

Jillian Prouty
Oelwein High School
Oelwein, Iowa, United States
Sierra Leone, Water and Sanitation
Water Crisis in Sierra Leone

In Sierra Leone, they have many issues, with two of the most prominent issues being their water and sanitation of the water. They have a very large number of infant mortality rates. In Sierra Leone, 70% of people live below the poverty line. Found from Water in crisis. (Barton, n.d.). Barton (n.d.) also states that, “the average life expectancy is fifty-six years old.” This is very low, especially when people in America have the ability to live well into their nineties. What would be causing these people in Sierra Leone to have a high death rate along with a very high poverty rate? The water instability and the lack of water sanitation are the two causes. These problems are a result of their climate and weather pattern. 6 months out of the year they get hard and heavy rain with no knowledge of how to collect it. The other 6 months of the year is their dry season. When the dry season does hit, these people have nowhere to store their water that fell from the past 6 months (What is the weather, climate and geography like in Sierra Leone, 2019). As you could imagine in this country, they also don’t have the proper toilets needed for using the restroom, and then disposing of the feces. When this is the case in third world countries, they will dig holes in the ground to use as their restrooms. When it is the rainy season and it floods in Sierra Leone, this then makes the feces spread to their drinking water and to crops where they have a source of their food intake. Thus, causing them to get sick and cause various diseases.

In Sierra Leone, they have a population of 8,089,880 people. With 70% of their people living in poverty, this would be 5,662,916 people living in poverty. When I say poverty, I mean they are extremely poor, and don’t have enough money to buy the essentials to live a good healthy life. Taking a closer look at the different families that live in Sierra Leone would be surprising to some of us. With their housing, they fit about 5 generations, on average, in one household. Some of them live in rural areas, but some of them also live in more of an urban area. It is evenly split at 50% urban and 50% rural. These people who live in more rural areas are farmers who farm on a very little amount of land they own. They try to eat a lot of the things they grow, but they don’t have a high yield of crops in their country due to the different types of weather in Sierra Leone. The family diets consist of sweet potatoes, rice, nuts, beans, fish, chicken, and goat. They also eat a lot of different fruits. Although they can grow some of the food they eat in their communities, they get a lot of their food imported from different countries. (Afs-Usa, n.d.). With the food being imported, the cost of buying that food is too high for some of the people in Sierra Leone. The average salary in Sierra Leone is 5,700,000SLL per month. This is comparable to \$558 in the United States. (Average salary in Sierra Leone, n.d.). Their government is what some would find a little confusing, especially while growing up in America. They have a constitutional republic, which means they elect the president for their country and the legislature to go with them. The republic they have is what causes a democracy, but they are not to the point of having one. Sierra Leone's government has been reported about killing people for something we find to be an average offense in the United States. The government has been accused of killing people in relations to the 2018 election. The police of Sierra Leone have also been accused of killing a young teenage boy due to a peaceful protest of students. In Sierra Leone they have a lot of human rights issues, including the sexual violence against women and young children, female genital mutilation, and criminalization of people with same- sex likings or marriages. These are just a few of the government issues going on in their country. All government information was used from The United States Department of State. (Sierra Leone - United States Department of state., 2020)

The largest problem in Sierra Leone is water quality. It all started with their country's civil war which started in 1990. During this time, they lost a lot of structures, running water, and toilets. Then, they were

hit with the ebola virus that happened in 2014. This caused their health care system to fail. It also highlighted the need for sanitization, safe access to water, and better hygiene. This challenge left 70% of the population in Sierra Leone below the poverty line. The fact that most of them did not have running water would require them to get their water from another source. A lot of them get their water from standing puddles, ponds, rivers, streams, and lakes. When it is the rainy season, which is 6 months out of the year, the land usually floods and all of their water sources mix together. Another problem you would have living there would be the lack of running toilets. They usually will dig a hole for their family and that is where they go to the bathroom. This is a huge problem for their water sources because the feces then mix with what they use as their drinking water. This then causes diseases, and with a bad healthcare system it is very hard for people to seek and receive proper healthcare. This, in turn, results in deaths being a lot higher in Sierra Leone (Hechtner, 2020).

