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Ethiopia, Factor 2: Water Scarcity

Ethiopia: A Thirsty Country

Living in a first world country Americans have access to everything we need to survive, and even more to thrive. Americans are very fortunate, but do we ever take even one minute out of our day to think of those who aren't? Many people don't do this, but America and numerous other countries have to face the sad truth that not every country is as fortunate as we are; Ethiopia is one of these countries. They have major political issues, as well as health and food security problems. Ethiopians don't have easy access to the basic necessities needed to live a good, healthy life. We will take a look at Ethiopia as a whole and discover many things that prevent Ethiopians from living as fortunate a life as Americans do. We will look at the day-to-day struggles they face and discover ways to fix these problems.

In order to understand what Ethiopian families need, we need to know what an Ethiopian family looks like (Ethiopian Culture Profile). Ethiopian families usually consist of a father, mother, and up to seven children. In Ethiopia the women of the household are expected to cook, clean, provide water, take care of livestock, and have and take care of children. On top of all of that, they are expected to help with the farming, which includes weeding, winnowing, and moving and storing sheaves (Ezra). With women doing all of that, not much is left for the men to do. Young boys take care of sheep and young girls help their mothers by taking care of siblings and cleaning (Ethiopian Treasures). Women are much more likely to receive a lesser education than men because of all these other duties they have to attend to. They also receive less health benefits and don't have much say in their lives. For women, being poor means many things; undernourished children, less education for children and many more infant deaths (Rural Poverty Portal). Many families belong to the Ethiopian Orthodox Church; however one third of the population practices Islam. To Ethiopians the Orthodox Church is known as Tewahdo, and is one of the oldest Christian bodies in the world. In primary and higher levels of school, Christianity is taught as a part of the curriculum (Encyclopaedia Britannica). However being that many Ethiopians belong to the Orthodox Church they are not allowed to eat meat during certain parts of the year (Encyclopaedia Britannica). This is one reason that food diversity remains low. A typical Ethiopian diet consists of mainly cereals like maize, sorghum, and teff. They also eat tubers and root crops such as potatoes and ensete. Despite having a high livestock population, consumption of animal meat is low; this is more common in small towns and villages. Food lacks diversity in rural areas (Food and Agriculture Organization). Animals with uncloven hoofs and that don't chew cud are avoided by Ethiopians because they are considered "unclean" (Countries and Their Cultures). In rural areas access to health care is unavailable. This is because healthcare is almost nonexistent in Ethiopia (The Earth Institute at Columbia University). However government spending on health care has risen in the past years. Most doctors and nurses reside in Addis Ababa, the capital of Ethiopia, where only 5% of the population lives. The place where doctors are most urgently needed is in the rural areas, and this lack of doctors and nurses is why HIV/AIDS is so prevalent in Ethiopia (Countries and Their Cultures). As we can see Ethiopia is a developing country that has been through many hardships, while the government has identified many issues that affect the population, change is slow.

Economically Ethiopia is one of the poorest nations in the world with a quarter of Ethiopian living on less than one dollar a day (Food and Agriculture Organization). Nineteen point five percent of the 94 million Ethiopians live in urban areas with better access to job opportunities, health care and clean water in relation to rural areas. This compares to the 81.5% of the people living in rural areas with fewer job prospects, little to no health care and unclean water. However, agriculture is very important in Ethiopia economy because it contributes to 47% of the country's gross domestic product (GDP) and 85% of the

country's labor force is involved in agriculture (Central Intelligence Agency). Small farm holders in Ethiopia are among some of the poorest people in the country, but these smallholders produce 95% of the country's agriculture (Rural Poverty Portal). Most of these smallholders produce products like potatoes, sugarcane and coffee. They also own cows, goats and sheep (Central Intelligence Agency). Subsistence farmers farm approximately one hectare or less (around 2.5 acres of land). The major barrier that subsistence farmers face is that they are not allowed to expand (due to government ownership of land) or cannot risk expanding (due to a lack of capital to invest), which has a detrimental effect on the population. These farmers do not produce enough food to feed the population of Ethiopia; not being able to expand farms has a direct impact on the people. Subsistence farmers are primarily looking to produce for themselves and feed their families. The lack of rainfall is a major factor in the rural areas of Ethiopia. These extreme droughts have become more and more frequent and more severe in the past decade. Droughts for Ethiopian farmers could mean prolonged hunger before harvest season for them and their families. Droughts can also kill farmer's livestock and other assets, and can bring on extreme poverty (Rural Poverty Portal). Ethiopian farmers are looking to expand but they fear that if they do they will lose crops and money due to droughts, when in turn can endanger families by increasing the risk of starvation.

