

Water in Ethiopia: Drought, Disease and Death

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Abstract

For the last thirty years, drought has consistently suffocated the landlocked country of Ethiopia. Several additional factors have made Ethiopia's water crisis worse. The lack of water and sanitation has created and spread food shortages and famine across the country, forced children to seek clean water over attending school, and water-borne illnesses have claimed many lives. Solutions do exist for Ethiopia and many organizations are willing help Ethiopia. However, if present conditions continue, the only things certain in Ethiopia's future are drought, disease, and death.

I. Introduction

Ethiopia boasts a population of about 83 million people and which only 38 percent have access to safe drinking water sources and only 12 percent of the population use improved sanitation facilities.¹ Ethiopia has found itself in an extreme water crisis situation, brought on mainly by severe drought, little governmental funding and assistance, and lack of water management and sanitation resources. The country is forced to battle the causes of the water crisis, but is in an unwinnable fight if the water problem is not solved first. The shortage of water and rainfall has brought an overwhelming spread of famine and food shortage.

Due to the lack of rainfall, some Ethiopians are forced to walk up to six hours in order to collect water that is often found riddled with disease. This is causing women and children to put water collection above all else, including school. It also is creating water-borne illnesses to infect and claim thousands of Ethiopian lives. Around 7.5 million Ethiopians suffer problems related to high fluoride levels.² This number is only the tip of the iceberg when it comes to water related disease in Ethiopia and without improving sanitation within the country, the numbers are set to only increase.

¹ World Bank (2011).

² Getachew and Guenet (2007).

Luckily, there does seem to be hope along the way for the people of Ethiopia, with many organizations around the world focusing their efforts for a better and cleaner tomorrow. World Vision and Water.org are dedicated to finding solutions for Ethiopia, by raising money and establishing water and sanitation resources in parts of the country that will help to slowly abolish the water problems once and for all. However, these organizations are not an end all solution to Ethiopia's problems and more needs to be done in every aspect to end the crisis once and for all.

II. Literature Review

With awareness for the global water crisis increasing, the availability of information on the Internet has also increased exponentially. Ethiopia has become a focal point country of the water crisis and many organizations and websites have posted various resources. However, there are still problems related to reliable information. Much of the information posted implies basic data but lacks the depth needed to acquire full understanding of the many aspects of Ethiopia's water crisis. The following paragraphs summarize first some traditional publications (like reports and articles in academic journals), and then some helpful internet resources on the water crisis in Ethiopia.

II.1. Some Traditional Resources

One of the first substantial contributions focusing on Ethiopia's droughts is a report by the Relief and Rehabilitation Commission (1985). The report analyzed Ethiopia's challenges due to major droughts in the 1970s and how Ethiopia struggled for a decade to recover from those droughts.

Haile (1988) published an article in the *Ethiopian Journal of Agricultural Sciences* in which he writes that drought is a recurrent phenomenon in Ethiopia, with droughts having occurred quasi-periodically during the last several centuries. He also writes that scientific investigations have revealed that the primary cause is the fluctuation of the general atmospheric circulation. As a consequence of such fluctuations the rain-producing components for Ethiopia have been weakened or dislocated during drought years. However, human interferences such as deforestation, overgrazing and over cultivation enhance the severity and prolongation of drought recurrences.

Webb, von Braun, and Yohannes (1992) examined the policy implications of coping failures at national and household levels to famine in Ethiopia. They found that even in a country like Ethiopia, where nearly everybody is poor, the depth of poverty is important in determining the impact of famine.

A World Bank Technical Report by Benson and Clay (1998) calculated the impact droughts have on Ethiopia and other Sub-Saharan African countries. Benson and Clay develop a new framework that allows understanding the wider economic impacts of drought. The new framework also explains why some economies are more susceptible to drought than others. One of their key findings was that different regions of Africa are experiencing different long-term climatic trends, implying that different regional strategies are required for mitigation and relief of droughts.

