

# **The Water Crisis in Ethiopia and Kenya: Being Locked Out of Water and Sanitation**

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## ***Abstract***

*This article analyzes a major health issue in two developing countries: the water crisis in Ethiopia and Kenya, which is caused by millions of people being locked out from having access to safe water and sanitation. Ethiopia's and Kenya's high mortality rates are a direct result of water-borne diseases. This article examines the evolution of the water crisis in Ethiopia and Kenya by reviewing access rates, the evolution of infant mortality rates, the burden the collection of water puts on children and women, and the lack of education.*

## **I. Introduction**

In the industrialized countries, most people have easy and relatively cheap access to water and sanitation. Water is essential for life and is needed to ensure that our most basic needs are met. These basic needs ordinarily include having water for the purpose of drinking, food preparation, washing of clothes, hygiene, and sanitation. However, the lack of access to water has become a global health issue. Simply put, without access to clean water we cannot stay healthy. More fundamentally, without clean water, getting out of the poverty cycle is nearly impossible. Our global water crisis is easily illustrated by focusing on two developing countries: Ethiopia and Kenya.

As of 2015, Ethiopia had a population of 99.4 million, of which 42.7 million (about 43 percent) lack access to clean water and 71.6 million people (about 72 percent) do not have access to improved sanitation sources. In Kenya, which had a population of 46.1 million in 2015, approximately 19 million people (about 41 percent) still depend on unimproved water sources, such as ponds, shallow wells and rivers, and about 27 million people (about 59 percent) lack access to improved sanitation.<sup>1</sup>

This article analyzes the water crisis in Ethiopia and Kenya. Following this introduction, the next section (Section II) provides a brief review of the literature, which is followed by some information on socio-economic data (Section III). Section IV examines the degree and some consequences of not having access to safe water and sanitation, before the last section provides some conclusions.

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<sup>1</sup> The data provided in this paragraph is based on World Bank (2017).

## II. Literature Review

There is abundant research on the water crisis in Africa. It is now clear that water scarcity in East Africa is a fueling conflict and it is hindering development. In Kenya and Ethiopia, for instance, dry seasons are growing longer and there is a rise in the competition of access to water. The studies on this subject are varied by topic and location. Naik (2016) is one of the many studies that covers the water crisis in the whole of Africa, Stevenson et al. (2012) focus on Ethiopia, Sreenivasan et al. (2015) concentrate on Kenya, while participants at the International Annual UN-Water Zaragoza Conference focused on some collaboration in the water sector between Ethiopia and Kenya.

Naik (2016) examines the water crisis in Africa individually and its root causes. According to his study, water is an issue that is connected to every condition of human development in Africa, including agriculture, education, economics, health, and peace and stability. In addition, he also mentions how Africa remains to be the world's poorest and underdeveloped country due to many reasons. Some of those contributing factors are lack of access to clean drinking water, deadly disease transmissions (HIV/AIDS and malaria), corruption of governments that have immorally violated human rights, high rates of illiteracy, among others. Indeed, the article strongly suggests that the crisis is due to natural and human-made circumstances. The natural circumstance is global warming and climate change, increasing the physical aspect. On the other hand, the human-made circumstance is economic scarcity because people do not know how to utilize adequate sources of water. Furthermore, the article also mentions how in Central and West Africa they have decent freshwater; but in East Africa, North Africa, and Southern Africa, the water conditions are critical.

Stevenson et al. (2012) focus on the water crisis in Ethiopia. They associate women's psychological distress to water insecurity, water collected, distance from water sources, unprotected water sources, and food insecurity. Beyond that, and most importantly, the article demonstrates how women's health can be affected whenever they have the responsibility of traveling to get water supply for their family.

Sreenivasan et al. (2015) addressed the water crisis that Kenya faces, but illustrate how this country is acting upon this issue. The authors explain how there are many clinics in rural western Kenya that do not have access to safe water. This is a major issue because it can easily lead to water-borne diseases which have claimed the lives of many people. Notably, to address this issue, a program was implemented in 2005 that installed water stations for hand washing and drinking water in 109 health facilities and trained health workers on water treatments and hygiene. The implementation of this program was effective because everything has been maintained since then.

