on a scale of three.

1. Early dehydration – no signs or symptoms.
2. **Moderate dehydration:**
 - thirst
 - restless or irritable behaviour
 - decreased skin elasticity
 - sunken eyes
3. **Severe dehydration:**
 - symptoms become more severe
 - shock, with diminished consciousness, lack of urine output, cool, moist extremities, a rapid and feeble pulse, low or undetectable blood pressure, and pale skin.

Death can follow severe dehydration if body fluids and electrolytes are not replenished, either through the use of oral rehydration salts (ORS) solution, or through an intravenous drip.

Causes

Infection: Diarrhoea is a symptom of infections caused by a host of bacterial, viral and parasitic organisms, most of which are spread by faeces-contaminated water. Infection is more common when there is a shortage of clean water for drinking, cooking and cleaning. Rotavirus and *Escherichia coli* are the two most common causes of diarrhoea in developing countries.

Malnutrition: Children who die from diarrhoea often suffer from underlying malnutrition, which makes them more vulnerable to diarrhoea. Each diarrhoeal episode, in turn, makes their malnutrition even worse. Diarrhoea is a leading cause of malnutrition in children under five years old.

Source: Water contaminated with human faeces, for example, from sewage, septic tanks and latrines, is of particular concern. Animal faeces also contain microorganisms that can cause diarrhoea.

Other causes: Diarrhoeal disease can also spread from person-to-person, aggravated by poor personal hygiene. Food is another major cause of diarrhoea when it is prepared or stored in unhygienic conditions. Water can contaminate food during irrigation. Fish and seafood from polluted water may also contribute to the disease.

Prevention and treatment

Key measures to prevent diarrhoea include:

- access to safe drinking-water
- improved sanitation
- exclusive breastfeeding for the first six months of life
- good personal and food hygiene
- health education about how infections spread
- rotavirus vaccination.

Key measures to treat diarrhoea include the following.

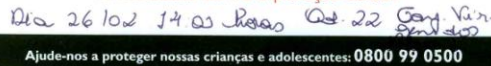
- **Rehydration:** with intravenous fluids in case of severe dehydration or shock and/or oral rehydration salts (ORS) solution for moderate or no dehydration. ORS is a mixture of clean water, salt and sugar, which can be prepared safely at home. It costs a few cents per treatment. ORS is absorbed in the small intestine and replaces the water and electrolytes lost in the faeces.
- **Zinc supplements:** zinc supplements reduce the duration of a diarrhoea episode by 25% and are associated with a 30% reduction in stool volume.
- **Nutrient-rich foods:** the vicious circle of malnutrition and diarrhoea can be broken by continuing to give nutrient-rich foods – including breast milk – during an episode, and by giving a nutritious diet – including exclusive breastfeeding for the first six months of life – to children when they are well.
- Consulting a health worker if there are signs of dehydration.

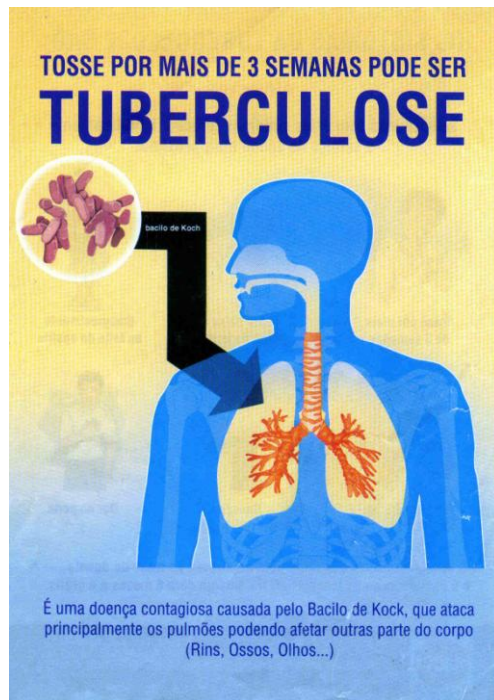
WHO response

WHO works with Member States and other partners to:

- promote current policies for the management of diarrhoea in developing countries
- conduct research to develop and test new health delivery strategies in this area
- develop new health interventions, such as the rotavirus immunization
- help to train health workers, especially at community level.

PUBLIC HEALTH INFORMATION AVAILABLE AT PSF





OS SINTOMAS DA TUBERCULOSE SÃO:

Atenção:
Se você está com estes sintomas, procure imediatamente o serviço de saúde mais próximo.

 Tosse por mais de 3 semanas	 Febre baixa no fim da tarde	 Emagrecimento ou falta de apetite
 Suadeira à noite	 Cansaço	 Dor no peito

A tuberculose se transmite pelo ar, através da tosse do doente, e é uma doença que tem cura. O tratamento dura 6 meses e é grátis.

SECRETARIA MUNICIPAL DE SAÚDE DE MACEIÓ
DIRETORIA DE DEFESA À SAÚDE
COORDENAÇÃO DE VIGILÂNCIA EPIDEMIOLÓGICA
TELEFONES: 3315-5188 - 3315-3476

(PSF 2009)

APPENDIX K
FLOOD AND MOLD DESTRUCTION AT PEIXOTO HOME





























































































































































































(Snyder 2009)









APPENDIX L ITEMIZATION OF HEALTH SERVICES IN MACEIO FOR 2005

Maceio - AL				
Health Services 2005				
Health Facilities total	236	establishments		
Schools of Public Health Total	75	establishments		
Establishments of federal public health	1	establishments		
Schools of Public Health state	16	establishments		
Health Establishments municipal public	58	establishments		
Private Health Establishments total	161	establishments		
Health Establishments private for-profit	142	establishments		
Health Establishments private nonprofit	19	establishments		
Private Health Establishments SUS	78	establishments		
Health Establishments with total hospitalization	38	establishments		
Health Facilities in hospital without	141	establishments		
Health Establishments with support for total diagnosis and therapy	57	establishments		
Health Facilities with public hospital	8	establishments		
Health Establishments without public hospital	66	establishments		
Health Establishments with support diagnosis and therapy public	1	establishments		
Health Establishments with private hospital	30	establishments		
Health Establishments without private hospital	75	establishments		
Health Establishments with support diagnosis and therapy private	56	establishments		
Health Establishments total private / SUS	78	establishments		
Health Establishments with private hospital / SUS	24	establishments		
Health Establishments without private hospital / SUS	23	establishments		
Health Establishments with support diagnosis and therapy private / SUS	31	establishments		

Health Establishments in hospital with specialized	17	establishments		
Health Establishments specializing in hospital without	70	establishments		
Health Establishments with specialties in hospital	10	establishments		
Health Establishments with no expertise in hospital	114	establishments		
General health establishments with total hospitalization	11	establishments		
Health Establishments general hospital without full	14	establishments		
Health Establishments specialized in public hospital	2	establishments		
Health Establishments specialized hospital without public	6	establishments		
Health Establishments with specialties in public hospital	3	establishments		
Health Establishments specialties without public hospital	48	establishments		
Health Establishments with general public admission	3	establishments		
Health Establishments general public without admission	13	establishments		
Health Establishments specializing in private hospital	15	establishments		
Health Establishments specialized hospital without private	64	establishments		
Health Establishments with private specialty hospital	7	establishments		
Health Establishments specialties without private hospital	66	establishments		
Health Establishments with general private hospital	8	establishments		
Health Establishments general hospital without private	1	establishments		
Health Establishments specializing in private hospital / SUS	14	establishments		
Health Establishments without specialized private hospital / SUS	28	establishments		
Health Establishments with specialty private hospital / SUS	6	establishments		
Health Establishments specialties without private hospital / SUS	26	establishments		
Health Establishments with general private hospital / SUS	4	establishments		