Most of the more recent publications are linking Ethiopia's water crisis to climate change. For example, Conway and Schipper (2011) analyze the challenges and opportunities of adaptation to climate change in Ethiopia. They show that there are large uncertainties in climate change projections for Ethiopia but that there is potential for low-regrets measures to reduce the vulnerability to current climate.

II.2. Some Internet Resources

The IRIN Humanitarian News and Analysis (2003) reports that the African water crisis was brought to the attention of some UN officials and the African government ministers representing more than 40 countries at a high-level five-day summit in Addis Ababa in December of 2003. Desperately wanting to set a plan in action to start solving the water crisis, the summit participants discussed and established many options that would help Africa's present situation and hopefully change the projected future. The water crisis was discussed as a factor that must be solved before any real progress could be made in the countries' political and economic situations.

World Vision, which is a Christian humanitarian organization that has dedicated its efforts to help relieve Ethiopia of the detrimental effects of the water crisis, has posted various data and project information on their Ethiopia country website.³ This website attributes problems with sickness, hunger, poverty, and education to the current water situation. It also reports on World Vision's efforts to improve the situation in the Ethiopian towns of Tongo and Fitiwalo.

An UNICEF background brief on Ethiopia's Water and Sanitation Program compiled by Morris (2007) reports that the effective access to safe water is far lower than is typically reported as 30-60 percent of existing water schemes are not functioning and many constructed latrines are not in use. Morris also reports that not only do the most frequent culprits like animal and human waste contaminate water, but that high fluoride levels in groundwater are a huge problem. The brief goes on to describe the action planned to take place through Ethiopia's water and sanitation program and the financing needed for the program (some US\$112 million).

Last but not least, MacDonald, Calow, Nicol, Hope, and Robins (1997) created a map that highlights areas in Ethiopia where groundwater may be available during periods of drought. The map, which is available freely on the internet,⁴ provides broad information that can be used to help target water supply programs or highlight critical monitoring areas.

III. Empirical Background

Ethiopia is an entirely landlocked country, located in East Africa, in what is called the Horn of Africa, see Figure 1. A combination of varied rainfall and temperature patterns are mostly responsible for Ethiopia's classification in Africa's tropical zone and the country's assorted topography.⁵ A year in Ethiopia characteristically sees three seasons of varying amounts of rainfall. These seasons include: *kremt*, the main rainy season running from June- September; *bega*, the dry season running from October-January; and *belg*, the small rains season running from February-May.

The average rainfall ranges from about 2000 millimeters in the Southwest regions to about 100 millimeters in the Northeastern Lowlands.⁶ Figure 2 shows the average mean of rainfall (in millimeters) from 1951-1995. It clearly shows large differences across different regions of Ethiopia, with most of the central western regions getting a sufficient amount of rain during the rainy season, but the rest of the country, especially towards the Horn of Africa, being very dry for most time of the year.

³ See <http://changeeverything.wvpartner.us/watercrisis.html>.

⁴ See http://www-esd.worldbank.org/esd/ard/groundwater/pdfreports/Struggle_for_Water_App6_Pt2.pdf.

⁵ CIA (2012).

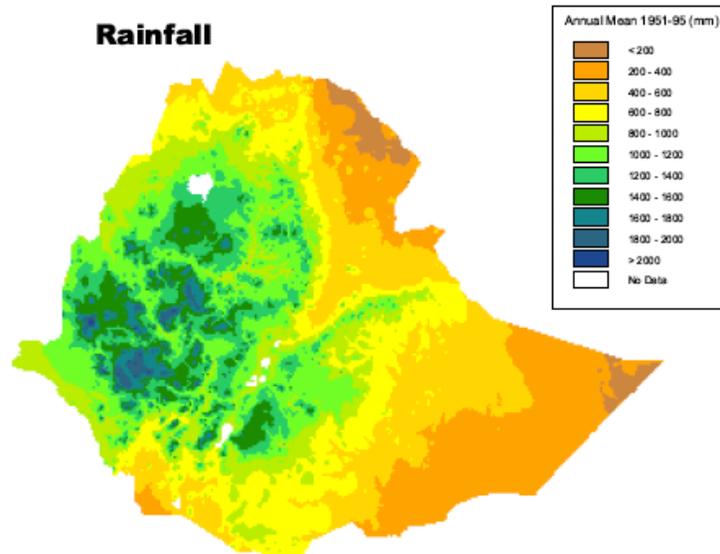
⁶ Encyclopedia of Earth (2012).

