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Ghana, Factor 9: Water & Sanitation

## **Ghana: How to Help Sanitize a Country in Need**

All around the world people are concerned with what they think is the next “life – ending crisis”. For some this means figuring out how to pay for the next smartphone, expensive coffees, and overpriced branded shoes, but for others it means figuring out how to get clean water, more food for their families, and medical attention. Anymore it seems that the world is a filter; sifting out the things that we do not put an importance on, such as having access to clean running water, and keeping the things that we wish we had, new clothes, the latest technology, etc. If you were to stop and look at how others are forced to live, many would reconsider complaining about not having an iPad or lattes from Starbucks, and start to realize how much we take for granted, while others are praying for the chance at just one sip of clean water.

### 1. Ghana Life:

The average family contains about four people, all of which know, or will learn how to farm at an early age. The whole family, usually headed by men rather than women, is very small in size both in height and weight due to the frequent malnutrition and disease. With a total population of approximately twenty-eight million people, the availability for a balanced diet is very rare. Families usually only have whatever crops they harvested to eat or very little grains such as rice or maize that is shared in the community.

Most people live in a bungalow or hut due to availability, and the typical house is small. Homes are usually constructed out of thick mud and the occasional cement blocks, with thin metal roofing. Most only contain a kitchen-like area, a space for sleeping, a possible other area room, and if they are lucky electricity. Notice that there is not access to a flushing toilet or clean, running water. Due to lack of sanitation, illness tends to spread like wildfire, especially with young children and the elderly. Although communities have doctors, most people cannot get the help they need due to availability of sources. Most doctors do not have the equipment or materials necessary to treat not only though illnesses, but also for the large amount of people that need said treatment (Bediako, 2008, pg. 64).

As far as education goes, Ghana requires that all children go to school from age 3 to 17, and recommends students to go to the equivalent of college from age 18 to 21 (Ghana Embassy, 2016). Although it is required to go to school, attendance rates are low, especially in women. A study done in 2008 by Dr. Grace Bediako, a government statistician, showed that approximately 77.3 percent of all females in Ghana go to school between the ages of 12 and 25. Due to a lack of materials, money, and sanitation, these young ladies take weeks off due to menstrual cycles (Montgomery, 2012). Most of these females are not only going through pain, but they are also missing out on important education since this age range is considered the high school and early college ages, giving young men an advantage academically.

Ghana is broken into three regions, the coastal belt, the forest zone, and the northern savannah. Farming and agriculture practices vary depending on which of the three main regions you live in. However, although the crops are different, a majority of these farms are maintained by child labor, and owned by farmers that are not fully educated on advancements made in the agricultural field.

In the coastal belt most citizens are trained in fishing or small scale farming. The fishing industry has always been one of a significant value, providing as much as 60 percent of consumed animal protein in the country (Fisheries and Aquaculture Department, 2016).

In the forest zone, more than 3.4 million households own a farm or keep livestock (Bediako, 2008). The most common livestock animals raised are sheep, cattle, and goats, due to the dual purpose of milk and meat. These livestock farms are also not the typical farm that we see here in America. Most livestock farmers in Ghana keep their animals in small areas in their backyard or in small pens connected to their homes. These, usually urban, livestock farms are taken care of by the children of the farmer(s) that own them. The majority of farms grow maize, commonly compared to corn, for household or community consumption. Maize is the most abundant crop due to its ability to grow in harsh areas, and its ability to be used in many dishes for humans and livestock to provide a majority of their necessary nutrients. Cocoa beans are also a huge crop in this area due to the global demand for the bean. Cocoa beans are one of Ghana's largest exports, but farmers could still only make around seven hundred and fifty dollars a year for all that they harvest (Our Africa, 2016).

In the northern savannah, most households raise livestock or grow crops that cannot be grown in the forest zone, for example, rice or yams. Much like maize, these crops tend to stay in the community when harvested due to crop sizes. Across the board, farms are about 2.27 hectares (about 4 acres) or smaller (Oppong-Anane, 2006). In comparison, the average American farm is about 434 acres (USDA, 2012), which calculates to about 109 percent larger than farms in Ghana.

## 2. Setbacks:

Agricultural productivity has been low due to the lack of farmable land, new farming technology, lack of agricultural knowledge, and water scarcity or contaminated water. For instance, during a drought or even Ghana's summer season, farmers limit the amount of water they use for their crops, thus being forced to use their family's or community's waste water in order to keep the plants alive. The use of waste water is highly looked down upon due to easy contamination leading to the spreading of pathogens. Sadly, although most farmers are aware of the potential health hazard, many are forced to use the waste water, even though it is not recommended.