Participants of the International Annual UN-Water Zaragoza Conference 2012/2013 discussed some examples of successful water cooperation, one of which was the cooperation between Ethiopia and Kenya of Lake Turkana.<sup>2</sup> Lake Turkana is located mostly in the Kenyan Rift Valley, though its far northern end crosses into Ethiopia. It is the world's largest permanent desert lake and the world's largest alkaline lake.<sup>3</sup> The conference participants discussed how despite collaboration on assessing the impact of climate change and drought, it has been difficult for the two countries to deal with implementation issues. Furthermore, there are some new emerging issues: the discovery of oil, which will complicate issues further.

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<sup>2</sup> See UN-Water Decade Programme on Advocacy and Communication (UNW-DPAC) (2013).

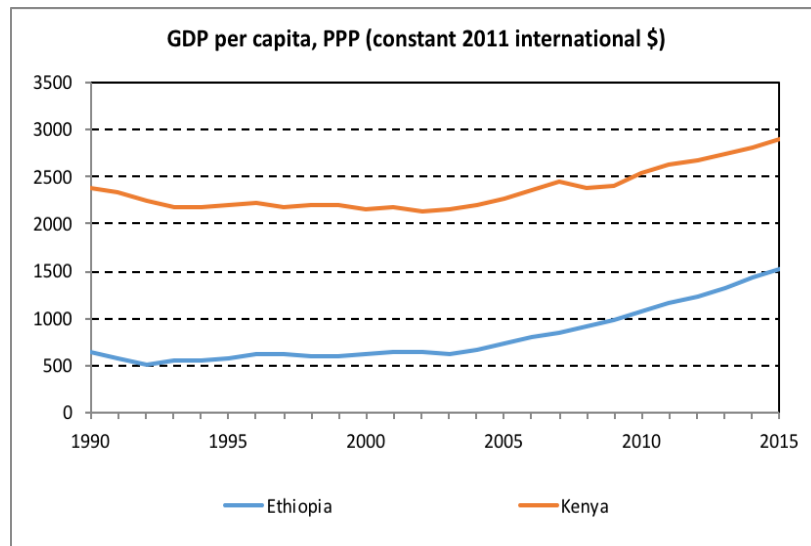
<sup>3</sup> [https://en.wikipedia.org/wiki/Lake\\_Turkana](https://en.wikipedia.org/wiki/Lake_Turkana).

### III. Socio-Economic Background

Ethiopia is located in the Horn of Africa, which is in the tropical zone laying between the Equator and the Tropic of Cancer, with three different climate zones according to elevation. Ethiopia's economy is based largely on agriculture, which accounts for 46 percent of the country's gross domestic product (GDP). Approximately 85 percent of the population is engaged in agricultural production. Coffee production is Ethiopia's largest source of foreign exchange and it has contributed significantly to the economy. However, Ethiopia as well as other countries in Africa face several issues that are challenging for the agricultural production of the economy, such as droughts, soil erosion, deforestation, and desertification. Since agriculture plays a major role in Ethiopia's economy, it is essential for Ethiopia to address these environmental problems, so they can improve and keep developing as a country.<sup>4</sup>

Kenya is located in Eastern Africa with a climate that varies by location, from mostly cool every day to always warm/hot. The climate along the coast is tropical. The agricultural sector plays a key role in Kenya's economy as it generates 26 percent of its GDP. However, water shortage, water quality, water pollution, flooding and other hazards are environmental issues that constantly affect the people of Kenya today. In addition, since Kenya is a dry country and it has uneven rainfall patterns, this climatic characteristic affects the availability of water. The two rainy seasons are, the "long rains" falling between April and June and the "short rains" between October and December. The typical annual rainfall is 5 inches in the arid regions and 76 inches around Lake Victoria.

