

Glyn Powell
Starmont High School
Strawberry Point, Iowa
Swaziland, Factor 10

The Kingdom of Swaziland: Improving access to safe potable water; with education of Sanitation to reduce disease

Within the busy continent of Africa, a small lush country is just a speck on the map northeast of the country South Africa. A magnificent, albeit small, country is the landlocked Kingdom of Swaziland. Swaziland is surrounded by an exquisite mountain range on its east and west sides and filled with African Savannas, Sprawling forests, and dazzling deserts. Within all this beauty we find the cruel truth of poverty nestled below.

Swaziland is home to approximately 1,370,000 people (CIA); this estimate is probably not accurate on account of excessive mortality rates. Mortality happens because of disease, malnutrition, and dehydration; the life expectancy of the population is 49 years, and is the fourth from the bottom in world averages. This epidemic affects the population within the country at colossal rates, especially the average citizen. It also has the highest rate of HIV/AIDS in the world, at 26% of the population. People in rural Swaziland generally have large families with four or more children; this creates health and nutrition issues as it is difficult to maintain adequate amounts of food, water, and medicines with the poverty rate. Additionally, hepatitis and malaria are common; numerous families have members that are infected with these diseases. Due to the amount of contaminated water in Swaziland many do not recover from these diseases, likewise the medical treatment within the country is very limited.

The backbone of Swaziland is subsistence agriculture; Swazi people grow food crops with an average area of land for each family only 1.3 hectares, or 3.2 acres. (FAO) Maize, sorghum, potatoes, sweet potatoes, soybeans, and cassava are the crops generally grown in Swaziland. Some of these crops are irrigated by hand, and others struggle because rainfall is not spread out across the year evenly. While people eat food uncooked, cooking food is a common practice. To cook over the fire in Swaziland fashion is to have water to boil the food in, or to put water with cassava flour to create a bread-like substance. Though there are many river systems and many borehole-wells dug throughout Swaziland, many of them are unusable because of seepage from raw human sewage and non-point sources of contamination. This means that people need to walk miles each day to get enough buckets of water so that they may use the water. Presently there are over 3,000 of these wells in rural Swaziland, but the vast majority of the wells are unsafe. In many instances as the people will walk to the spring, watering hole, or to the back waters to find to their dismay that there are more people at the spot than available potable water. In other cases people may wait for hours for the water to come to the surface. (Swazi Companions) On account of these worsening situations the desired outcome for Swaziland is to increase availability and access to safe, potable water; and to reduce disease from water and food borne bacteria through education regarding sanitation and hygiene.

With in Swaziland there are four major states, or regions. Hhohho is in the north, Manzini is in the Center, Shiselweini is in the south, and Lubombo is in the east. The different areas receive different amounts of rainfall, usually between October and March. The most arid region, in the area of Lubombo, receives between 55 and 85 cm, or 21 to 33 inches of rain each year. (Aquastat) This means that the area is a bit dryer than Iowa, which receives 32 to 34 inches per year. Given this amount of rain, it's surprising to a casual observer that Swaziland has a water problem. The problem lies in the high amount of rural population (about 76%) coupled with a lack of adequate sanitation. Almost 60% of the rural people have a pit latrine. Depending on the depth of the latrine hole, sewage can seep into the ground water. Estimates suggest that up to 60% of the water in rural areas is contaminated by human or animal

waste. This leads to outbreaks of disease, including diarrhea from cholera, dysentery. (Aquastat) The rate of infant mortality in Swaziland is huge, at more than 6% of the live births, due to the fact that children are especially vulnerable and can die within a day of the onset of the disease.

Another distinct problem in the water supply is a type of parasite called bilharzia, found in snails and transmitted to humans to complete the life cycle. This parasite lives in the intestines, when in humans causing anemia. When the infection becomes active, it is called schistosomiasis, and especially affects children in tropical climates, scarring internal organs. (Carter Center) For people already sick with other diseases, or malnutrition this is a significant problem. The Shiselweini and part of the Lubombo province has the biggest potential for this infection, because the water in the south is slower-moving or stagnant. Children or adults infected with these parasites may have stunted growth, and may never receive treatment to eradicate the problem, correspondingly shortening their life spans. Other diseases only strike at certain times in the year such as malaria. Malaria is transmitted by infected mosquitoes, causing illness on a seasonal basis.

