

Neha Karri  
Eden Prairie High School  
Eden Prairie, MN  
Ethiopia, Water Scarcity

### **Ethiopia: Alleviating The Water Crisis**

Ethiopia, a country situated in the east of Africa, houses a population of 110,871,031. Of these, about 80% reside in rural areas and 20% in urban areas (CIA, 2022). Ethiopia currently is governed under a federal parliamentary republic- a federation of states under one government. According to the CIA factbook, Ethiopia currently has a total land area of approximately 1,096,570 square miles housing its total population. With only 36.3% of its land devoted to agriculture, Ethiopia struggles to feed itself a proper well-balanced meal (CIA, 2022). With a scarce supply of water and recent droughts, about 85% of Ethiopia which survives on subsistence farming cannot grow their food. For Ethiopia to recover from the previous year's massive droughts, a secure way to gain access to water for farming must be achieved.

Ethiopia's climate and geography are one of a diverse range "ranging from equatorial rainforest with high rainfall and humidity in the south and southwest, to the Afro-Alpine on the summits of the Simien and Bale Mountains, to desert-like conditions in the north-east, east, and south-east lowlands" (World Bank, 2019). Along with its diverse range of climate comes a large variability of rainfall and in the arid areas of land where most farming takes place, the highly variable rainfall can lead to disaster.

Typically, households in Ethiopia average around 4-5 people per household and are headed by men. In the urban centers, Ethiopians live in more modern homes. But, in rural areas where the majority live, they subsist in dilapidated homes made of wood and mud with leaks and cracks. Most Ethiopians typically survive on around \$1-3 per day. As such, the typical Ethiopian diet is comprised of cereals, tubers and root crops, and other vegetables (FAO, 2010). A favorite of Ethiopian culture is the bread Injera, a staple food of the country. Injera is usually served with wots, a traditional dish of Ethiopia that is a mixture of vegetables, meats, spices, and sauces. Coffee is also a large drink in Ethiopia as so much is grown there. While the animal population is high, due to a low food supply, meat is not eaten as milk is more prized in rural areas. Additionally, with so many cultures, many cooking styles and beliefs surround the food as each culture cooks a different way.

Ethiopia's main market is in the agricultural sector which accounts for 40 percent of the GDP, and 80 percent of exports. (USAID, 2022). Coffee remains the largest foreign exchange earner but pulses, oilseeds, potatoes, sugarcane, and a few vegetables are also sold in the market. Still, only a small amount of farmers are engaged in the agriculture market. The majority of farmers are smallholders practicing subsistence farming on less than one hectare of land. Their output is predominantly cereal crops and accounts for 95% of Ethiopia's agricultural production. (Agriculture in Ethiopia, 2022). However, even with a large amount of farming being done, only 5% of the land is irrigated and crop yields are small leading to approximately 20.4 million people in need of food assistance (World Food Programme, 2022).

Ethiopia as a country is very vulnerable to weather-related shocks as drought continues to occur like the 2015-2016 droughts and recent seasons of lackluster rainfall have left many families in danger of crop

failures, livestock losses, and food and water insecurity. While, Ethiopia is home to many numerous freshwater lakes and the Blue Nile river, due to increasing demands, climate change, and watershed degradation the water supply has quickly reduced itself. Ethiopia's water resources are also very unevenly distributed as approximately 70% of its water resources are concentrated in the west (WRI, 2021). But, substantial demand for water and irrigation exists in the east of Ethiopia leading to a high deal of water stress and low water supply for farming. Ethiopia's farmers have low access to fertilizers, improved seeds, and fertilizers making harvest lackluster and small, often not enough to feed their own family. With increasing cities and urbanization in the East, water stress continues to rise as water demands in the east begin to rise and not enough water can be transported. Additionally, extremely poor rainfall followed by 2 dry seasons has left Ethiopia's rural areas vulnerable to crop failures, large-scale animal deaths, and increased diseases and deaths.

High water stress and low water supply have led to nearly 25% of Ethiopia's population living in areas of high water stress while 6 of the 10 regional capitals also live in areas of high water stress (WRI, 2021). As a result, Ethiopia remains 173 out of 189 on the Human Development Index (CIA, 2022). Conditions are only exacerbated by the severe drought, the lack of government assistance, and the lack of management of water. Due to this, many Ethiopians must walk up to 6 hours to collect diseased water which can often lead to water-borne illnesses. Around 7.5 million Ethiopians suffer problems related to high fluoride levels (Getachew and Guenet, 2007). The lack of water has also led to a higher prevalence of poverty as many Ethiopians must shirk their education to gather water and provide for their families. The net attendance for schools ratio for males and females is only about 31 percent (Worldbank, 2015). As the government has also passed legislation reducing assistance from outside groups, many of the programs within Ethiopia cannot combat the highly increasing water stress issues that are facing Ethiopia. Climate change has led to an increase in droughts which propel the destruction of Ethiopia's water resources. As a result of such issues, about 68.94% of rural Ethiopians currently do not have access to water leading to high mortality rates and rates of diseases such as diarrheal disease which is one of the leading causes of under-five mortality in Ethiopia. However, the main reason for such water scarcity is the lack of water management. With about 80 percent of Ethiopia's population living in rural communities and being employed in agriculture, these people are almost entirely dependent on groundwater sources. (African Development Bank, 2011). But, while some companies and organizations have implemented wells or water systems within these rural communities, these sources are not widely abundant.