## 3. Current water situation:

In Ghana, although only about 3 million out of the 27 million people lack access to safe water, around 23 million people lack access to advanced sanitation, such as flushing toilets (Water.org, 2016). There are also people that have to walk miles a day for only a small bucket of water that they have to use to cook, farm, and wash anything they might need. They have the option to choose what they use the water they gathered for, but they do not get to choose whether or not that said water is sanitized. Within the water are thousands upon thousands of harmful invisible pathogens; microorganisms that spread disease.

The most recent incident of this agriculture barrier comes from Accra, Ghana. Accra is the capital and largest city in Ghana, with a population of approximately 1.9 million people (Antwi-Agyei, 2016). Accra is also a high tourist city due to it containing multiple businesses, an airport, and the main hub for the country's railroad system. While these businesses are great for the country's economy, it is not so good for the surrounding farming area. In 2015, a study was conducted on seven major agricultural sites that use waste water on crops, which include lettuce, onions, and other common salad vegetables. The study concluded that not only did the consumers in the area have knowledge on the use of contaminated water, but they also continued to purchase the products even when they had been proven to contain a strand of E. Coli bacteria, because that was all they had access to or afford (Antwi-Agyei, 2016). The world is evolving quickly, and Ghana, alongside many other developing countries, are struggling to keep up.

Currently there are many programs working to help Ghana receive clean, sanitary water. For example, UNICEF's WASH (Water, Sanitation And Hygiene) program promotes the giving of handwashing and other sanitary materials to the citizens of Ghana. Every year almost 4,000 children die from illnesses, especially pneumonia and diarrhea, thus the program's main goal is to not only give people necessary equipment, but to educate the public of Ghana on easy ways to sanitize water, food, and even themselves.

Working with programs like these will dramatically help the citizens of Ghana, especially women, children, and small farmers (UNICEF, 2016).

For the average home farming, urban family in Ghana, climate volatility and population growth are a huge concern. With an unpredictable climate, it is very difficult to grow the variety of crops that would provide the family with an adequate amount of nutrients. Population is also an issue because if there is not enough food in the community for the population currently, it will be an unbearable challenge to determine how a community is to feed the people with a limited amount of farming space.

#### 4. Possible Solutions:

There is an abundance of ways to help Ghana sanitize water, but many involve materials and funding that Ghana would not be able to afford. For example, electricity, skilled laborers (farmers trained in agriculture), and land to expand on certain projects. One easy way to achieve clean water is via clay filtering. These filters are simply a five-gallon bucket with a clay pot placed inside. After water runs through the secured filter, the water is 99.9% cleaned from bacterium and other viruses that could be potentially pathogenic. The filters cost about fifteen dollars to make, but can sanitize two and a half liters on average every hour, and last for approximately three to five years. They can also be easily cleaned on a daily basis by scrubbing the pot clean, but also most efficiently by placing into boiling water in order to eliminate any remaining pathogens or other microorganisms (Centers for Disease Control and Prevention, 2012). This form of sanitation does not require much training, and any explanation will be able to be comprehended without too much confusion. This method also does not require electricity, pre-learned skills, or a large amount of area, thus eliminating problems that would form issues with other forms of sanitation.

Currently, the Potters for Peace design for ceramic filters are the most commonly implemented by various organization. This is flowerpot shaped filter that can hold about eight to ten liters of water, and sits inside a plastic or ceramic receptacle. Potters for Peace is a US based non-profit that works with local potters to build the filters, as well as working with the government to help establish factories that produce the ceramic filters since 1998. As of today there are two ceramic filter factories that were created via Potters for Peace. One is located in the capital of Ghana, Accra, and the other is located in Tamale. Between the two cities alone, nearly three million people now have access to the filters, along with the other citizens in surrounding areas (Potters for Peace, 2017).

Clay filtering could also help economically. For instance, if a family is to filter roughly twenty liters of water every day, meaning that the filter would be constantly running, the cost per liter treated would be about 0.15 to 0.62 Ghanaian Cedi, roughly 0.034 to 0.14 US cents (Centers for Disease Control and Prevention, 2012). Also, in order to give people from all over Ghana a simple way to get clean water, a large amount of clay pots would need to be made. In order to fill said demand, the government of Ghana could create more jobs by adding factories in all cities, large and small. This way people are receiving safe water while also making enough money to sustain their families.