Not only does the water scarcity affect how much food a subsistence family can produce to feed themselves, it also affects their health as well. In rural areas 11% of people have access to "adequate sanitary water" and that percentage drops more depending upon location and poverty level. Droughts have allowed many rivers and ponds to dry up (The Water Project). This water can also be contaminated with animal or human waste, and contains disease, as well as high levels of fluoride. Fluoride is a naturally occurring chemical, found in fruits, vegetables, and the atmosphere and also in drinking water. Over 260 million people all over the world consume fluoride through drinking water (1st International Workshop on Fluorosis Prevention and Defluoridation of Water). Fluoride can be used to help prevent tooth decay and help strengthen bones (World Health Organization). In small doses fluoride can be harmless, in fact it can help the body, but water that contains too much fluoride in it can damage the body. Water that contains 0.8-1.2 mg/l of fluoride can help prevent tooth decay and strengthen bones. Above 1.5 mg/l has a much different effect. It can cause fluorosis, a condition where the teeth begin to show signs of pitting, and it also causes deposits in bones. Anything above 10 mg/l can cause crippling skeletal fluorosis; this is a disease that is caused by exposure to excess fluoride. It can cause pain and damage to the bone and joints. Many villages in Ethiopia have water contaminated with fluoride with levels in the 1.5-10 mg/l range (World Health Organization). Some of these levels can be as high as 36.0 mg/l, as found in Abernosa in the Ethiopian Rift Valley. Because these statistics were taken at a given time, this does not account for increased levels during periods of drought. Droughts can cause fluoride levels to rise, so the water the families are getting is higher in fluoride than they are normally exposed to.

As of now the droughts are still very severe so these families don't have access to enough water for the basic necessities for bathing and washing up which can lead to deadly infections. During periods of drought disease is very common and runs throughout small towns and villages. The inadequate water supply is causing many people to die, and the children of Ethiopia are suffering the most. Waterborne illnesses, like diarrhea and cholera, are the leading cause of death in children five and under (The Water Project). Not only is the water unsanitary, but the water isn't close for families to access easily, some families have to walk miles, and for long extended periods of time just to get to a water source. Of these families that have to walk for miles, 20.9% of them indicated that less than 50% of that water they collected contained fluoride. Out of the total sample of families, 45.5% of them had access to nothing but fluoride-free water (Mosler). This means that 55 percent of Ethiopians have access to nothing but fluoride contaminated water. This needs to be improved so that all of the families are getting water fluoride levels within the 0.8-1.2 mg/l range or fluoride free water. Because of the long distances having to be traveled, women are at a particular disadvantage. It is the women's job to walk for the water. They walk for miles and then they have to carry jugs back to their homes that can weigh up to 40 pounds. Ethiopian women leave young children at home alone while they and older siblings collect the water.

Young girls are primarily the most affected by this. Young girls are expected to help mothers with certain chores, like fetching water. For young girls having to walk all day to get to a water source means that they have to miss school, resulting in a lesser education than boys (Water.org). If water was more assessable, girls could stay home and go to school to receive an education just like the boys do.

These droughts have no signs of relief anytime soon. This has a great effect on families in Ethiopia. If these droughts and the lack of access to clean, sanitary, fluoride-free water continues, families in Ethiopia cannot produce enough food to eat, let alone enough to sell and make a profit. They will also continue to lose many of their children to disease. The farmland is drying up and is becoming sandier. Sandy soil doesn't hold as much water as other soil types like clay or a loam soil; this is due to sand having bigger particles causing water to travel through it more easily. This means the plants need more water so they can grow because the plants cannot absorb the water fast enough, allowing a greater amount of wasted water. This sandy soil makes it much harder to farm and makes it harder to survive (The Water Project). This environmental possess, called desertification, has been identified by the government as a major issue facing the country. Along with desertification, other contributing factors to detrimental drought effects on farms are overgrazing of farm lands, soil erosion and poor farm management practices (Central Intelligence Agency). Ethiopian farmers are finding it harder and harder to farm and produce enough for their families to survive.