**Figure 1: GDP per capita, PPP (constant 2011 international \$) in Kenya and Ethiopia**



Source: Created by author based on World Bank (2017).

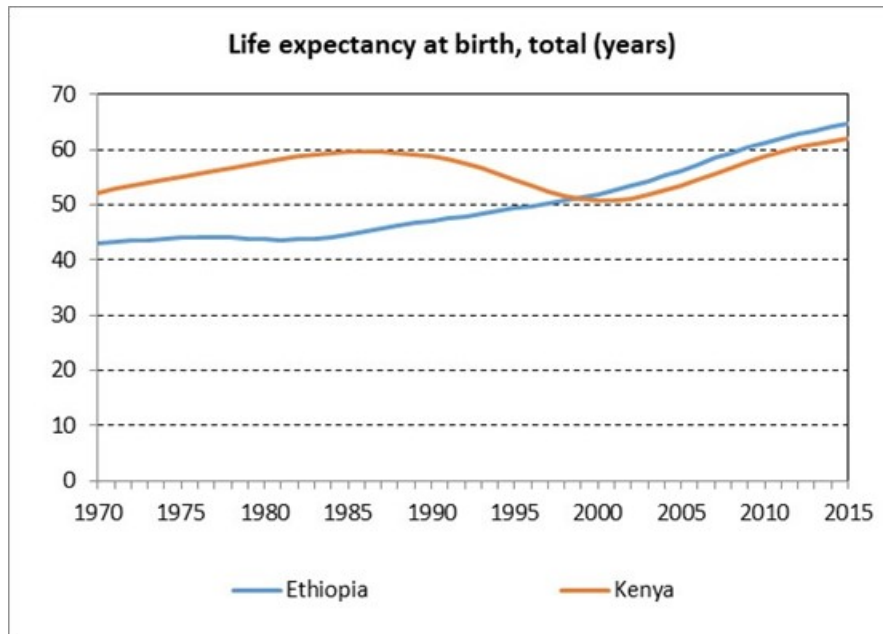
As shown in Figure 1, though both Kenya and Ethiopia have increased their GDP per capita (in constant 2011 international dollars) between 1990 and 2015, both countries had a lower GDP per

<sup>4</sup> The information provided in this and the next paragraph is based on the Nations Encyclopedia (n.d.) and the World Bank (2017).

capita in 2003 than they had in 1990. Hence, there was overall no progress in terms of GDP per capita for nearly 15 years. From 1990 to 2015, Kenya's GDP per capita increased by only \$525 (from \$2,376 to \$2,901), while Ethiopia's GDP per capita increased by \$877 (from \$652 to \$1,530). Hence, Ethiopia has much more progress in absolute and especially in relative terms.

Figure 2 shows that Kenya's life expectancy (in years) has been fluctuating, while Ethiopia's life expectancy has initially been flat but slowly increasing since the mid-1980s. From 1970-1998, Kenya's life expectancy was higher than in Ethiopia; after 1998, Ethiopia's life expectancy was marginally higher than that of Kenya's. In 1970, life expectancy for Kenya was 52 years and for Ethiopia it was around 40 years. In 2000, the life expectancy in Kenya dropped from 52 years to 49 years, while Ethiopia's life expectancy kept increasing though time; from 40 years of life expectancy to finally 55 years in 2015.