Health Establishments general hospital without private / SUS	0	establishments		
Health Establishments SUS	153	establishments		
Health Establishments own plan	10	establishments		
Health Facilities third plan	135	establishments		
Health Establishments own	152	establishments		
Health Establishments single total	225	establishments		
Health Establishments with total outsourcing	11	establishments		
Health Establishments outsourced total	27	establishments		
Schools of Public Health only	73	establishments		
Schools of Public Health with outsourcing	2	establishments		
Health Facilities outsourced public	1	establishments		
Health Establishments single private	152	establishments		
Health Establishments with private outsourcing	9	establishments		
Health Facilities outsourced private	26	establishments		
Health Establishments single private / SUS	74	establishments		
Health Establishments with outsourcing private / SUS	4	establishments		
Health Facilities outsourced private / SUS	17	establishments		
Hospital beds in total health establishments	3,050	beds		
Hospital beds in public health establishments total	780	beds		
Hospital beds in public health establishments federal	85	beds		
Hospital beds in public health establishments State	685	beds		
Hospital beds in public health establishments municipal	10	beds		
Hospital beds in private health establishments total	2,270	beds		
Hospital beds in private health establishments SUS	2,100	beds		
Mammography with simple command	21	equipment		

Mammography with stereo-taxis	5	equipment		
For X-ray bone densitometry	6	equipment		
Tomograph	12	equipment		
MRI	1	equipment		
Ultrasound Doppler	50	equipment		
Electrocardiograph	104	equipment		
Electroencephalograph	16	equipment		
Hemodialysis Equipment	169	equipment		
X-ray up to 100mA	25	equipment		
X-ray of 100 to 500mA	36	equipment		
X-ray more than 500mA	15	equipment		
Health Establishments with total outpatient	173	establishments		
Health Establishments with no outpatient medical	6	establishments		
Health Establishments with outpatient care with medical care in basic specialties	126	establishments		
Health Establishments with outpatient care with other medical specialties	108	establishments		
Health Establishments with outpatient care with dental care dentist	72	establishments		
Health Establishments with total emergency care	22	establishments		
Health Establishments with pediatric emergency care	14	establishments		
Health Establishments with emergency care obstetrics	8	establishments		
Health Establishments with emergency care psychiatry	0	establishments		
Health Establishments with emergency care clinic	10	establishments		
Health Establishments with emergency care Surgery	7	establishments		
Health Establishments with emergency care Trauma and Orthopedics	9	establishments		
Health Establishments with emergency care Neuro Surgery	5	establishments		












































Health Establishments with emergency care Oral Maxillofacial Surgery	4	establishments		
Health Establishments with emergency care Other	2	establishments		
Health Facilities that provide services to the SUS Ambulatory	110	establishments		
Health Facilities that provide services to the SUS Admission	32	establishments		
Health Facilities that provide services to the SUS Emergency	14	establishments		
Health Facilities that provide services to the SUS ICU / ICU	8	establishments		
Health Facilities that provide services to the SUS Dialysis	6	establishments		

















































Source: IBGE, Medical Health 2005; Malha municipal digital Brazil: situation in 2005. Rio de Janeiro: IBGE, 2006.






NOTE: zero is attributed to the values of the municipalities where there is no occurrence of the variable or where, by rounding, the totals do not atigo the unit of measurement.

(IBGE 2009)

APPENDIX M HOSPITAL MORTALITY IN MACEIO FOR 2008

Maceio - AL				
Hospital Morbidity 2008				
Total	1,497	deaths		
Men	792	deaths		
Women	705	deaths		
Deaths --infectious diseases and parasitic - total	226	deaths		
Deaths - diseases, infectious and parasitic diseases - men	123	deaths		
Deaths - diseases, infectious and parasitic diseases - women	103	deaths		
Deaths - cancer - tumors - total	140	deaths		
Deaths - cancer - tumors - men	67	deaths		
Deaths - cancer - tumors - women	73	deaths		
Deaths - disease - blood, organs, hematological, immune trasntornos - total	7	deaths		
Deaths - disease - blood, organs, hematological, immune trasntornos - men	4	deaths		
Deaths - disease - blood, organs, hematological, immune trasntornos - women	3	deaths		
Deaths - diseases - endocrine, nutritional and metabolic diseases - total	62	deaths		
Deaths - diseases - endocrine, nutritional and metabolic diseases - men	28	deaths		
Deaths - diseases - endocrine, nutritional and metabolic diseases - women	34	deaths		
Deaths - trasntornos mental and behavioral disorders - total	15	deaths		
Deaths - trasntornos mental and behavioral - men	8	deaths		
Deaths - trasntornos mental and behavioral disorders - women	7	deaths		
Deaths - diseases - nervous system - total	17	deaths		
Deaths - diseases - nervous system - men	9	deaths		
Deaths - diseases - nervous system - women	8	deaths		


Deaths - diseases - eye and attachments - total	0	deaths		
Deaths - diseases - eye and attachments - men	0	deaths		
Deaths - diseases - eye and attachments - women	0	deaths		
Deaths - diseases - ear and mastoid process - total	0	deaths		
Deaths - diseases - ear and mastoid process - men	0	deaths		
Deaths - diseases - ear and mastoid process - women	0	deaths		
Deaths - disease - circulatory system - total	318	deaths		
Deaths - disease - circulatory system - men	154	deaths		
Deaths - disease - cardiovascular - women	164	deaths		
Deaths - diseases - respiratory system - total	157	deaths		
Deaths - diseases - respiratory - men	87	deaths		
Deaths - diseases - respiratory - women	70	deaths		
Deaths - diseases - digestive system - total	113	deaths		
Deaths - diseases - digestive system - men	71	deaths		
Deaths - diseases - digestive system - women	42	deaths		
Deaths - disease - skin and subcutaneous tissue - total	4	deaths		
Deaths - disease - skin and subcutaneous tissue - men	1	deaths		
Deaths - disease - skin and subcutaneous tissue - women	3	deaths		
Deaths - diseases - musculoskeletal and connective tissue - total	9	deaths		
Deaths - diseases - musculoskeletal and connective tissue - men	3	deaths		
Deaths - diseases - musculoskeletal and connective tissue - women	6	deaths		
Deaths - diseases - genitourinary system - total	81	deaths		
Deaths - diseases - genitourinary system - men	40	deaths		
Deaths - diseases - genitourinary system - women	41	deaths		

Deaths - disease - in the perinatal period - total	233	deaths		
Deaths - disease - in the perinatal period - men	127	deaths		
Deaths - disease - in the perinatal period - women	106	deaths		
Deaths - pregnancy, childbirth and puerperium - total	12	deaths		
Deaths - pregnancy, childbirth and puerperium - women	12	deaths		
Deaths - congenital malformations, deformations and chromosomal abnormalities - total	27	deaths		
Deaths - congenital malformations, deformations and chromosomal abnormalities - men	15	deaths		
Deaths - congenital malformations, deformations and chromosomal abnormalities - women	12	deaths		
Deaths - symptoms, signs and abnormal findings on clinical and laboratory - total	26	deaths		
Deaths - symptoms, signs and abnormal findings on clinical and laboratory - men	17	Deaths		
Deaths - symptoms, signs and abnormal findings on clinical and laboratory - women	9	deaths		
Deaths - Injuries, poisoning and external causes - total	45	deaths		
Deaths - Injuries, poisoning and external causes - men	36	deaths		
Deaths - Injuries, poisoning and external causes - women	9	deaths		
Deaths - External causes of morbidity and mortality - total	1	deaths		
Deaths - External causes of morbidity and mortality - males	0	deaths		
Deaths - External causes of morbidity and mortality - women	1	deaths		
Deaths - contacts with health services - total	4	deaths		
Deaths - contacts with health services - men	2	deaths		
Deaths - contacts with health services - women	2	deaths		
Sources: Ministry of Health, Department of the Unified Health System - DATASUS 2008. NOTE 1: Assign zeros to the values of the municipalities where there is no occurrence of the variable. NOTE 2: Assign the expression given uninformed the variables where the values of the municipalities were not informed.				


