

Lauren Fisher
Chicago High School for Agricultural Sciences
Chicago, Illinois

Providing Clean Water to Urban Farms to Ensure the Safe Production of Crops and Promote the Economy in Ghana

We as Americans, tend to take food safety for granted. We expect our fresh foods to be safe and free from dangerous chemicals and unsanitary handling. Recently, we have seen where this is not necessarily the standard. Many people across the country have become ill or in worst cases, have died due to eating lettuce, tomatoes or spinach contaminated with E-coli. It is a serious problem. However, we only seem to be inconvenienced if the tomatoes or spinach are out of stock at the grocery store or are not available to go on our favorite sandwich at Subway. If we do get sick, many of us have access to a doctor for medication. Sooner or later, the outrage dies down and life is back to normal until the next food recall. For the most part, the U.S. has adequate sanitary processes to protect our food supply. This may not be the case in other nations.

For years, Africa has been considered one of the poorest continents. Ironically, it is rich in natural resources. For instance, diamonds, gold, uranium and other rare ground metals are in great demand in the world market. Also, petroleum and gas, valuable kinds of wood, agricultural products such as cotton, coffee, cocoa, and exotic fruits can be found throughout the continent. Coastal waters help to bring in fish and other types of seafood to the land. In contrast, many Africans can't benefit from these resources due to the uneven distribution of goods and services throughout the continent.

Specifically in Ghana, located in Western Africa, poverty levels are at extremes. In the capital city of Accra, the poverty level is only 2%. While in more rural areas this level can range from 70% - 90%. Ghana is approximately 92,000 square miles, comparable to the state of Oregon, and has a population of 23 million people. Some general statistics of Ghana help to provide a snapshot of the country's current state. For example, the life expectancy is only 58 - 60 years of age. The literacy rate is 58%. In Ghana, only 64% of the country's children receive even a primary education. The average income in U.S. dollars is \$520; nearly half of Ghanaians live on less than a dollar a day. Infant mortality has been recorded as 51 deaths out of 1,000 live births. Access to clean water is available to 62% -70% percent in urban areas and only 35% -40% percent in rural areas. These few demographics show the desperation felt by many people throughout the country.

Due to the hot climate, water evaporation occurs quickly. Water evaporates because of thermal energy causing their molecules to move away from each other and because of this the amount of water is dwindling. Thankfully, Ghana has sources of water. However, the problem is with treating the water to make it safe for human consumption. By the current lack of clean drinking water in Ghana, health has become a serious concern. Poor water quality contributes to 70% of the diseases in the country. With dirty water how can the people grow crops and stay healthy? With no fresh water how do we quench Ghana's thirst?

The poor urban families in Ghana are experiencing the impact of poor water quality firsthand. Generally, a typical family consists of multiple generations, including the old, the middle-aged and the young. The composition and makeup of the family include, the mother and father, the children, and the grandparents, in some cases even the great grandparents. The typical diet in these homes includes roots and tubers such as yams, cassava, and maize also known as corn, plantains and rice. Fish is common but meat is considered for rich people. Children in poor families attend public schools, which may be several miles from their home. The average amount of time it takes to complete their education is 20 years.

In these homes, agriculture is the main source of income although it may not be the only source. The size of an urban farm typically ranges from 0.1 - 0.2 hectare which is Ghana's unit of measurement for acres. Roles within the family are clearly defined. Men use farming to generate income and women use the produce to feed their families. The majority of the farmers are between 20-40 years old. Farming is an extremely strenuous job in Ghana where modern equipment is scarce. 90% of farmers are men and the majority use watering cans to irrigate their crops. Men are best suited for this job because there may be a large distance between the home and the actual farm plot. Men are needed to carry the heavy watering cans to the fields.