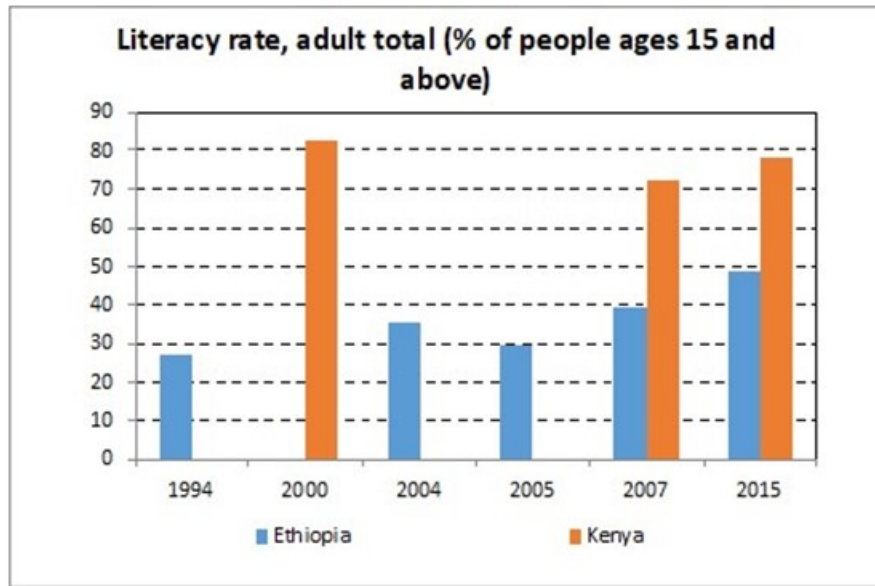
**Figure 2: Life Expectancy at Birth in Kenya and Ethiopia, 1970-2015**



Source: Created by author based on World Bank (2017).

Data on adult literacy rates is scarce in Ethiopia and even more so in Kenya. For Ethiopia, adult literacy rates are available for only five years (1994, 2004, 2005, 2007 and 2015); for Kenya, adult literacy rates are available for only three years (2000, 2007 and 2015). Despite the limited data, Figure 3 shows that Ethiopia has made some progress in increasing its adult literacy rates from 28 percent in 1994 to 59 percent in 2015. On the other hand, based on the available data, Kenya does not seem to have made any progress. Literacy rates in Kenya decreased from 82 percent in 2000 to 72 percent in 2007, after which they recovered slightly, reaching 78 percent by 2015. Despite Ethiopia's overall progress and Kenya's overall deterioration, adult literacy rates remain much higher in Kenya than in Ethiopia.

**Figure 3: Adult Literacy Rate in Kenya and Ethiopia (all available years)**



Source: Created by author based on World Bank (2017).

#### **IV. Ethiopia's and Kenya's Water Crises**

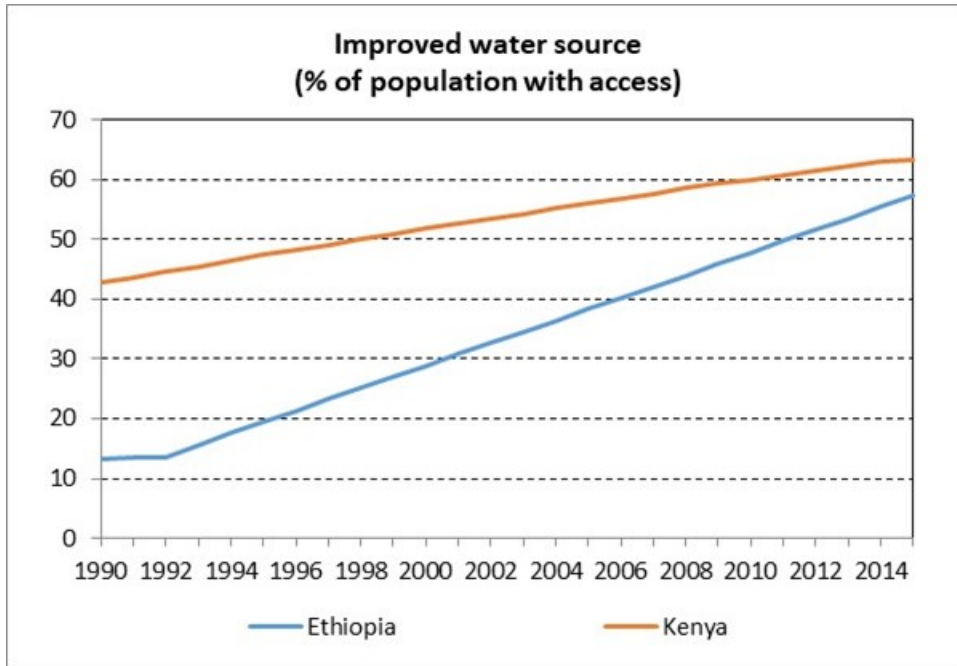
Following the Resolution of the UN General Assembly in 2010, access to safe water and sanitation are generally considered to be basic human rights. Drinking unsafe water and lack of access to adequate sanitation is responsible for many water-borne diseases, many of which lead deaths from diarrheal diseases. Following some basic information on various access rates to water and sanitation in Kenya and Ethiopia, this section examines the impacts on health (especially infant mortality) and reviews the burden of collecting water has on children and women. It also examines some broader but related education issues, including the gender gap in education.