Figure 1: Map of Ethiopia and the Horn of Africa



Source: Google Maps (2011)

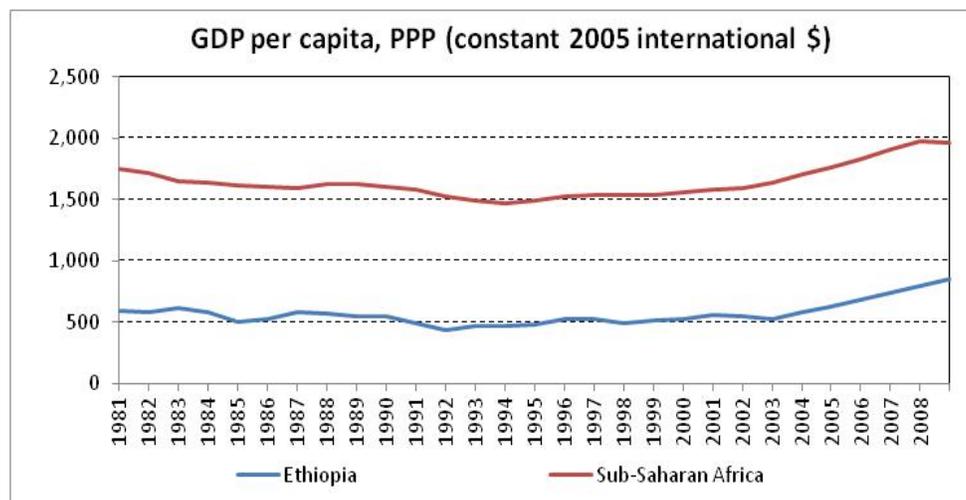
Figure 2: Ethiopia's Average Mean of Rainfall from 1951-1995 (in Millimeters)



Source: MacDonald, Calow, Nicol, Hope and Robins (1997).

With a purchasing power parity (PPP) adjusted Gross Domestic Product (GDP) per capita of only US\$849 in 2009, Ethiopia is one of the world's poorest countries.⁷ As shown in Figure 3, GDP per capita was stagnating for decades in Ethiopia. Only since 2003 has GDP increased for more than a few years. Figure 3 also shows that Ethiopia's GDP per capita was about a third of the average GDP per capita of Sub-Saharan Africa (SSA).

Figure 3: GDP per capita for Ethiopia and Sub-Saharan Africa (SSA), 1981-2009



Source: Created by author based on World Bank (2011).

A substantial reason for Ethiopia's economic stagnation is due to frequent droughts, which have a significant impact on the economy as agriculture is Ethiopia's largest sector, accounting for nearly half of Ethiopia's GDP, see Figure 4. Furthermore, as of 2005, 80.2 percent of the Ethiopian labor force was employed in the agricultural sector.⁸ Agriculture also accounts for 90 percent of exports. In other words, Ethiopia is a country completely dependent upon its agriculture and the need of progress in this sector is necessary for the survival of Ethiopia as a whole.⁹

Within agriculture, 64 percent of value added comes from crops, 23 percent comes from livestock and 13 percent comes from forestry. Of the crops grown in Ethiopia, 73 percent are cereals and 20 percent are pulses, oilseeds, and annual crops. Less than 7 percent is devoted to permanent crops. Ethiopia's agriculture is almost entirely dependent on rainfall for the maintenance of crops, but with the constant amount of drought plaguing the country, the sector is failing to produce the amounts that it needs. The main outcome of Ethiopia being unable to supply the numbers needed for a successful agricultural yield is increased poverty rates. There are indications that the situation may actually get worse, as with temperatures rising and droughts becoming more common, it has been projected that climate change will reduce yields of the wheat crop by 33 percent in coming years.¹⁰