If we were to improve water availability in Ethiopia, life would dramatically improve for Ethiopians. Subsistence farmers could expand their farm lands and produce more food for their families. Not only could they make enough food to eat, they could produce enough food to sell and make a profit (Rural Poverty Portal). This would allow smallholder farmers to make a small income which would allow families to rise above the poverty line and reduce poverty in the country. Improved water availability would further improve Ethiopian family life. For women they would be able to stay at home instead of traveling all day to reach a water source. For young girls this means attending school and receiving a better education. Having access to clean fluoride-free water would be healthier for families. If the fluoride in the water was at the correct level of 0.8-1.2 mg/l they would have better teeth and bone quality. They would not have to worry about tooth decay or skeletal fluorosis (World Health Organization). The water would be clean and healthy to drink. These are a number of issues that can impact the quality of life in Ethiopia.

After taking a look at Ethiopia it is very clear that the scarcity and cleanliness of water is a major issue that needs to be addressed. This could be one of the most important issues to fix; it is one thing not to have access to any water but it is almost worse to have access to unsanitary, contaminated water. The water that many Ethiopians have access to contains diseases which can kill them faster than dehydration does. Not only will water being more accessible to Ethiopians help their health immensely, it will help their farming system even more. Then Ethiopians can be less prone to diseases, they can have enough food to eat, not be malnourished and they can also make a profit from the food they produce. There are already governmental and private organizations that are trying to alleviate water scarcity and address clean water sources (i.e. drilling wells) but these programs are not addressing the fluoride contamination of water. Alleviating the issue of water scarcity and cleanliness can help lower the poverty level by giving more people food and financial security. However it is detrimental to give them fluoride contaminated water.

The reality about removing fluoride from water is that it is very difficult and expensive. A good effective way of removing fluoride from water is using bone char carbon as a filter. This method is a fairly new one, but it works. Bone char carbon removes up to 50-60 percent of fluoride from water (The Water Exchange). One positive of this method is that many Ethiopian farmers raise livestock, and have access to animal bones. However charring animal bone is a complicated process. It involves heating up animal bone (typically cow bones) to temperatures of 400-500 degrees Celsius in a controlled environment; this is an oxygen-depleted atmosphere (Exposing the Truth You Decide). This is a major drawback because

individual Ethiopian farmers would not have access to this type of equipment or environment. That being said, Ethiopia has a sizable livestock population. Livestock contributes to 11% of the national gross domestic product (GDP) and 24% of agricultural GDP in Ethiopia. Ethiopians raise livestock like cows, sheep, and goats (Central Intelligence Agency). About 80% of smallholder farmers own cattle, 31-38% own sheep, 21-30% own goats (Spatial Analysis of Livestock Production Patterns in Ethiopia). Ethiopia has estimated population of 49 million cattle, 25 million sheep, and 22 million goats (Agricultural Transformation Agency). In 2012 an estimated 70 million dollars was traded in just animal meat (like sheep and goat) to places like United Arab Emirates, and Saudi Arabia. (Observatory of Economics Complexity) Over the past several years livestock production has been increasing. Based on this research, I suggest that we improve the animal production and trading it could then in turn help the water situation as well.

I propose a cooperative (government, local communities, and farmers) be formed to benefit the people of Ethiopia by providing them with a simple resource to remove toxic levels of fluoride from their water themselves. By utilizing the resource of the livestock production in rural areas, the bone char method of filtering fluoride from ground water could be made available to a wider population. Individual Ethiopian farmers, even if they wanted to use the bone char carbon method to filter their water, would not have the resources to char the animal bone correctly (at the 400-500 degrees Celsius requirement in a controlled environment). Because we know that historically changes in agricultural practices are slow to implement, incentive would need to be given to rural farmers to participate. If a co-op provided the butchering service at no or little cost to the farmer, harvested and charred the bones, and then provided bone char back to the farmers for use in water filtration more farmers would be likely to participate. This one small change could dramatically improve life for Ethiopian families; they could have clean healthy water, and live longer, healthier lives.