(IBGE 2009)

APPENDIX N

PSF HEALTH INTAKE FORM



Estado de Alagoas
Prefeitura Municipal de Maceió
Secretaria Municipal de Saúde



Saúde
Trabalhando com você

SECRETARIA MUNICIPAL DE SAÚDE

FICHA A		SECRETARIA MUNICIPAL DE SAÚDE				UF <input type="text"/>
SISTEMA DE INFORMAÇÃO DE ATENÇÃO BÁSICA						
ENDEREÇO		NÚMERO	BAIRRO		CEP	
<input type="text"/>		<input type="text"/>	<input type="text"/>		<input type="text"/>	
MUNICÍPIO	SEGMENTO	ÁREA	MICROÁREA	FAMÍLIA	DATA	
<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	

CADASTRO DA FAMÍLIA								
PESSOAS COM 15 ANOS OU MAIS	NOME	DATA NASC.	IDADE	SEXO	ALFABETIZADO		OCUPAÇÃO	DOENÇA OU CONDIÇÃO REFERIDA (sigla)
					sim	não		

PESSOAS DE 0 A 14 ANOS	NOME	DATA NASC.	IDADE	SEXO	FREQUENTA A ESCOLA		OCUPAÇÃO	DOENÇA OU CONDIÇÃO REFERIDA (sigla)
					sim	não		

Siglas para a indicação das doenças e/ou condições referidas

ALC - Alcoolismo	EPI - Epilepsia	TB - Tuberculose
CHA - Chagas	GES - Gestação	HAN - Hanseníase
DEF - Deficiência	HA - Hipertensão Arterial	MAI - Malária

SITUAÇÃO DA MORADIA E SANEAMENTO

TIPO DE CASA	
Tijolo/Adobe	
Taipa revestida	
Taipa não revestida	
Madeira	
Material aproveitado	
Outro - Especificar:	
Número de cômodos / peças	
Energia Elétrica	
DESTINO DO LIXO	
Coletado	
Queimado / Enterrado	
Céu aberto	

TRATAMENTO DA ÁGUA NO DOMICÍLIO	
Filtração	
Fervura	
Cloração	
Sem tratamento	
ABASTECIMENTO DE ÁGUA	
Rede pública	
Poço ou nascente	
Outros	
DESTINO DAS FEZES E URINA	
Sistema de esgoto (rede geral)	
Fossa	
Céu aberto	

OUTRAS INFORMAÇÕES

Alguém da família possui Plano de Saúde?		Número de pessoas cobertas por Plano de Saúde	
Nome do Plano de Saúde			

EM CASO DE DOENÇA PROCURA	
Hospital	
Unidade de Saúde	
Benedeira	
Farmácia	
Outros - Especificar:	
MEIOS DE COMUNICAÇÃO QUE MAIS UTILIZA	
Rádio	
Televisão	
Outros - Especificar:	

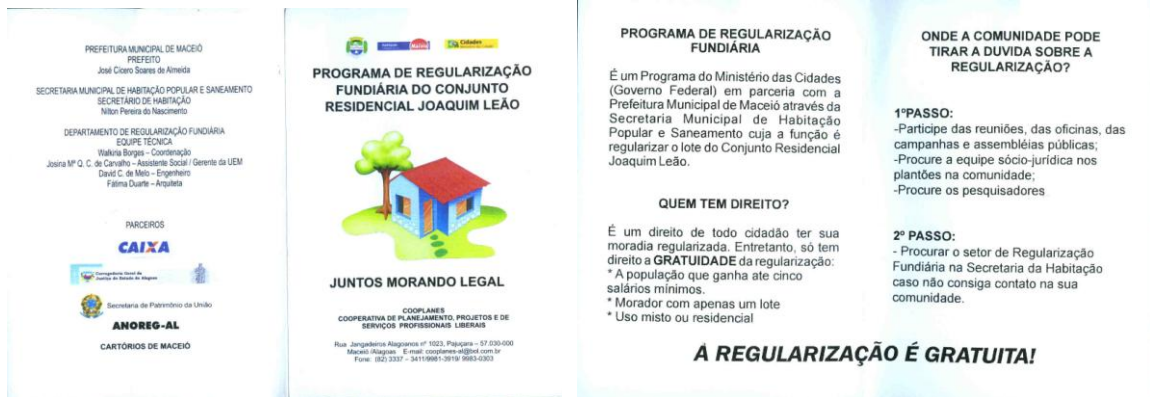
PARTICIPA DE GRUPOS COMUNITÁRIOS	
Cooperativa	
Grupo religioso	
Associações	
Outros - Especificar:	
MEIOS DE TRANSPORTE QUE MAIS UTILIZA	
Ônibus	
Caminhão	
Carro	
Carroça	
Outros - Especificar:	

OBSERVAÇÕES

(Ministry of Health, 2009)

APPENDIX O

GOVERNMENT HOUSING NOTICES AND ASSIMILATION PROGRAM BROCHURES



Boletim Informativo MORANDO LEGAL

PROGRAMA DE REGULARIZAÇÃO FUNDIÁRIA DO
CONJUNTO RESIDENCIAL JOAQUIM LEÃO

Volume 3, edição 1

Setembro de 2007.

Cidades
Ministério das Cidades



Relações
Ministério das Relações Exteriores

CAIXA

ATENÇÃO! ATENÇÃO!

Joaquim Leão
A regularização fundiária chegou
Regularizar para valorizar
Nossa moradia familiar

Com apoio do Governo Federal
Prefeitura e habitação
Vamos todos receber com satisfação
A nossa escritura na mão

SECRETARIA DE
PATRIMÔNIO DA UNIÃO
CORREGEDORIA GERAL
DE JUSTIÇA
ANOREG
CARTÓRIOS

Vera
moradora do conjunto

Elaboração:

COOPPLANES
Cooperativa de Planejamento, Projetos e de Serviços Profissionais - LDBs

COMO COMEÇOU O PROGRAMA DE REGULARIZAÇÃO FUNDIÁRIA NO CONJUNTO RESIDENCIAL JOAQUIM LEÃO?

> Outubro de 2006 a março de 2007- início da execução do Projeto Técnico Social

Mobilização da comunidade para garantir a participação e escolha dos representantes de quadras, através da realização de assembleias públicas; capacitação dos representantes e da equipe técnica para realizar os plantões sócio jurídicos.