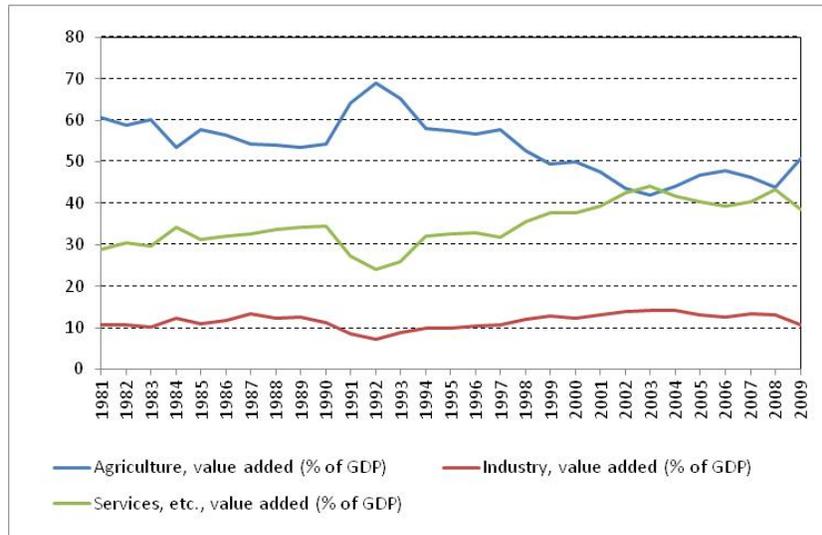
⁷ World Bank (2011).

⁸ World Bank (2011).

⁹ African Development Bank (2011).

¹⁰ World Bank (2012).

Figure 4: Sectoral Shares of Ethiopia's Economy, 1981-2009



Source: Created by author based on World Bank (2011).

IV. Causes of the Water Crisis

There are a few, very serious factors that contribute to the water crisis in Ethiopia. It is the combination of these factors together that makes the situation so destructive to the country. These factors include: (1) climate change, (2) government resistance against external help, and (3) a lack of water management.

IV.1. Climate Change

Climate change refers to a period of time where a country or region goes through changing weather or temperature patterns than what is accustomed. Not only that, but it also refers to changes in seasons over long periods of time. Notably these changes have become more drastic in recent years, mainly due to global warming. Global warming is the process of the Earth's surface and overall temperatures rising due to the amount of greenhouse gases being emitted into the atmosphere by humans. The burning of fossil fuels, like oil, coal, and natural gas is contributing to these emissions and therefore speeding up the gradual increase of Earth's temperatures. The current level of carbon dioxide (CO₂) emission is at the highest it has ever been in the past 650,000 years.¹¹

Ethiopia has seen at least five major droughts since 1980 accompanied by an abundance of local droughts as well. Global warming is a significant reason as to why these droughts are becoming more frequent and prolonged. The effects of drought on the country of Ethiopia are becoming increasingly worse with time, especially due to the fact of how dependent the country is on rainfall. The continued failure of the October to December rains has been one of the biggest contributors to the water crisis. The lack of expected rainfall has also led to water and pasture shortage within the country, which is absolutely one of the biggest problems.

¹¹ NOAA National Weather Service (2007).