Swaziland is a monarchy, ruled by King Muswati III; the prime minister is Prime Minister Barnabas Sibusiso Dlamini. Under this absolute monarchy, the aforementioned four regions are sub divisions of the government, underneath them there are 11 municipal governments, then 55 tinkhundla (traditional law centers). (U.S Department of State) Knowing how the actual government is set up is essential, this is because within each region King Muswati appoints the “managers”. The managers then appoint people underneath them to do different jobs. Each region is responsible for its own water safety, but there is a lack of involvement and financial support to maintain clean wells and provide a network of national sewage lagoons or sanitation services. Throughout the country, more than 3,000 wells have been drilled since 1986. Some of these are simply bore holes in the ground with a cement or wooden cover, and people pull up the water in buckets, much as we did in America 150 years ago. Unfortunately, there is no trained support team that is paid to maintain and fix the broken wells. Some estimates suggest that up to 90% of these wells are in need of repair. (WASH Africa)

Though there are rivers throughout Swaziland, they are used for multiple purposes, including animal watering, clothing washing, bathing, and gathering water for people to drink. This multi-use is common, with the north part of the country tapping the Komati and Lomati river systems, the center part of the country tapping the Usuthu river, and the South part of the country, known as the Shiselweini region, using the water in the Mbuluzi and Ngwavuma rivers. (FAO) This is also a huge source of infection and contamination. Especially when people lack education, they may not sanitize the water before using it for household requirements. And if they have an open wound, parasites from the water are easily able to get into their bloodstream and cause disease, making the mere act of gathering water a potentially dangerous activity.

A small percentage of farmers irrigate with water to raise the maize to help keep their crops alive, especially in the areas that are savannas, especially in the regions of Manzini and Shiselweini. Much of this water comes from the rivers, but if the water is already stagnant, as can happen in Shiselweini and Lubombo, problems that are hidden, like a sewage spill, may not be noticed. (IWA)

There is a vast amount of groundwater in Swaziland, and only 10% of it has been tapped, meaning there is a large potential for more water being available, if we can provide the system that will keep it in working order. The majority of Swaziland’s problem could be solved by first getting the pumps in working order and providing regular maintenance; this is an economic investment issue. The second set of conditions is much more difficult to maintain, because it requires a change in habits. Specifically, it means the education of people on keeping their refuse away from water so that the water can remain sanitary. It also requires that a system of pumping for pit latrines, and latrines made with a concrete pit

below be constructed and maintained. This requires education, and must be incorporated into the Swaziland outlook over time. Though the system of education in Swaziland is varied, most people by age fifteen have received their primary education; themselves being able to read, write, and do basic mathematics.

Planning for the future is one of the goals of the IWA, or International Water Association. Their Sanitation 21 report focuses on the Millennium Development Goals of the United Nations, and provides a framework for proper hygiene development in third world countries. Specifically, it talks about the need to identify people of influence on local, regional, and national levels, and to use the influence of these leaders to help develop the solution and implement the idea into the local area, district, or the country as a whole. This could include a system of sanitation pumping systems or lagoons, a repair organization to maintain groundwater wells, and an educational effort to talk about the need for hand-washing and water sterilization before use. Additionally, enough water must be available so people aren't washing clothing or bathing in contaminated river sources. (IWA)

The challenges for Swaziland are immense. For one thing, having the highest rate of HIV/AIDS in the world has meant that over 125,000 children have lost at least one parent to AIDS (Young Heroes Project). More than 15,000 households have children trying to raise children. This means that the need for education is immediate, and the solutions must also be immediate. Waiting for a system to change or develop is not an option for the kids. This is where relief projects come in. There are a variety of water projects across Africa, all aiming for different goals. Some build wells, others build sanitary systems, and some make table top purifiers using a variety of methods. The question "What project is the best?" is one that is commonly asked. That point can be debated for days, but in a personal connection I have learned about table top chlorinators through missions other people have done in my church.

Look at the ministry provided to Swaziland by the Episcopal Diocese of Iowa, known as the Swaziland Safe Water Ministry. Realizing that the problems include access to clean water and education, the Diocese has worked with grants and volunteers to have a "grow your own" concept. The Iowa Diocese, and in particular, Christ Church in Cedar Rapids, partners with the Swazi Neighborhood Care Point system. This system gives basic health care, food, and some education to Swazi orphans and children. (Christ Episcopal) These Care Points build trust, and have allowed volunteers to identify issues and areas where concentrated efforts are needed. Table top chlorinators were brought to the area in 2008 by this Diocese Ministry. The goal here is to make certain that the table top units stay working, as a result of the Diocese's effort there is a training program to have technicians that are Swaziland native people. The people in the ministry show the locals how to build their own table top chlorinators using simple filters and an electrode system connected to solar panels. The goal is to have the Swazi people as independent as possible in these areas. This means that raw materials are brought over to Swaziland from the U.S., or money is sent to purchase raw materials. Technicians will assemble the units, move them out to needed locations and repair them through the Care Point network connections. Subsequently the water is purified; it can safely be used for cooking, drinking, and washing. Many of the demonstrations and teaching about this technology was in remote areas that didn't have electricity, so the solar panels were a western addition to the society. (Swazi Companions)