> Abril a setembro de 2007

Em abril foi iniciada a pesquisa sócio econômica e o levantamento topográfico (medição dos lotes); Continuação do trabalho técnico social através dos plantões sócio jurídicos (atendimento dos moradores por advogados, assistentes sociais, engenheiros e psicólogos), assembleia pública e campanha educativa informando sobre o programa, além das reuniões com os representantes para o fortalecimento do programa.

A partir de julho com o levantamento topográfico e o cadastramento dos moradores foi iniciado o trabalho de emissão de pareceres pelo escritório jurídico. A aprovação dos registros dos lotes e a pesquisa estão quase sendo concluída.

AGRADECIMENTOS

Aos representantes de quadra, Creche Escola Lindolfo Collor, Guarda Municipal, e moradores do Conjunto Residencial Joaquim Leão que colaboraram para o desempenho do programa. Sem vocês nada conseguiríamos



Entrega do Relatório ao grupo de representantes - junho/2007



Reunião com o grupo de representantes - junho/2007



Oficina de arte com as crianças do Conjunto durante a 1ª Campanha Educativa - abril/2007



Assembleia para escolha do grupo de representantes - janeiro/2007

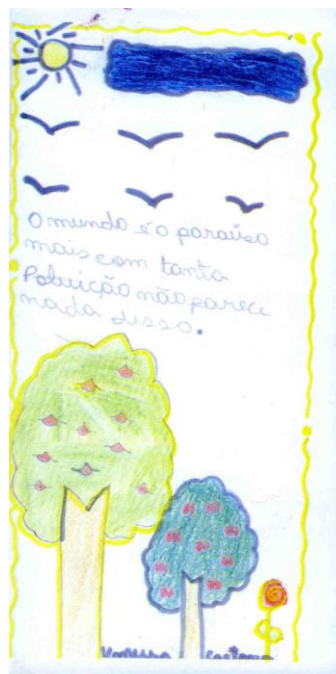


Oficina com o grupo de representantes - janeiro/2007



Atendimento do plantão sócio jurídico na Guarda Municipal - junho/2007

A SUA PARTICIPAÇÃO TEM SIDO FUNDAMENTAL
PARA O SUCESSO DO PROGRAMA. CONTINUE
COLABORANDO ATÉ A ENTREGA DAS







(COOPLANES 2009)

REFERENCES

REFERENCES

- Agar, Michael H. *The Professional Stranger: An Informal Introduction to Ethnography*. San Diego, California: Academic Press, Inc., 1980.
- Almeida, Jorge T., ed. *Brazil in Focus: Economic, Political and Social Issues*. New York, New York: Nova Science Publishers, Inc. 2008.
- Alugue Temporada. "The Guide for Vacation Rental Property in Brazil." <http://www.aluguetemporada.com.br/rentals/brazil.cfm> [accessed November 24, 2009].
- Alvarez, Sonia E., Evelina Dagnino, and Arturo Escobar, eds. *Cultures of Politics, Politics of Cultures: Re-Visioning Latin American Social Movements*. Boulder, Colorado: Westview Press, 1998.
- Andersson, Yvonne and Patrick Bohan. "Disease surveillance and waterborne outbreaks." *Water Quality: Guidelines, Standards and Health*. London, UK: World Health Organization, 2001.
- Andres, Luis A., J. Luis Guasch, Thomas Haven and Vivien Foster. *The Impact of Private Sector Participation in Infrastructure: Lights, Shadows and the Road Ahead*. Washington, D.C.: The International Bank for Reconstruction and Development/The World Bank. 2008
- Anton, Danilo J., *Thirsty Cities: Urban Environments and Water Supply in Latin America*. Ottawa, Ontario, Canada: International Development Research Centre, 1993.
- Anuatti-Neto, Francisco, Milton Barossi-Filho, Antonio Gledson De Carvalho, and Roberto Macedo. *Costs and Benefits of Privatization: Evidence From Brazil*. Sao Paulo, Brazil: University of Sao Paulo, 2003.
- Arestis, Philip and Alfredo Saad-Filho, eds. *Political Economy of Brazil: Recent Economic Performance*. New York, New York: Palgrave MacMillan. 2007.
- Armstrong, Franny. *Drowned Out: We Can't Wish Them Away*. DVD. Bullfrog Films, 2003.

AZ Central. "Water Bottlers Face Increased Opposition – Samantha Young." <http://www.azcentral.com/business/consumer/articles/2008/04/10/20080410biz-WaterOpposition-10.html> [accessed May 6, 2009].

Balkin, Karen. ed. *Poverty: Opposing Viewpoints*. Farmington Hills, Michigan: Greenhaven Press. 2004.

Ball, Olivia and Paul Gready. *The No-Nonsense Guide to Human Rights*. Oxford, UK: New Internationalist Publications Ltd, 2006.

Ballve, Marcelo. "Bolivia: Privatized Water Company Defeated." *NACLA Report on the Americas* 38, no. 5 [Mar/Apr 2005]: 41-43.

Banning, John W., Curtis J. Sorenson, and Richard Ziesenis. "Physical and Cultural Influences on the Performance of Septic Systems in Douglas County, Kansas." *Transactions of the Kansas Academy of Science (1903-)* 102, No. 3/4 [Oct 1999]: 23-137.

Barkin, David. "Mexico City's Water Crisis." *NACLA Report on the Americas* 38, no. 1 [Jul/Aug 2004]: 24.

Barlow, Maude. *Blue Covenant: The Global Water Crisis and the Coming Battle for the Right to Water*. New York, New York: The New Press. 2007.

Barlow, Maude and Tony Clark. "The Struggle for Latin America's Water." *NACLA Report on the Americas* 38, no. 1 [Jul/Aug 2004]: 15.

Barzilay, Joshua I., M.D., Winkler G. Weinberg, M.D. and J. William Eley, M.D., M.P.H. *The Water We Drink: Water Quality and Its Effect on Health*. Piscataway, New Jersey: Rutgers University Press, 1999.

Bastien, Joseph W. *Drum and Stethoscope: Integrating Ethnomedicine and Biomedicine in Bolivia*. Salt Lake City, Utah: University of Utah Press. 2008.

Batra, Ravi. *Golden Age: The Coming Revolution Against Political Corruption And Economic Chaos*. New York, New York: Palgrave Macmillan. 2007

Baudrillard, Jean. *Simulacra and Simulation*. Edited by Mark Poster. Stanford, California: Stanford University Press, 1998.

BBC News. "Brazil Quits Loan Accord With IMF." <http://news.bbc.co.uk/2/low/business/4390145.stm> [accessed November 24, 2009].

Bennett, Vivienne, Sonia Davila-Poblete and Nieves Rico, eds. *Opposing Currents: the Politics of Water and Gender in Latin America*. Pittsburgh, Pennsylvania: University of Pittsburgh Press. 2005.

Benjamin, Medea and Maisa Mendonca, eds. *Benedita da Silva: An Afro-Brazilian Woman's Story of Politics and Love*. Oakland, California: Food First Books, 1997.

Biehl, Joao. *VITA: Life in a Zone of Social Abandonment*. Los Angeles, California: University of California Press. 2005.

Bioline International. "Lymphatic Filariasis in Brazilian Urban Area (Maceio, Alagoas) - Gilberto Fontes, Eliana MM Rocha, Ana C Brito, Carlos Mauricio F Antunes." <http://bioline.org.br/request?oc98196> [accessed November 24, 2009].