Women help the men in carrying buckets of water, known as 'head-loads'. They are also needed to harvest fruits and vegetables. During harvest season, all family members are expected to help. Primarily, however, the woman of the household is in charge of food preparation at home and selling the harvested food at the city markets. Successful urban farms mean fresh produce is available to the public. If this is done within the city limits, transportation costs are lower to bring the produce to the markets, and as a result, urban farmers enjoy higher levels of profit. Also, sellers are able to provide a variety of fruits and vegetables at less expensive prices to these families. Lastly, the small eating places known as "chop-bars" would benefit from more sanitary wastewater conditions because they would have fresh produce to cook with.

Agriculture is a major contributor to Ghana's economy. It contributes to 36% of the gross domestic product and employs 60% of the labor force. Sanitation and wastewater generation plays an important part in the success of Ghana's agricultural conditions. About 63% of Ghana's population has sanitation coverage. The collection and disposal of wastewater is done by using underground tanks, sewage systems and public toilets. However, only less than 5% of households in Accra are connected to piped sewage systems and 21% use floodwater drains or gutters as open sewers that end up in the city's water supply. Over a quarter of homes in Ghana have no toilet facilities. Water closets, also known as out houses, are considered modern lavatories, but only 9% of the households have them. These examples show that the majority of the urban population does not have an adequate way to manage wastewater. Not only does this impact the urban family's income but also the availability of food.

There are wastewater treatment plants around Accra. However, less than 25% are functional. This is because a small percentage of the city's wastewater is actually collected for treatment. Also, treatment ponds are filled to their capacity and fecal sludge overflows to nearby rivers. Unfortunately, the current sewage networks are not capable to keep up with the high rates of urbanization. There are also cases where these farmers use wastewater directly from drains and broken sewers, especially during the dry season, which is from November to February. As a result urban families have to use this polluted water to irrigate crops and refresh produce at markets. This is where the food safety issue begins. This is bad for the crops and has been a common factor in diseases. Not only is urban farming affected by this poor wastewater treatment, the family's income is also negatively impacted. Most produce sellers in the city markets use this untreated wastewater on their crops. Having a clean water supply means safer and more abundant amounts of fresh fruits and vegetables to sell at the markets.

However, over the years, the economy has been negatively impacted by agriculture in Ghana. There were drops in prices for goods and services. Farmers have also had to deal with rising costs of materials. For example, because of the cedi, which is Ghana's unit of currency, being too high in value, fertilizer and farming equipment is expensive. There has also been a downfall in food production, with a decrease in the food sufficiency ratio from 83% to 71%. This means there is not enough food for everyone. Things got even worse when drought conditions hit the region. Food shortages were becoming common throughout the country, and export crop production decreased dramatically from a lack of hydration.

For urban farmers that depend on water there are a few methods that have been used to successfully retrieve and conserve fresh water to improve the lives of the typical urban family. One way is well drilling which consists of drilling a hole in the ground to extract the natural resource, in this case groundwater. Well drilling has been the objective for many organizations trying to help the cause in Ghana and Africa as a whole. It will help Ghana be able to have access to fresh ground water. However, well drilling can be very pricy due to the equipment and the labor needed to for the drilling the process. Drilling can cost up to 12 dollars per foot.

Another method to increase availability and conservation of fresh water is to create reservoirs. A reservoir is a large tank of a natural or an artificial lake used for collecting and storing water for human consumption or agricultural use. Reservoirs are constructed by building a sturdy dam, usually with concrete, rock, or a mixture across a river or stream. After the dam is finished, the stream fills up the reservoir. The term reservoir can also be used to describe an underground reservoir like an oil or water well.

Surprisingly, Ghana has already built one of the largest reservoirs in the world, Lake Volta in 1965. It is a major fishing ground and provides irrigation water for farmlands in the Accra plains. This reservoir generates enough hydroelectric power to supply most of Ghana's electricity needs. This has aided in helping Ghana's people to retrieve fresh water for agricultural productivity. Again, this is a costly project and resources are not widely available, especially during this period of our global economy.