The impact of the water crisis in Sierra Leone is huge. The women and children of Sierra Leone are the people who collect the water for their families. The children and women who collect water have to walk for their water, which takes time out of their day for the children to get an education. These children, and sometimes adults, who are collecting the water usually then get some type of disease from the water they are collecting which could result in death in children. As stated before, when they get a disease, they can't get the proper treatment they need because of their poor healthcare system and government. This results in the death of young children and the average life expectancy to be very low (Barton, n.d.).

One of the main issues with the water crisis in Sierra Leone is that they use the same rivers and streams for their toilet as they do for drinking water. A way we can fix this is by installing latrine toilets in their communities. Latrines are toilets in a sense that they are a toilet-like seat over a hole in the earth. They are inside a communal building that could be available to multiple different families. In the building, there is air ventilation, a vent pipe, and a fly cover over the vent pipe to keep it sanitary. There is also a seat cover over the toilet to lessen smell. There will still be a smell with this option due to the feces and urine not being actually flushed anywhere. Although nothing is being flushed, they need to add water into their pit where the feces and urine end up to help the earth absorb it. The whole building should sit on a piece of cement slab to help make it sturdier. This would especially help the children in these communities. With 1 in 5 females not being in school due to the fact they can't have the proper sanitation after reaching the age of puberty. The males in the community would also benefit from this, with 1 in 6 males not attending school. The males will benefit from this by just having some sort of sanitary toilet for them to use. Even if these toilets are the only ones they get to use throughout their lives, it is still very beneficial to them. With them getting an education and then them getting to use latrines, they will be educated in the school building not only for school specific topics, but for sanitation needs also. All information found from the CDC and the Voss Foundation (Sanitation technology: Ventilated improved pit (vip) latrines, 2012; Toilets & Latrines, 2015). 12.3% of Sierra Leone's schools have basic sanitation in their school system. 99% of the schools in the United States have basic sanitation. Some of the children in Sierra Leone are just too scared to drink the water at school due to how gross looking it is, says UNICEF. (Drinking water, sanitation and hygiene in Schools: GLOBAL baseline report 2018, 2020)

With the many positives of a latrine come many negatives also. Something we all can agree on with the latrine is it isn't going to be the most sanitary option for using the restroom. In the best situation possible, everyone would want to have running water and a flushing toilet, but at this point that is not something that everyone in Sierra Leone can have. The latrine is not going to be the cleanest option out there, but it is still possible to get some type of disease from using the latrine. Most men are concerned that the latrines aren't private enough for them to use. Most women are cautious about the health issues the latrines could cause even though they are supposed to be better. Children are most concerned about the timing when needing to use the restroom. With working in the fields, they are going to have to walk pretty far to get back to one of the latrines. The men, women, and children are all going to have to walk at some point to find a latrine, due to the installation of latrines not being possible to go into each and every

house in Sierra Leone. All information on the cons of latrines taken from the NCBI (Thys et al., 2015). Another great possible solution to the water crisis in Sierra Leone would be the installation of water wells or water pumps. These would be placed in the towns, in a public area. In fact, some of the towns in Sierra Leone already have pumps and wells being installed through the UNICEF program. This program has done a lot throughout the years with Sierra Leone in trying to help them get back onto their feet. Their main goal is to put wells and water pumps in towns and in schools. They feel all children should have access to clean drinking water. They also feel students should not have to take time out of their school day to go walk for water to drink throughout the day. They have rehabilitated a well and pump at a school in Masorie, Sierra Leone, as it states in the article "In Sierra Leone, a restored water well makes school a better place." (Kassaye, 2016). In the article, it also states that 450 people from surrounding towns and their own town come to this well now that it is back to functioning. The kids spend the morning right when they get to school cleaning the pump and cleaning around the well. Since they have rehabilitated this pump, there is more routine hand washing for the kids to learn. In the school, they also have toilets for their children, and use buckets of water for hand washing. 63% of schools in Sierra Leone have access to safe water. Sanitation in schools is lower than 13% due to the fact that they do not know how to wash their hands or they can't wash their hands. Only 23% of schools have functional water supply. UNICEF is supporting 170 schools in their Ebola recovery plan. UNICEF is a great opportunity for students and their parents. With the children being in school, they will be better able to find a suitable job for their futures. They will also learn about sanitation and hygiene and won't take time out of their school day to walk for water (Kassaye, 2016).