Boberg, Jill. *Liquid Assets: How Demography Changes and Water Management Policies Affect Freshwater Resources*. Santa Monica, California: Rand Corporation, 2005.

Borchardt, Mark A., et. al. "Septic System Density and Infectious Diarrhea in a Defined Population of Children." *Environmental Health Perspectives* 111, No. 5 [May, 2003]: 742-748.

Bouguerra, Mohammed Larbi. *Water Under Threat*. New York, New York: Zed Books, 2006.

Bullough, Bonnie R.N., Ph.D. and Vern I. Bullough, Ph.D. *Poverty, Ethnic Identity and Health Care*. New York City, New York: Meredith Corporation. 1972.

Bunker, Stephen G. *Underdeveloping the Amazon: Extraction, Unequal Exchange, and the Failure of the Modern State*. Chicago, Illinois: University of Illinois Press, 1985.

Bunker, Stephen G. and Paul S Ciccantell. *Globalization and the Race for Resources*. Baltimore, Maryland: The Johns Hopkins University Press, 2005.

Caldeira, Teresa P.R.. *City of Walls: Crime, Segregation, and Citizenship in São Paulo*. Los Angeles, California: University of California Press. 2000.

CASAL. "Companhia de Saneamento de Alagoas." <http://www.casal.al.gov.br/> [accessed November 24, 2009].

Centers for Disease Control and Prevention. "Chagas Disease." <http://www.cdc.gov/chagas/> [accessed November 24, 2009].

Centers for Disease Control and Prevention, Division of Foodborne, Bacterial, and Mycotic Diseases (DFMMD). “Leprosy (Hansen’s Disease).” http://www.cdc.gov/nczved/dfbmd/disease_listing/leprosy_ti.html [accessed November 24, 2009].

Centers for Disease Control and Prevention. “Global Water, Sanitation, & Hygiene (WASH).” <http://www.cdc.gov/healthywater/global/> [accessed November 24, 2009].

Centers for Disease Control and Prevention. “MMWR Weekly: Brief Report: Gastroenteritis Among Attendees at Summer Camp – Wyoming, June-July, 2006.” <http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5615a4.htm> [accessed November 24, 2009].

Centers for Disease Control and Prevention. “Stormwater Management and Vector Breeding Habits.” <http://www.cdc.gov/nceh/ehs/Docs/Stormwater-Factsheet.pdf> [accessed November 24, 2009].

Centers for Disease Control and Prevention. “Tap Water – Where Does It Come From and Is It Safe to Drink?” <http://www.cdc.gov/Features/GroundWater/> [accessed November 24, 2009].

Centers for Disease Control and Prevention, National Center for for Zoonotic, Vector-Borne, and Enteric Diseases, Division of Parasitic Diseases. “Giardiasis.” http://www.dpd.cdc.gov/dpdx/HTML/ImageLibrary/Giardiasis_il.htm [accessed November 24, 2009].

Centers for Disease Control and Prevention, National Center for for Zoonotic, Vector-Borne, and Enteric Diseases, Division of Parasitic Diseases. “Schistosomiasis.” http://www.cdc.gov/ncidod/dpd/parasites/schistosomiasis/factsht_schistosomiasis.htm [accessed November 24, 2009].

Center for Reproductive Rights. “Center Challenges Brazil’s Record On Maternal Mortality.” <http://reproductiverights.org/en/press-room/center-challenges-brazils-record-on-maternal-mortality> [accessed November 22, 2009].

Circle of Blue Water News. “Peter Gleick: The Denominator Problem; Misleading Use of Water Numbers.” <http://www.circleofblue.org/waternews/2009/world/peter-gleick-the-denominator-problem-misleading-use-of-water-numbers/> [accessed November 24, 2009].

City of Columbia. “Septic Tank and Drainfield Maintenance.” http://www.gocolumbiamo.com/Health/Wastewater_Systems/septic_systems.php [accessed November 24, 2009].

City of Tumwater, WA. "The Oregon Trail – What dangers did the settlers face?" <http://www.ci.tumwater.wa.us/researchOTpg8.htm> [accessed November 22, 2009].

Clinton, Hillary Rodham. *It Takes A Village*. New York, New York: Simon and Schuster, 2006.

Coles, Anne and Tina Wallace, eds. *Gender, Water and Development*. New York, New York: Berg, 2005.

Collier, Paul. *The Bottom Billion*. New York, New York: Oxford University Press. 2007.

Coulter, James B. "The Septic Tank System in Suburbia." *Public Health Reports (1896-1970)* 73, No. 6 [Jun 1958]: 488-492.

Council on Hemispheric Affairs. "Thirst for Profit: Corporate Control of Water in Latin America – Lisa Boscov-Ellen." <http://www.coha.org/2009/06/water-for-sale/> [accessed May 7, 2009].

Creswell, John W. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. Thousand Oaks, California: Sage Publications, Inc. 2003.

Crohurst, H. R.. "Sanitary Disposal of Sewage through a Septic Tank: A System of Simple Construction and Inexpensive Operation for Isolated Dwellings." *Public Health Reports. (1896-1970)* 35, No. 50 [Dec 10, 1920]: 2959-2964.

Da Silva, Ivanete, Marinalva Nobre da Silva, and Quiteria Maria Pereira de Souza. *Educacao em Saude no Programa de Controle da Esquistossomose, No Municipio de Santana do Mundau*. Maceio, Alagoas, Brazil: Universidade Federal de Alagoas, 2006.

Daily Gazette. "Industry group says bottled water may soon be off shelves in New York State – Michael Lamendola." <http://www.dailygazette.com/news/2009/may/07/0507bottles/> [accessed May 7, 2009].

Daniel, E. Valentine and John Chr. Knudsen. eds. *Mistrusting Refugees*. Los Angeles, California: University of California Press, 1995.

Danford, John W., *Roots of Freedom: A Primer on Modern Liberty*. Wilmington, Delaware: ISI Books, 2004.

De Villiers, Marq. *Water: The Fate of Our Precious Resource*. New York, New York: Jacobus Communications Corporation, 2000.

Dershowitz, Alan, *Rights From Wrongs: A Secular Theory of the Origins of Rights*. New York, New York: Basic Books, 2004.

Egendorf, Laura K. ed. *Human Rights: Opposing Viewpoints*. Farmington Hills, Michigan: Greenhaven Press. 2003.

Erickson, Paul A. and Liam D. Murphy. *A History of Anthropological Theory*. Buffalo, New York: Broadview Press, 2008.

Evans, Peter. *Livable Cities? : Urban Struggles for Livelihood and Sustainability*. Los Angeles, California: University of California Press, 2002.

Fadiman, Anne. *The Spirit Catches You and You Fall Down*. New York, New York: Farrar, Straus and Giroux, 1997.

Fairfax Water. "Employment." <http://www.fcwa.org/employment/index.htm> [accessed November 24, 2009].

Farmer, Paul. *Infections and Inequalities: The Modern Plagues*. Los Angeles, California: University of California Press, 1999.

Farmer, Paul. *Pathologies of Power: Health, Human Rights, and the New War on the Poor*. Los Angeles, California: University of California Press, 2004.

Finger, Matthias, Ludivine Tamiotti, and Jeremy Allouche, eds. *The Multi-Governance of Water: Four Case Studies*. Albany, New York: State University of New York Press, 2006.

Fischer, Brodwyn. *A Poverty of Rights: Citizenship and Inequality in Twentieth-Century Rio de Janeiro*. Stanford, California, Stanford University Press, 2008.