IV.2. Government Resistance against External Help

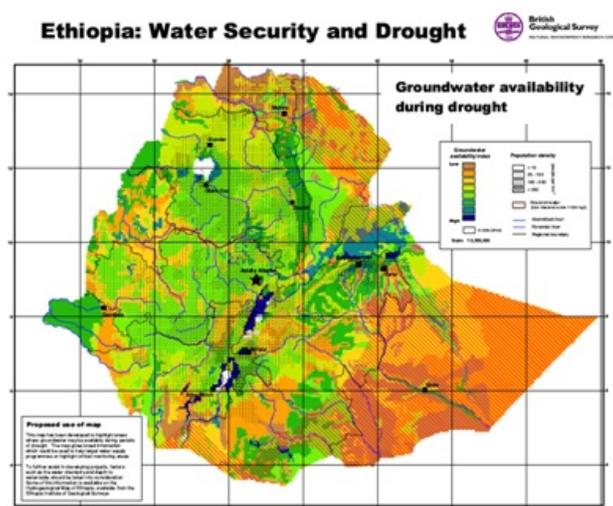
Due to their struggles with famine, poverty, and drought, the country of Ethiopia received help and assistance from outside groups and non-profit organizations for many years. However, after a significant drought in 2008 plastered Ethiopia's problems all over the world the Ethiopian government decided that the negative attention towards their country could be avoided if they took matters into their own hands. In 2009, Ethiopia's parliament decided to pass a new law that would regulate charities and foreign humanitarian groups coming into the country and offering assistance.

This law categorized a foreign group as an organization, local or not, that received more than 10 percent of their funding from abroad.¹² This new law restricted many organizations like World Vision and Water.Org (a non-profit led by Spokesman and actor Matt Damon) from being able to enter the country and officially provide the Ethiopian population with water resources and sanitation. These groups specifically bring water resources such as wells and irrigation systems, along with sanitation practices and buildings to allow the changes to be maintained and improved for years to come.¹³

IV.3. Lack of Water Management

The poor infrastructure of Ethiopia has exacerbated the water management problems. 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.¹⁴ However, as shown in Figure 5, during a drought these sources become depleted or almost eliminated completely. While some companies and organizations have implemented wells or water systems within these rural communities, these sources are not widely abundant. Therefore, in some cases, individuals, particularly women and children, are forced to walk up to six hours to retrieve water.

Figure 5: Ethiopia: Groundwater Availability during Drought



Source: MacDonald, Calow, Nicol, Hope and Robins (1997).

¹² Addis (2009).

¹³ World Vision (2011).

¹⁴ African Development Bank (2011).

V. Effects of the Water Crisis

The Water Crisis has rooted its way into being one of Ethiopia's top problems and a necessary hurdle in the progression of the country's overall economy. The effects of the water crisis include (1) poverty, (2) sickness and disease, and (3) a lack of education.

V.1. Poverty

Poverty in Ethiopia has turned into an overwhelming effect of the water crisis. As mentioned, there is 85 percent of the population living in rural areas and virtually everyone in these areas maintains a lifestyle directly intertwined with the drought-stricken agricultural sector. Between 1999 and 2004, more than 50 percent of all households experienced at least one major "drought shock". A "drought shock" can be defined as "a severe disturbance caused by events outside a country's control that have nonmarginal impacts on domestic economic values".¹⁵ These shocks are directly related to the cause of poverty. In 2004, poverty would have been at least 14 percentage points lower (see Table 1), which is equivalent to about 11 million people that would no longer be below the poverty line. With the shock of drought, causes the shock of a non-profitable agriculture yield. With the country being mostly dependent on agriculture for the sustainment of the economy, the poverty increases with a drought. This is why it can be concluded that the poverty increases as a result of the drought shock and lack of water.

Table 1: The Impact of Drought Shocks in Ethiopia

	People in Poverty (percent)
Observed poverty	47.3
Predicted poverty with no drought shocks	33.1
Predicted poverty with no shocks of any kind	29.4

Source: United Nations Development Programme (2007), Table 2.3, p. 85.

The spillover effects of the poverty resulting from the water crisis can be seen in a multitude of areas within Ethiopia. Two of these areas are analyzed below as continued effects of the water crisis: Sickness and Disease and Education. These effects of the water crisis also partly come from the increased poverty. Due to an inability to buy medicine or receive medical attention, the healthcare and health of Ethiopia's population is suffering. The education sector of Ethiopia could also be seen as affected by the poverty increase in the country because children are being required to leave school in order to help provide for the family, whether that is working and earning money or acquiring water and necessities. The spillover effects of poverty are so intertwined with the effects of the water crisis that it is almost impossible to directly attribute these problems to either one entirely independently.