The water crisis in Ethiopia stems from multiple possible sources from the government to the lack of water sources. Therefore, for the water crisis to be alleviated in Ethiopia a multi-pronged attack must be used to secure all possible solutions are enacted. One way to alleviate water scarcity is to build rainwater harvesting systems. Rainwater harvesting systems can be as simple as barrel harvesting systems or more complicated allowing for even rural areas to use them. Most importantly is that they are more efficiently able to save the rainwater and store it for future use. But, it also reduces soil erosion which is very predominant seeing as many of the farmers who use subsistence farming farm very water-heavy crops such as grains and coffee. Along with reducing soil erosion, rainwater harvesting systems also reduce the pressure on groundwater systems allowing for more water to be used elsewhere and providing for more people reducing some of the water pressure that is building up. On the contrary, rainwater harvesting systems require rainfall to be active and in Ethiopia where rainwater is variable, rainwater harvesting systems cannot be fully depended on to alleviate the water crisis.

While the rainwater harvesting systems take care of the water pouring from the sky, most of the water comes from the ground. Ethiopia contains a large number of water sources and the subsoil is one of the largest sources of water. The main problem with gathering this water is that there are not enough wells or boreholes near rural villages leading to long treks to access water. Therefore, the implementation of new wells and springs in nearby villages helps to provide more water for rural communities. By constructing the infrastructure to access the water not only through wells but through digging boreholes into the soil water, rural communities can gain access to water and alleviate the water scarcity issue. Many foundations such as WeAreWater are already implementing such projects, but due to a lack of funding and materials are only able to do so at a smaller scale. By involving the government and combining both organizations and the local government in enacting this plan, the ability to construct water sources near villages around the country can be possible.

While the water problem can be addressed, the largest problem is that so little of the land has been irrigated leading to the low harvests and malnutrition in Ethiopia. Although Ethiopia has about 6 million ha of land suitable for irrigation less than 5% is irrigated for farm use mostly due to a lack of water storage and transport systems (Applied Geography, 2017). Moreover, this land is closer to river basins such as the Omo Ghibe and Rift Valley basins with easy-to-extract water allowing for easy irrigation of land near the basins than in the east where droughts occur and water is hard to find. Also, Ethiopia is most likely estimated to have the most amount of groundwater in it allowing for easy access to groundwater that is not affected by the climate's variability to be used as a source of irrigation and clean drinking water. These new areas of water can not provide fresh drinking water, but more importantly, can provide a source of irrigation to the nearby land helping produce fresh food that can feed Ethiopia.

Another solution to the growing problem of malnutrition is to slow down the erosion of soil and land. Soil erosion not only destroys the land making it unusable for agriculture but also can impact water quality with various pollutants such as bacteria and chemicals. In Ethiopia, soil erosion is compounded due to continuous growth, heavy deforestation, and flooding. To preserve the land and water, the implementation of a program to stop soil erosion must occur. Something that is already being done is the restoration of already eroded land. While the government is taking initiative it does not have the resources of making a large impact. Therefore, allocating more funding and making it a higher priority is imperative to increase the amount of farmland, thereby increasing the production and the economy of Ethiopia. Along with restoring eroded land, preventative measures must be put in place to stop further erosion of agricultural land. Through soil-friendly agricultural practices such as full crop cover should be taught and spread to the rural areas. Full crop cover, the practice of intercropping, means growing two crops together in the same field to help hold down and keep nutrients from the plants into the field, further fertilizing the soil and rooting it down for planting. Many of these erosion control practices can be implemented with minimal financial expenditure and assistance in construction. As such, the best way to control the erosion of soil is to spread the info on proper procedures to the rest of Ethiopia. With most of the farming population situated in rural areas, the government has the responsibility to help spread the information on proper erosion practices. The best solution for proper soil erosion in such rural areas of Ethiopia is full crop cover. It can easily be initiated by the own farmers. However, to help persuade farmers into putting the extra expense of multiple crops, the government is recommended to subsidize the initial croppings of intercropped cash crops and food crops. Intercropping both cash crops and food crops allows not only the

government and the farmers to gain money, but also allows for farmers to gain food and stop soil erosion at the same time. Through full crop cover and rehabilitation of eroded land, the malnutrition crisis and the further pollution of water can be alleviated allowing for access to freshwater to irrigate the land and reduce food and water insecurity.

Most importantly, the best way to solve the water crisis and provide families with water to drink and farm with is by the need for the government to realize the true extent of the water crisis and implement a working water management system. Due to their legislation, the Ethiopian government limited foreign aid after the 2008 draft. If they were to allow organizations like Water.Org and World Vision to reenter the country without too many regulations, they would be able to more securely assist hundreds of thousands of Ethiopian citizens. The aid of outside organizations would allow the government to set up stations, wells, and systems of sanitation and water collection preventing the spread of disease and malnutrition in rural areas. The aid of foreign organizations would also allow the Ethiopian government to focus its money and attention on more pressing issues such as malnutrition or their economy. Additionally, the implementation of a water management system would help turn around the poverty, malnutrition, and water crisis. While Ethiopia has about 50 cubic meters per person, it also has low water reservoirs. Therefore, a water management team would not only help store abundant amounts of water. But, a water management system would also allow for the allocation and efficient transport of water to the east and north where water is the least available and necessary. An active government is necessary for Ethiopia to be able to solve its water crisis and feed the millions of citizens who are suffering from food and water insecurity.

Ethiopia is suffering. They are suffering from a constant water crisis that seeks to destroy the country beyond help. Due to frequent droughts, an unhelpful government, and a lack of water management, Ethiopia continues to suffer from food and water insecurity stemming from their lack of water. Under these conditions, Ethiopia continues to suffer from poverty, disease, malnutrition, failing crops, and dying animals. But many sources want to help Ethiopia. With the implementation of water collecting reservoirs and the push for the government to step up, Ethiopia can take its steps to success and a brighter future of self-sufficiency.

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