To build a table top chlorinator requires a basic filter and a chlorine source, like bleach. Depending on the filter used, chlorinators can run from \$5 to \$200 dollars. The challenge in Swaziland is to find the PVC pipe and cotton and to make the filter and make certain that the chlorine is at the right percentage to create sterile, but drinkable water. There are many methods to do this with ready-made filters, but the difficulty is in locating replacement parts. The Iowa project is unique in the fact that it showed how to make chlorinators, including the filters, from scratch.(Swazi Companions) Because no government agency was available to provide trained workers, the Episcopal Church mission selected the workers,

trained the workers, and provided funds for them to share the knowledge of chlorinators with others across Swaziland. (Swazi Companions)

The main reason for the table top chlorinators is to help with human exhaustion. Anyone who travels many miles per day to get water would already be weary, and then the people have to boil the water and cool it. Boiling the water removes bacteria or debris, but it is easy for the people to become lazy or inconsistent about treating water by boiling. Orphans in particular may not have the knowledge of the dangers that face them when the water is not properly treated. Searching and gathering of water may be weakening the people, making the body more susceptible to disease. Additionally, it may be difficult to find available wood in an area where many people dwell, so it becomes difficult to boil the water.

Some chlorination systems simply filter the water, treat it with a known amount of a bleach system, and set it to sanitize in clear plastic bottles in the sunlight for a few days. The problem with this is that it is difficult to maintain clean bottles, and the time factor is a disadvantage. People also may skimp on the bleach to help 'stretch' a resource. The ultimate solution is a series of working pumps, rather than boreholes, but that will not be a viable system until we address the missing piece in rural areas. The missing piece in all of these systems is hygiene and sanitation. People are not necessarily accustomed to cleaning their hands after working with animals, the sick, or keeping the latrines at an acceptable distance from the water source. Not being taught to bathe or sponge wash in a space that is separate from animal waste products. People who wash their clothes in the river are unaware that they may be picking up parasites or bacteria on their clothes and in any open sores. The solution to this is education. In addition to basic skills like reading, writing and figuring, young people need education on the root causes of dysentery, malaria, and bilharzia. In the same way that Jimmy Carter's initiative took education on as the way to get rid of the guinea worm and make water safer across Africa, education and homemade filters can help enhance the knowledge of the safety needed when handling water or making chlorinators. (Carter Center)

The future of Swaziland is dependent on the education of sanitation, hygiene, and decreasing the infant mortality rate and HIV/AIDS infection rates. On account of the slow pace of reform and education, volunteer organizations and missions will continue to be needed in the foreseeable future to help Swaziland reach its potential.

Works Cited

- Africa::Swaziland*. Central Intelligence Agency. Web. 18 Aug. 2011
<<https://www.cia.gov/library/publications/the-world-factbook/geos/wz.html#top>>
- Background Note: Swaziland*. U.S. Department of State. Web. 18 Aug. 2011
<http://www.state.gov/r/pa/ei/bgn/2841.htm>
- Be a Hero to the Orphans of Swaziland*. Young Heros. Web. 18 Aug. 2011
<http://www.youngheroes.org.sz/index_home.php>
- Geography, Climate, and population of Swaziland*. Aquastat. Web. 18 Aug. 2011
<<http://www.fao.org/nr/water/aquastat/countries/swaziland/index.stm>>
- Improving Food Security in Vulnerable Households in Swaziland*. Web. 18 Aug. 2011.
<<http://fex.enonline.net/29/foodsecurity.aspx>>.
- Schistoamiasis Control Program*. Carter Center. Web. 18 Aug. 2011
<<http://www.cartercenter.org/health/schistosomiasis/index.html>>
- Swazi Companions of Iowa*. Mission Team~Iowa. Web. 18 Aug. 2011.
<<http://companionsofswaziland.blogspot.com/2009/09/swaziland-safe-water-ministry-update.html>>
- Swaziland*. World Food Programme. Web. 18 Aug. 2011
<<http://www.wfp.org/countries/Swaziland/Overview>>
- Swaziland Companions*. Christ Episcopal Church. Web. 18 Aug. 2011
<<http://www.christepiscopal.org/Swaziland.html>>
- Swaziland: More boreholes, no water*, WASH Africa. Web. 18 Aug. 2011
<<http://washafrika.wordpress.com/2009/11/06/swaziland-more-boreholes-no-water/>>
- Tools for water Use and Demand in South Africa*. E.L. Tate. Web. 18 Aug. 2011
<<http://www.wmo.int/pages/prog/hwrp/documents/TD73.pdf>>
- Water in Crisis-Spotlight on Swaziland*. Lindsay Boyce. Web. 18 Aug. 2011
<<http://thewaterproject.org/water-in-crisis-swaziland.php>>
- Water Resources*. Swaziland Review. Web. 18 Aug. 2011
<<http://swazilandreview.com/water.html>>