Flores, Alder. *Introducao ao Estudo do Meio Ambiente: Monitoramento Ambiental Qualidade Das Aguas Balneabilidade*. Maceio/Alagoas, Brazil: Grafica e Editora Poligraf Ltda., 2007.

Florida, Florida. *The Rise of the Creative Class: and How It's Transforming Work, Leisure, Community and Everyday Life*. New York, New York: Basic Books, 2002.

Food & Water Watch. "UN Must Recognize Water as a Basic Human Right: Statement of Food & Water Watch Executive Director Wenonah Hauter." <http://www.foodandwaterwatch.org/press/releases/un-must-recognize-water-as-a-basic-human-right-article03272008> [accessed November 22, 2009].

Forbes. "Brazil Raises '09 Minimum Wage 6.4 pct to 465 Reais – Ana Nicolaci da Costa."

<http://www.forbes.com/feeds/afx/2009/01/30/afx5988842.html> [accessed November 24, 2009].

Foreign Policy Digest. "A Healthy Debate: Does the Brazilian Healthcare Model Offer a Guide to the US?" <http://www.foreignpolicydigest.org/Americas/March-2009/brazilian-universal-healthcare.html> [accessed November 24, 2009].

Frontline/World. "Bolivia Leasing the Rain, June 2002." <http://www.pbs.org/frontlineworld/stories/bolivia/thestory.html> [accessed November 24, 2009].

Frost & Sullivan. "A Comparative Analysis of the Public and Private Healthcare Provisions in Brazil- Luisa Wogg." <http://www.frost.com/prod/servlet/market-insight-top.pag?Src=RSS&docid=146757019> [accessed November 24, 2009].

Galiani, Sebastian, Paul Gergler and Ernesto Schargrotsky. *Water for Life: The Impact of the Privatization of Water Services on Child Mortality*. World Health Organization, 2003.

Gans, Herbert J. *The War Against The Poor: The Underclass And Antipoverty Policy*. New York, New York: BasicBooks, 1995.

Gerardi, Michael. H. and Melvin C. Zimmerman. *Wastewater Pathogens*. Hoboken, New Jersey: John Wiley & Sons, Inc., 2005.

Gilder, George. *Wealth & Poverty*. San Francisco, California: Institute for Contemporary Studies Press, 1993.

Gleick, Peter. *The World's Water: The Biennial Report on Freshwater Resources*. Pacific Institute For Studies In Development, Environment, and Security, 1998.

Gleick, Peter. "The Human Right to Water." *Water Policy* 1 no. 5 [1999]: 487-503.

Gleick, Dr. Peter H.. *Water Conflict Chronology*. Pacific Institute For Studies In Development, Environment, and Security, 2008.

Global Issues. "Water and Development." <http://www.globalissues.org/article/601/water-and-development> [accessed November 24, 2009].

Gordis, Leon. *Epidemiology*. Philadelphia, Pennsylvania: Saunders Elsevier, 2009.

Graeber, David. *Toward an Anthropological Theory of Value: The False Coin of Our Own Dreams*. New York, New York: Palgrave, 2001.

Great Lakes Directory. "The Battle for Water – Tony Clarke and Maude Barlow." http://www.greatlakesdirectory.org/mn/040504_great_lakes.htm [accessed November 24, 2009].

Gunning, Isabel R. "Arrogant Perception, World Travelling and Multicultural Feminism : The Case of Female Genital Surgeries." *Columbia Human Rights Law Review* 23, no. 2 [1992]: 189-248.

Hall, David, Emanuele Lobina, and Robin de la Motte. *Public solutions for private problems?: responding to the shortfall in water infrastructure investment*. Public Services International, 2003.

Healthline. "Leprosy Health Article." <http://www.healthline.com/adamcontent/leprosy> [accessed November 24, 2009].

Hebron. "Phytomedicines." http://www.hebron.com.br/ingles/fito_giamebil.php [accessed November 24, 2009].

Hershberg, Eric and Fred Rosen. *Latin America After Neoliberalism: Turning the Tide in the 21st Century*. New York, New York: The New Press, 2006.

Heynen, Nik, James McCarthy, Scott Prudham, and Paul Robbins. *Neoliberal Environements: False Promises and Unnatural Conseuenes*. New York, New York: Routledge, 2007.

History.com. "The Early Years of the Jamestown Settlement." <http://www.history.com/classroom/jamestown/jamestowninsert1.html> [accessed November 24, 2009].

Hopkins, Edward Scott, W. Mc Lean Bingley, B.Eng., P.E., and George Wayne Schuker, B. Eng., *The Practice of Sanitation: In Its Relation To The Environment*. Baltimore, Maryland: The Williams & Wilkins Company, 1970.

IBGE Cities@. <http://www.ibge.gov.br/cidadesat/topwindow.htm> [access November 24, 2009].

Idaho Department of Environmental Quality. "Community Septic Systems." http://www.deq.idaho.gov/water/assist_citizen_comm/septic/septic_community_guide.pdf [accessed November 24, 2009].

Inecon/Fundacao Getulio Vargas Consortium. *Verification of the Private Sector's Participation in Providing Water Supply and Sanitary Sewage Services in Brazil*. National Department of Environmental Sanitation, Brazil, 2008.

Inter-American Development Bank. "Child Health and Infant Mortality in Brazil." <http://www.iadb.org/res/publications/pubfiles/pubR-493.pdf> [accessed November 24, 2009].

International Relations Center Americas Program. "Water Privatization in Latin America – Carmelo Ruiz Marrero." <http://www.globalpolicy.org/component/content/article/215/46063.html> [accessed November 22, 2009].

International Water Management Institute. "Water Scarcity: Private Investment Opportunities in Agricultural Water Use Efficiency." <http://www.wri.org/map/physical-and-economic-water-scarcity> [accessed November 24, 2009].

Irena, Salina. *Flow: How Did a Handful of Corporations Steal Our Water?* DVD. Oscilloscope Laboratories, 2008.

Johnston, Hank and Paul Almeida. *Latin American Social Movements*. New York, New York: Rowman & Littlefield Publishers, 2006.

Kanitz, Stephen. *Brazil: The Emerging Economic Boom 1995-2005*. Sao Paulo, Brazil: Makron Books, 1995.

Keck, Margaret. "'Water, Water, Everywhere, Nor Any Drop to Drink': Land Use and Water Policy in São Paulo, Brazil." *Liveable Cities?: Urban Struggles for Livelihood and Sustainability*. Los Angeles, California: University of California Press, 2002.

Keck, Margheret E. and Rebecca Abers. "Running Water: Participatory Management in Brazil. *NACLA Report on the Americas* 38 no. 1 [Jul/Aug 2004]: 29.

Kidder, Tracy. *Mountains Beyond Mountains: The Quest of Dr. Paul Farmer, A Man Who Would Cure The World*. New York, New York: Random House, 2003.

Knight, Peter T. and Ricardo Moran. *Brazil: Poverty and Basic Needs Series*. Washington D.C.: The World Bank, 1981.

Koplin, Allen N. "Septic Tanks Can Be Dangerous to Your Health." *Journal of Public Health Policy* 9, No. 2 [Summer, 1988]: 164-166.

Krause, Matthias. *The Political Economy of Water and Sanitation*. New York, New York, 2009.

Latin American Network Information Center. "Lessons From Recife: Favela Residents Move up from Mud, into Policy Arena."