Another option is dam building. In this case, a barrier is set up to lock in water or underground streams for consumption in a particular area. Some other uses for dams are for power generation, like hydroelectric power. Dams provide water supply and help to stabilize water for irrigation. They also prevent against floods and provide land reclamation, which is when a dam is used to prevent the entry of water to an area that would be submerged without the dams' protection, allowing its reclamation for human use. Another use is for water diversion and lastly for beautiful scenery and recreation.

Another way to improve the safety of agricultural production in urban areas is to recognize those farmers who use sanitary practices in their farming activities. Educating the farmers in safe crop preparation would be beneficial in the long run. Also, the creation of health legislation to regularly analyze the levels of water contamination and to enforce these laws when they are broken would help in monitoring clean water usage. However, it is a big expense to properly train staff who would travel to these farmers to instruct them on safe agricultural processes and to have adequate laboratory and inspection personnel to assess the water quality.

There are many organizations that have been working to help with these poor conditions throughout Africa. Celebrities, churches, not-for-profit organizations and private companies have gotten involved to restore "the motherland". Africa's poverty, major illnesses and conflicts have inspired famous entertainers and celebrities such as George Clooney, Bono, Bob Geldof, Alicia Keys and Don Cheadle. Benefit concerts such as Live 8 in July 2005, hosted ten concerts in unison worldwide to help raise awareness and money for Africa's problems. Although tickets were sold for free, people still made an effort to donate as generously as they could. 40,000 pounds, which is 64,636.02 U.S dollars, were raised in a period of just five minutes. Shows were featured in the United States as well as other places throughout the world such as the United Kingdom, France, Italy, Canada, Japan, South Africa, and the Russian Federation. Music of many different genres was performed and an estimated 3 billion people attended the international music event.

Many churches have made plans to help Ghana. My church in particular, New Faith Baptist Church International, has organized several trips to Ghana in which members have volunteered their time

to dig water wells. This has been a tremendous help to rural and urban communities by supplying the families with clean water. Now, it is not a hardship for children to bathe for school or for mothers to prepare wholesome meals for their families. The Joseph Assignment, as our mission is called, has drawn out a plan to help Ghana's poverty stricken country. In addition to the clean water projects, we donate our time and money to raise money for school supplies and sponsoring orphans.

In conclusion, we Americans are very fortunate to live the lives that we do. We have been lucky enough to not have to worry about our water and food supply on a day to day basis. We tend to take the little things for granted. People in Ghana dream of living the life that we live in the United States. Yet, we are so careless with our country's resources. Next time you take a sip of water from a drinking fountain or turn on the garden hose to water your backyard plants and flowerpots, just think of the situation that many of the people in Ghana struggle with everyday.

My research made me reflect on the safeguards that are in place in the U.S. & how we take them for granted. We are lucky to have technology available to treat our wastewater; government agencies to ensure food safety; and resources to communicate to people when food has been contaminated and plans to correct the damage. I am now more sensitive to the need for clean water in other countries, especially Africa. Now, when my church reports on conditions in Ghana and asks for help I am more aware of why the need is so great. It makes me consider donating more freely of my money and time to help with their efforts to build or sponsor wells dug in these various communities.

Works Cited

Agricultural Use of Untreated Urban Wastewater in Ghana
http://www.idrc.ca/fr/ev-68337-201-DO_TOPIC.html.

Water and Food Security
<http://www.fao.org/DOCREP/x0262e/x262e01.htm>.

Water Profile of Ghana
http://www.eoearth.org/article/Water_profile_of_Ghana.

Lyman, N. Princeton and Dorff, Patricia. Beyond Humanitarianism. Council on Foreign Relations / Foreign Affairs, USA, 2007.

World Vision: Ghana
<http://www.worldvision.org/content.nsf/sponsor/sponsor-ghana>.

Food Needs and Population
<http://www.fao.org/DOCREP/x262e/x0262e23.htm>.