The issues you could have with installing a water pump would be the cost of installation. The cost for a well and pump would be around \$8,000 US dollars. If they already had a previous pump and the town just needed it to be updated and taken care of, it would be cheaper. Another problem with the water pump and water well would be the upkeep of it. Someone would have to manage the well to make sure it does not break or get disgusting from being out in the open. With the water pump and water well, some people would still have to walk for their water, especially if you are one who lives in a different town and you are coming to a surrounding town to get your water from the water pump and water well.

Another way to fix the water crisis in Sierra Leone would be to collect the water they do get throughout their rainy season. This might not be the best option out of all of them, but it definitely is still an option. The first option of collecting rainwater to drink would be to use a rain trap. A rain trap is a tarp that is tipped downward into a funnel and then beneath the funnel is a container that the water is collected into. You have to be careful with what fabric you use to funnel the water into the container though because this could cause coloration to the water. Coloring in the water could be harmful to human consumption. The families also might not collect enough water throughout the rainy season to have enough for the dry season. This would require them to have another water source during the dry season.

Dew traps would be another option of collecting the rainwater. For this method you would need an absorbent type of material, such as a t-shirt. You would also need a container of some sort for the water to end up in. To start the dew trap, you take the t-shirt or any other absorbent material, and wipe off a plant that has dew on it. Then, wring out the absorbent material into your container. This wouldn't be the best option because of how time consuming it would take if you were collecting water for a full family. It also wouldn't be a good option because you don't know what is on the plants that could be harmful to humans. To prevent any diseases from happening, you would need to sterilize the water before using it.

Transpiration is a third option for collecting water. This will especially help you in the hot humid weather. The tools you will need to collect the water are a large clear bag, a type of cord or rope, and a tree or bush that has a lot of leaves or is very full. Make sure the tree or bush you pick out has access to direct hot sunlight. First, you need to cover the fully leaved part of the plant with the clear bag. Then, you should pull the branch that is covered towards the ground so the water goes into the bottom of the bag.

You can secure the branch down with the rope and a nearby rock. Next, you wait for the water to be collected into the bottom of the bag and then you'll have your water. The issues with this collection process are you have to wait for the water to be collected, which could take awhile to collect depending on how hot and humid it is outside. Another issue would be that your water is going to probably have some dirt in it and some leafy residue from whatever plant you're collecting it from. (Guide, O., & Guide, 2016)

Galvanized water tanks are something Sierra Leone could use to store their water. For reference, these tanks look a lot like grain bins. These tanks provide the communities water storage of clean or gray water. With weather changes being drastic at some points in the year, water storage is a must. By using these water tanks, this could help their community tremendously. The water tanks can provide water for peoples' homes, businesses, and factories. By using this, they will be saving water by being more conscious of the water usage from the tanks. They are limited to only a certain amount of water and the people in Sierra Leone will be grateful for any amount of water they get. The main uses for these water tanks are for watering a garden, washing clothes, drinking water, or flushing a toilet.

Some of these tanks are used with rainwater harvesting. This would be a way to store rainwater in a safe, secure area. The rainwater would then be used for watering farms and use with livestock. The rainwater could also be used for rinsing off fruits and vegetables. These tanks could be used for long- or short-term use and are a great cost-efficient way to store water. They have many different sizes of water tanks for the communities to choose from. 30,000, 50,000, 75,000-, 100,000-, 250,000-, and 500,000-liter tanks are the sizes that the company ATS sells for now. They have many different shapes for the tanks. You could get the normal cylinder type of tank or they have customizable tanks for communities to choose from. The custom water storage option is best for people who want to run their business, have it for their private home use, people with no access to running water, or people using it for their food productions.