<http://lanic.utexas.edu/lance/courses/jacobi/las310/resources/favelas.html> [accessed November 24, 2009].

Levine, Robert M. and John J. Crocitti, eds. *The Brazil Reader: History, Culture, Politics*. Durham, North Carolina: Duke University Press, 1999.

Lobina, Emanuele and David Hall. *Problems With Private Water Concessions: A Review Of Experiences In Latin America And Other Regions*.

Loue, Sana. *Assessing Race, Ethnicity, and Gender in Health*. New York, New York: Spring Science+Business Media, Inc., 2006

Mantz, Jeffrey W. "Improvisational Economies: Colton Production in the Eastern Congo." *Social Anthropology* 16 no. 1 [2008]: 34-50.

Mast, Tom, *Over a Barrel: A Simple Guide to the Shortage*. Austin, Texas: Greenleaf Book Group, 2005

McDonald, Bernadette and Douglas Jehl. *Whose Water Is It?: The Unquenchable Thirst Of A Water-Hungry World*. Washington, D.C.: National Geographic, 2003.

McGranahan, Pedro Jacobi, Jacob Songsore, Charles Surjadi and Marianne Kjellen. *The Citizens at Risk: From Urban Sanitation to Sustainable Cities*. London, UK: Earthscan Publications Ltd., 2001.

MedlinePlus. "Ivermectin."

<http://www.nlm.nih.gov/medlineplus/druginfo/meds/a607069.html> [accessed November 24, 2009].

MedlinePlus. "Water Pollution."

<http://www.nlm.nih.gov/medlineplus/waterpollution.html> [accessed November 24, 2009].

Melosi, Martin V., *Garbage In The Cities: Refuse, Reform, and the Environment*. Pittsburg, Pennsylvania : The University of Pittsburg Press, 2005.

Metropolitan Washington Council of Governments (MWCOC). "Water Supply."

<http://www.mwcog.org/environment/water/watersupply/manassas.asp> [accessed November 24, 2009].

Middleton, Neil, Phil O'Keefe and Sam Moyo. *The Tears of the Crocodile: From Rio to Reality in the Developing World*. Boulder, Colorado: Pluto Press, 1993.

Midkiff, Ken. *Not a Drop to Drink: America's Water Crisis [And What Can You Do]*. Novato, California: New World Library, 2007.

Miller, Debra A., ed. *Will the World Run Out of Fresh Water?* Farmington Hills, Michigan: Thompson Gale, 2007.

Millichap, J. Gordon, M.D., *Is Our Water Safe To Drink? : A Guide To Drinking Water Hazards and Health Risks*. Chicago, Illinois: PNB Publishers, 1995.

Mosse, David. *The Rule of Water: Statecraft, Ecology and Collective Action in South India*. New Delhi, India: Oxford University Press, 2003.

Nadakavukaren, Anne. *Our Global Environment: A Health Perspective*. Prospect Heights, Illinois: Waveland Press, Inc., 2000.

National Registration Center for Study Abroad (NRCSA). "Medical Program in Maceio, Brazil." http://www.nrcsa.com/top_choice/medical/brazil_group/index.html [accessed November 24, 2009].

New York Times, The. "Toxic Waters: Clean Water Laws Are Neglected, at a Cost in Suffering." http://www.nytimes.com/2009/09/13/us/13water.html?_r=2 [accessed November 22, 2009].

Olivera, Oscar and Tom Lewis. *¡Cochabamba!: Water War in Bolivia*. New York, New York: South End Press, 2008.

Olivier, Anne. *Water Tariff Increase In Manaus (Brazil): An Evaluation Of The Impact On Households*. Developement Institutions & Analyses de Long Teme, 2006.

Ong, Aihwa. *Buddha Is Hiding: Refugees ▪ Citizenship ▪ The New America*. Berkeley and Los Angeles, California: University of California Press, 2003.

Outwater, Alice. *Water: A Natural History*. New York, New York: Basic Books, 1996.

Owensby, Brian P. *Intimate Ironies: Modernity and the Making of Middle-Class Lives in Brazil*. Stanford, California: Stanford University Press, 1999.

Oxfam India. "Deadly Floods Devastate Southern India." <http://www.oxfamindia.org/emergencies/deadlyfloodsdevastatesouthernindia> [accessed November 24, 2009].

Parlatore, Antonio Carlos. *Privatization Of The Water Utility Sector In Brazil*. Embassy of Brazil, N.D..

Pineo, Ronn and James A. Baer, eds. *Cities of Hope: People, Protests and Progress in Urbanizing Latin America, 1870-1930*. Boulder, Colorado: Westview Press, 1998.

Pino, Julio Cesar. *Family and Favela: The Reproduction of Poverty in Rio de Janeiro*. Westport, Connecticut: Greenwood Press, 1997.

Polak, Paul. *Out Of Poverty: What Works When Traditional Approaches Fail*. San Francisco, California: Berrett-Koehler Publishers, Inc., 2008.

Prefeitura Municipal de Maceio. "Prefeitura Municipal de Maceio." <http://www.maceio.al.gov.br/> [accessed November 24, 2009].

Naren, Prasad, ed. *Social Policies and Private Sector Participation in Water Supply*. New York, New York: Palgrave Macmillan, 2008.

O&P Business News. "Brazil: Its Health Care System Is a Study in Contrasts." <http://www.oandpbiznews.com/2004w1/brazil.asp> [accessed November 24, 2009].

Public Citizen. *Water Privatization Case Study: Cochabamba, Bolivia*, N.D.

Public-Private Infrastructure Advisory Facility. "Cosponsored Publications by Region." <http://www.ppiaf.org/content/view/268/436/> [accessed November 24, 2009].

Reid, Michael. *Forgotten Continent: The Battle For Latin America's Soul*. New Haven, Connecticut: Yale University Press, 2007.

Reneau, R. B., et. al. "Distribution of Total and Fecal Coliform Organisms from Septic Effluent in Selected Coastal Plain Soils." *Public Health Reports (1974-)* 92, No. 3 [May - Jun., 1977]: 251-259.

Roehmer, Milton I., M.D. *Rural Health Care*. St. Louis, Missouri: The C.V. Mosby Company, 1976.

Sachs, Jeffrey D., *The End of Poverty: Economic Possibilities For Our Time*. New York, New York: The Penguin Press, 2005.

Satterthwaite, David and Gordon McGranahan. *Overview of the Global Sanitation Problem*. United Nations Publication, 2006.

Scheper-Hughes, Nancy. *Death Without Weeping: The Violence of Every Life in Brazil*. Berkeley, California: University of California Press, 1992.

Schouten, Ton, Patrick Moriarty. *Community Water, Community Management: From System to Service in Rural Areas*. London, United Kingdom: ITDG Publishing, 2003.

Scott, James. *Domination and the Arts of Resistance*. New Haven, Connecticut: Yale University Press, 1990.

Sen, Amartya. "How to Judge Globalism," *The American Prospect* 13 no. 1 [Jan 2002].

Shannyn's Water Blog. <http://www.waterhealthblog.com/> [accessed November 24, 2009].

Shirly, Mary M., ed. *Thirsting for Efficiency: The Economics and Politics of Urban Water System Reform*. Oxford, United Kingdom: Elsevier Science, Ltd., N.D.

Shiva, Vandana. "Violence of Globalization." *Canadian Woman Studies* 21/22 nos. 4/1 [2001].