Other options could include the use of bio-sand filters. These are similar to the clay filters, but go through a much more rigorous sanitizing process, and require less maintenance than most options. Filters can be built out of anything that is non-toxic and water proof, but is most commonly made from a type of concrete. Water is then poured into the system, traveling through a mixture of sand and gravel. After slowly running through the rock system, the water flows through a plastic pipe and collected in a clean water container. These filters have a highest rate of 98.5% of removing bacteria, and 95% of the iron in hazardous water. A helpful factor in the filters is that not only does it require none of the problems stated earlier, electricity, skilled hands, etc., but they also last a long time. Depending on the materials used, most filters will not have to be dismantled and moved, just simply cleaned by disrupting the sand layer via mixing and re-draining before fully filtering again (Dangol, 2013).

Another possible solution could be the expatriation of aquaculture and aquaponics. Aquaponics is the combination of hydroponics, the growing of plants with nutrient solutions rather than soil, and aquaculture, the use of fish to grow crops such as lettuce. In aquaponics, a tank is made to contain the fish at the bottom, and plants on the top. The waste water from the fish filters through the plant system, which is similar to using fertilizers, to give a growth benefit to the plants. After filtering through the plants, the water then returns to the fish tank, providing the fish with clean water and nutrients, thus meaning that feeding the fish is unnecessary (USDA, 2016). In Ghana, the climate and other conditions, especially water temperature, are optimal for growing tilapia, which is the third most common fish type used in aquaculture. Tilapia would be the best fish for Ghana's aquaculture programs due to their high protein content, large size, disease resilience, and quick reproduction (Pioneer, 2016).

One final possible solution would be to directly train locals in basic sanitation of not only themselves, but also of food. Even though there are programs currently trying to help educate the citizens, they have not reached the point to where a wide variety of Ghana's citizens have been educated. Most programs have been focusing on the areas that are in the most critical state, which is great, but it also means that other areas are not being trained, leaving them stuck with unsafe water. The government also needs to be more involved with said organization programs. If the government were to get involved, it would be more likely to reach all of Ghana rather than small areas here and there.

#### 5. Sponsors and other governmental help:

Although not every family in Ghana can afford big water filters, they certainly deserve one. Organizations such as UNICEF's WASH program, Water.org, and the African Ministers' Council on Water, have been encouraged to help directly in Ghana, especially to train the locals first hand.

As mentioned before, UNICEF's WASH program was designed to provide locals with materials that will make sanitizing water easier, as well as teaching them basic sanitary practices. This program works heavily with government in Ghana, and has helped many people in the country (UNICEF, 2013).

Water.org is a similar program in which the main goal is to directly train and educate the locals in Ghana. This program has partnered with other major organizations to build 40 latrine centers in communities all over Ghana, especially in urban areas, giving safe water opportunities to about 3,000 people. Although this number may seem small, it is definitely a step in the right direction (Water.org, 2016).

The African Ministers' Council on Water is in partnership with many of the sponsors from the previous programs, thus teaching around the same skills. Currently they are working alongside UNICEF to reach the Ghanaian government in order to educate the rest of Ghana that has not been a part of certain water and sanitation programs. They are also trying to work with the citizens of Ghana to create new water and sanitation regulations for the country (Water and Sanitation Program, 2011).

Together these programs have grown to help a majority of Ghana, but without funding from different government programs or tax payers they will not be able to continue their work. This means that there is a possibility that Ghana would not have access to not only materials, but also to the proper education. More funding needs to be implemented in order to keep these programs running, and to keep helping the people of Ghana.

#### 6. Conclusion:

In the end, some possible solutions are adequate for Ghana. For example, the filtering systems, both clay and bio-sand, provide the citizens of Ghana with not only a new way to sanitize water at home or in a community, but also with a new source of income. With the clay filters, local artists and potters can keep their trade and use their skills to provide clean water for their family, community, and many more. As for

the bio-sand filters, villages can use materials that are easily accessible as well as affordable. The aquaponics and aquaculture systems would also be a convenient solution for the communities of the coastal belt. With these systems, fish farmers would be able to sell, breed, and use all of their fish for a source of income, protein, and a farming technique for various crops.

Although the programs that have been put in place by different government and national groups provide a solid foundation for the people of Ghana, these solutions do not always train the people in order to make the programs sustainable. This means that should the program lose a funding source, the people of Ghana could suffer the consequences.

All in all, the citizens of Ghana should be trained on the new technology that programs are integrating, as well as being taught starting at a young age about current water and sanitation issues that are affecting their area. For without the power of knowledge and awareness, a brighter future can never become a reality.

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