¹⁵ Benson and Clay (2009).

V.2. Sickness and Disease

While it seems that the lack of access to water could be one of the biggest problems the Ethiopian people face, the reality is that sometimes even having access to water could be just as detrimental. Water quality and sanitation in Ethiopia is an effect of the water crisis that causes multiple complications in a variety of ways. The biggest problems relate to disease and sickness, in which there are about three different types that are water-related:¹⁶

- **Water-Washed:** Water-Washed diseases are considered those caused by lack of personal hygiene. One of the most common of these diseases is *shigella*, which causes dysentery, scabies, leprosy, trachoma, skin infections, and even ulcers.
- **Waterborne:** Waterborne diseases are spread when humans ingest contaminated water. Typhoid, cholera, hepatitis, and dysentery are the most common diseases resulting from animal and human waste contaminated water. Diarrheal diseases are also seen regularly and can be some of the most harmful. The symptoms and effects of diarrheal diseases can be fatal for those that already suffer from inadequate immune systems.
- **Water-Based:** Diseases are considered water-based when aquatic organisms transmit them. Worms can infect humans by penetrating the skin during a bath or be ingested in contaminated water. These worms cause *schistosomiasis*, which is the second most deadly parasitic disease only behind Malaria. Four in every five people infected with this disease are living within Sub-Saharan Africa.

V.3. Lack of Education

Water contamination and lack of water have also taken tremendous effects on education in Ethiopia. While 86 percent of males and 81 percent of females are enrolled in primary school, the net attendance ratio for each is only about 45 percent.¹⁷ Children are finding themselves unable to attend school because they are either sick or must chose finding water as the first priority over their education. With children unable to attend school, they are unable to learn. These children failing to receive an education now will result in them failing to become employed in the future, which will increase the poverty rate. The ability for Ethiopia's economy to recover or even make progress is directly related to an educated population, if the population is not becoming more educated, then Ethiopia has no hope in a better future.

VI. Conclusion

While the water crisis in Ethiopia does have overwhelming causes and effects, there are things that can be done to help lessen and hopefully oblivate the entire crisis in the future.

First and foremost is the need for the Ethiopian government to realize that the wellbeing and survival of their people is more important than the consequences of receiving negative attention, which is their main reason for limiting foreign aid after the 2008 draft. If the Ethiopian government were to allow organizations like Water.Org and World Vision to re-enter the country without the overbearing rules and regulations, they would be able to provide help and assistance to hundreds and even thousands of people. These non-profit organizations will be able to set up water

¹⁶ National Academy of Sciences (2008).

¹⁷ World Bank (2011).

management systems and teach the Ethiopian people how to operate and run them which will result in long-term benefit. These groups will be able to implement systems of sanitation and educate about water-related diseases and infections to ensure an increase in health for years to come. The Ethiopian government could also begin spending more money and efforts in these areas to help alleviate their countries problems, but in recent years that has either been something they have been unable to do or unwilling to fully commit to accomplishing.

Regardless of who is the one to take action, it is still imperative that Ethiopia is provided with water management and water sanitation resources. The reality is that water in Ethiopia is actually rather abundant, but has a water crisis because at 50 cubic meters per person it has one of the lowest reservoir storage capacities in the world (World Bank, Ethiopia Country Note). If management sources and sanitation solutions were introduced and sustained, the country would experience a complete turnaround in terms of poverty, education, health, and economy.

Ethiopia is suffering from a water crisis that has the potential to destroy the country beyond repair. Due to frequent and abundant amounts of drought, the result of global warming; problems within the government; and lack of water management the water crisis continues escalate. Under these current conditions, the country of Ethiopia is experiencing sickness and disease, poverty, and lack of education. With the future holding no foreseeable changes to these areas, the country of Ethiopia is only set to have an increase in problems. The necessity for a drastic change is becoming immediate. While hope is apparent in a variety of solutions, if Ethiopia continues to attempt to solve the water crisis alone, they are likely fighting an unwinnable battle.

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