They also provide the option of portable water tanks. These would be a great option for sanitizing and hygiene stations in different locations. These would work great in a school or community setting that doesn't get running water to their town. It would also be good for a community that doesn't get any clean water or has to bathe in a stream, pond, or river. (Codepilot, 2018)

A solution the United States and many other countries have used is a thing called LifeStraw. These are straws that you can drink out of that purify water. When LifeStraw was invented in 1994 it was used to stop guinea worms from polluting drinking water. To stop the worms from getting into the water, they used a mesh net. This didn't stop any other type of diseases from contaminating the water, just the worms. Fast forward to 2005 and LifeStraw evolved from dirty, unsafe drinking water to safe drinking water. In 2011, LifeStraw provided 4 million people in Kenya with safe drinking water through their "Carbon for Water" campaign. Throughout all of the years LifeStraw has been running, they have provided millions of children with LifeStraw for safe drinking water. Also in recent years, LifeStraw has provided people with in-home filtration systems (Our history, n.d.). If they could do something like this for Sierra Leone, it could provide communities with safer water, and also prevent the spread of diseases.

LifeStraw works by using an ultrafiltration filter, which means the filter inside the straw is extremely small in diameter. This then allows the water to pass through the straw without the harmful molecules to pass through. Some other straws use iodine which kills the harmful molecules before they can get to the consumer. When you have a straw that uses either of these methods, the water would be filtered, but it would taste very bad. The LifeStraw company then adds activated carbon to the water to give it a better taste right before it reaches the consumers.

LifeStraw can filter about one liter of water in eight minutes. LifeStraw can also provide people with 1,000 liters before needing to be replaced, this would provide one person with a year's worth of water. In

Sierra Leone they usually get their water in the dry season from the polluted areas, but with LifeStraw this would provide them with the safety and sanitation they need. With LifeStraw donating a lot of their straws to children, they could reach many of them free of cost to the community. (Triton Plumbing, 2016)

The best option for water sanitation in Sierra Leone would be to combine all of these options into one big common idea. By using the latrines for toilets and making sure people in all communities have access to them would be a big help for human feces. Putting in water wells and water pumps would be a great option for schools and towns to use. It would also give students the opportunity to get an education and have clean and safe drinking water. Having a water well and pump would provide the children with sanitization in hand washing after using the latrines that could be installed into their schools. This would help students to learn more about the body and hygiene of the body. With the water pumps and water wells, people would start to bathe themselves. This would also be a great help with hygiene. With collection of water, they would have the chance to have clean and safe drinking water. This isn't the ideal way to get clean water, but with the other options this could be a backup in case a water well and water pump break. LifeStraw would provide people with safe, affordable drinking water if the community water pump and well were to break. The straw can last up to a year so this would give the community the time to fix their water pump and well, or it could even give the community the time to install a new water pump and well.

The water tanks would provide communities with the opportunity to have clean, safe drinking water, as well as clean, safe water for their gardens and crops. This would help with product consumption and also with the diseases being spread from their crops to the consumers. The death rates in children and adults would go down and the life expectancy would go up. This would provide their communities with the stability they need.

UNICEF is a group of people who have already started to help communities with the water pumps and water wells. They restore water pumps and water wells in communities in Sierra Leone who have previously had them but only need to be restored. By doing this, they are single handedly helping the communities with sanitation, hygiene, and health. If they continue to do this with the support of us, people in Sierra Leone will know more about hygiene and sanitation. With the help of UNICEF, the children in Sierra Leone would be able to go to school and get an education. They also would be able to learn more about hygiene and sanitation.

Together UNICEF, ATS, and LifeStraw could provide communities with the safe water they need. UNICEF can provide the communities with the water pumps and wells they need. ATS can provide communities with the storage facilities they need. LifeStraw can provide children with safe and affordable straws. Together we can accomplish the best, and together we can help Sierra Leone.

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