Now if that issue was resolved, one thing still needs to be fixed in order for this process to work. That issue is getting the water closer to the families. Ethiopian women and young girls still have to walk for miles to get the water. There are many organizations out there that raise money and build wells for small communities, organizations like; Water in Crisis, The Water Project, Miya, Water.org and many, many more. All of which do good things for developing countries like Ethiopia, however the wells that these organizations build for small communities are not permanent. And even though the water they get from these wells is close, it might not necessarily be clean. There is still the fact that farmers do not have enough rainfall for their crops. Ethiopian farmers still cannot expand to produce enough food for the growing population. These farmers have been taught older, traditional methods of farming through the generations, but they have not been taught about new and improved farming methods. If the farmers were educated about drought resistant crops, and proper farming methods, then they could help with food security in Ethiopia. They would know how to properly handle crops in times of drought, and still be able to produce enough food. These are all issues that still need to be addressed.

The issue of water scarcity is compounded by other contributing factors in Ethiopia. Population growth is one of these problems. Currently the social infrastructure and agriculture land cannot support this growing population. This is one of the main reasons that so many people live below the poverty level. The population growth at its current rate negatively affects water scarcity; it's like a circle that just keeps going around and around (Haile). Eighty five percent of Ethiopians rely on subsistence farming for their food, and because of the ongoing droughts farmers simply cannot support the 94.1 million people in Ethiopia. This is one of the major reasons that Ethiopia still relies on emergency food aid (SmartBrief). One step that can help fix this is educating younger generations about family planning. An educational system can be put in place to educate young girls on family planning. The tradition of Ethiopian girls leaving school, getting married young and having children young can be affected, and the population growth would decrease immensely (Haile). The positive outcome of slower population growth would be

smaller family size, which would allow families to rise above the poverty line. This shows that water scarcity is not the only contributing factor in feeding Ethiopia.

The government and communities need to play a role of support in educating the families in small communities about clean water, its relation to health, and producing food for their country. Communities and the government can partner together to address and educate the people about clean water and its relation to health. This can be accomplished by the government targeting the women and young girls, who culturally are responsible for the water supply for the family, by educating them about clean, healthy water. By targeting young girls, we can break the cycle of unhealthy water practices. This can be done in two ways. One option can be sending in an outside party to individual communities and educating everyone on healthy water practices. Another option is setting up an educational program, like the ones in the U.S. about anti-tobacco campaigns (i.e. D.A.R.E.) for young kids in school. The government and communities also needs to show support for smallholder farmers, these farmers are the people that feed their country. Farmers also need to be educated on more efficient farming methods. Ethiopian farmers need to communicate with the government in order to show them what the farms need to expand, how farmers can be supported in times of drought, and what smallholder farmers need to produce more food. The government, which already owns all the land and provides long term leases to tenants (Central Intelligence Agency), can support expansion in the form of increased land leases. This will in turn take away the financial risk factor for expansion as discussed earlier. The Ethiopian government can reassure the farmers that in times of drought there is a safety net in place to secure farms and families. Another step the government can take is educating the farmer on more efficient farming methods so they can produce more food, even in times of drought. The government can help discover what works for typical Ethiopian farms. In many other countries, the U.S. has tried to come in to show the locals how the U.S. farms and the methods we use. Our methods have simply not worked for other countries, due to factors not yet uncovered. So the Ethiopian government could take multiple roads on how they want to proceed. The government can choose to fund their own research into finding new and improved ways for their farmers to farm their land. Or the government could partner with other countries like the U.S or even the U.N. to get help to find better, more efficient ways of farming in Ethiopia. These are ways the government can be the support farmers need. Ethiopia could be a self-sustaining country, if and only if, the smallholder farmers can expand, and this simply cannot happen without government support.

Water is one of the most essential things that humans need, without it the human race would die off. We cannot just stand by and not help countries like Ethiopia that are thirsty. We need to help, we need to educate them and show them that they are not alone. No one needs to be hungry or thirsty in this world. We can make a difference, but when is the human race going to finally realize that. When is it going to sink in that we are not the only ones on this planet? We are not the ones with the bigger problems. Countries like Ethiopia are the ones that need assistance and we are the ones that can help. When will you realize that you can make a difference? And when will you choose to be that difference you want to see in the world?

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