Shiva, Vandana. *Water Wars: Privatization, Pollution, and Profit*. Cambridge, Massachusetts: South End Press, 2002.

Shultz, Jim. "Bolivia: The Water War Widens." *NACLA Report on the Americas* 36 no. 4 [Jan/Feb 2003]: 34.

Skidmore, Thomas E. and Peter H. Smith. *Modern Latin America*. New York, New York: Oxford University Press, 1997.

Skidmore, Thomas E., *Brazil: Five Centuries of Change*. New York, New York: Oxford University Press, 1999.

Smedley, Brian D., Adrienne Y. Stith, and Alan R. Nelson, eds. *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*. Washington, D.C.: The National Academies Press, 2003.

Smith, Harold J. *Privatization of Small Water Systems*. National Rural Water Association, N.D.

Smith, James H. and Jeffrey W. Mantz. "Do Cellular Phones Dream of Civil War? The Mystification of Production and the Consequences of Technology Fetishism in the Eastern Congo. In *Inclusion and Exclusion in the Global Arena*. Max Kirsch, eds. New York, New York: Routledge, N.D.

Stauffer, Julie. *The Water You Drink: Safe Or Suspect?*. Gabriola Island, BC, Canada: New Society Publishers, 2004.

Steger, Manfred B. *Globalization: A Very Short Introduction*. Oxford and New York: Oxford University Press, 2003.

Stein, Richard Joseph, ed. *The Reference Shelf: Water Supply*. New York, New York: The H. W. Wilson Company, 2008.

Stewart, Amy and Tim Gray. *The Governance Of Water And Sanitation in Afria: Achieving Sustainable Development Through Partnerships*. New York, New York: Tauris Academic Studies, 2009.

Swanson, Peter. *Water.: The Drop of Life*. Minnetonka, Minnesota: NorthWord Press, 2001.

Taliani, Alberto. *Brazil: The Earth Greenery*. Vercelli, Italy: White Star, S.p.A, 2006.

Temas Blog, The. "Inequities in Water and Sanitation Services in Argentina." <http://www.temasactuales.com/temasblog/health-issues/inequities-in-water-and-sanitation-services-in-argentina/> [accessed November 24, 2009].

Tibbetts, John. "Septic Suburbia: Too Many Tanks Increases Disease". *Environmental Health Perspectives (NIEHS)* 111, No. 5 [May, 2003]: A292-A293.

Torras, Mariano. *Welfare, Inequality, and Resource Depletion: A Reassessment of Brazilian Economic Growth*. Burlington, Vermont: Ashgate Publishing Company, 2003.

Tortajada, Cecilia, Olli Varis, Jan Lundqvist and Asit K. Biswas, eds. *Water Management for Large Cities*. New York, New York: Routledge, 2006.

Tudo Na Hora. "O Portal de Noticias de Alagoas." <http://www.tudonahora.com.br/> [accessed November 24, 2009].

UNESCO. "Water: A Shared Responsibility – The UN World Water Development Report 2." Executive Summary: March 2006.

UNICEF – Tajikistan. "Life-saving hygiene programme for students in rural Tajikistan." http://www.unicef.org/infobycountry/Tajikistan_43161.html [accessed November 24, 2009].

UNICEF, "Water, Sanitation and Hygiene Annual Report 2007." WES Section Programme Division. New York, 2007.

United Nations. "General Comment No. 15 (2002), the Right to Water (arts. 11 and 12) of the International Covenant on Economic, Social and Cultural Rights, January 20, 2003."

[http://www.unhchr.ch/tbs/doc.nsf/0/a5458d1d1bbd713fc1256cc400389e94/\\$FILE/G0340229.pdf](http://www.unhchr.ch/tbs/doc.nsf/0/a5458d1d1bbd713fc1256cc400389e94/$FILE/G0340229.pdf) [accessed May 6, 2007]

University of Kentucky: College of Agriculture. "Basic Water Education Publications and Resources." <http://www.ca.uky.edu/enri/bwe.htm> [accessed November 24, 2009].

University of Kentucky: Cooperative Extension Service. "Water Pollution from Sewage – How Can it Affect My Health?" <http://www.ca.uky.edu/enri/PUBS/enri404revised.pdf> [accessed November 24, 2009].

UN News Center. "Despite progress, over 2 billion people lack access to improved sanitation."

<http://www.un.org/apps/news/story.asp?NewsID=27408&Cr=water&Cr1=sanitation&Kw1=sanitation&Kw2=&Kw3=> [accessed November 24, 2009].

U.S. Environmental Protection Agency. "A Homeowners Guide to Septic Systems." http://www.epa.gov/owm/septic/pubs/homeowner_guide_long.pdf [accessed November 24, 2009].

U.S. Environmental Protection Agency. *2008 Report On The Environment: Highlights Of National Trends*. EPA, 2008.

U.S. Environmental Protection Agency – Agriculture. "Clean Water Act (CWA)." <http://www.epa.gov/oecaagct/lcwa.html> [accessed November 24, 2009].

Utton, Albert E. and Ludwik Teclaff, eds. *Water in a Developing World: The Management of a Critical Resource*. Boulder, Colorado: Westview Press, 1978.

Vilas, Carlos M. "Water Privatization in Buenos Aires." *NACLA Report on the Americas* 38 no. 1 [Jul/Aug 2004]: 34.

Vinod, Thomas. *From Inside Brazil: Development in a Land of Contrasts*. Palo Alto, California: Stanford University Press and Washington, DC: The World Bank, 2006.

Virginia Department of Health. "Division of Onsite Sewage and Water Systems." <http://www.vdh.virginia.gov/EnvironmentalHealth/Onsite/index.htm> [accessed November 24, 2009].

Wade, Peter. *Race and Ethnicity in Latin America*. Chicago, Illinois: Pluto Press, 1997.

Wagner, Travis. *In Our Backyard: A Guide to Understanding Pollution and Its Effects*. New York, New York: Van Nostrand Reinhold, 1994.

Ward, Diane Raines. *Water Wars: Drought, Flood, Folly, and the Politics of Thirst*. New York, New York: Penguin Books, 2002.

Washington Post, The. "Poverty, Tendency to Self-Medicate Help Drive Up Flu Deaths in Mexico." <http://www.washingtonpost.com/wp-dyn/content/article/2009/05/04/AR2009050403755.html?referrer=emailarticle> [accessed November 24, 2009].

Washington Post, The. "Youth Torn Between Gangs and the Government." <http://www.washingtonpost.com/wp-srv/world/specials/favelas/handholding.html> [accessed November 24, 2009].

We Home Inspect. "Use and Care of Septic Systems." http://wehomeinspect.com/septic_systems.htm [accessed November 24, 2009].

Weyland, Kurt. *Democracy Without Euity: Failures Of Reform in Brazil*. Pittsburgh, Pennsylvania: University of Pittsburgh Press, 1996.

Wood, Charles H. and Bryan R. Roberts, eds. *Rethinking Development in Latin America*. University Park, Pennsylvania: University of Pennsylvania Press, 2005.

World Bank. *Brazil: An Interim Assessment of Rural Development Programs for the Northeast*. Washington D.C.: The World Bank, 1983.

World Bank. *A Guide to The World Bank*. Washington, DC: The World Bank, 2007.

World Health Organization. *The Right to Water*. Geneva, Switzerland: The World Health Organization, 2003.

Young, Robert A. *Water Management Options For Ceara And Piaui, Brazil In The Prospect Of Global Changes*, 1998.

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