##### **IV.1. Access to Water and Sanitation**

Ethiopia's and Kenya's water crises are mainly due to these countries' dry climate, though also to the limited governmental funding and assistance (Schemm, 2017). Figure 4 shows the national access rates to safe water in Ethiopia and Kenya from 1990-2015. While both countries have made progress, Ethiopia has made far more progress than Kenya, increasing its access rate by 45 percentage points (from 13 percent in 1990 to 58 percent in 2015), while Kenya increased its access rate by only 20 percentage points (from 43 percent in 1990 to 63 percent in 2015). Despite this progress, nearly half of Ethiopia's population and more than one third of Kenya's population do still no access to safe water in 2015.

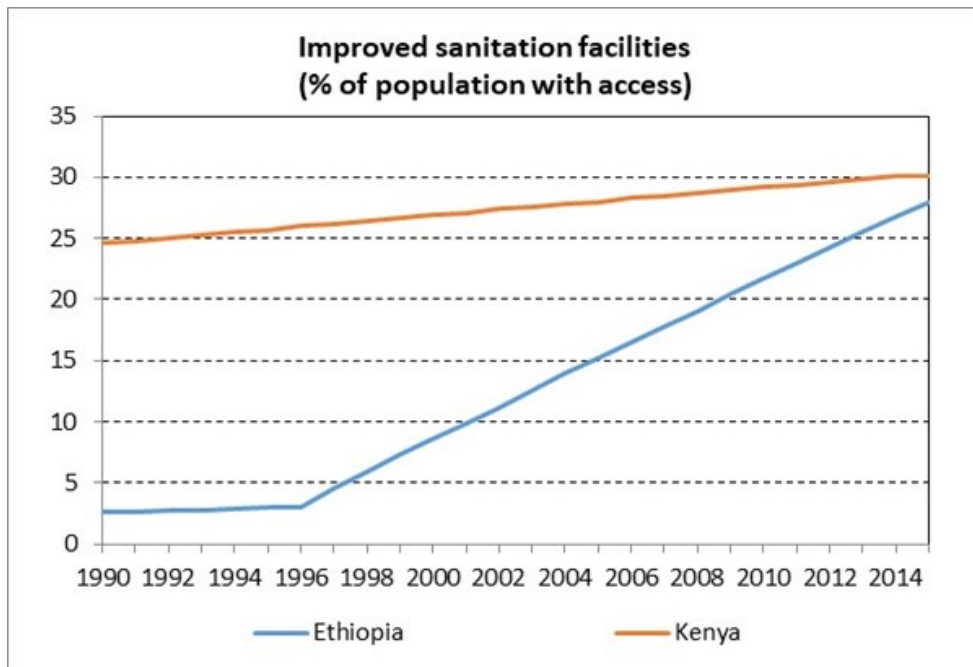
Figure 5 shows the access rates to improved sanitation facilities for Ethiopia and Kenya from 1990-2015. This graph confirms that most people do not have access to improved sanitation facilities in both Ethiopia and Kenya. In Ethiopia, only 3 percent of the population had access to improved sanitation facilities in 1990. By 2015, that percentage increased to 27 percent. In Kenya, about 25 percent of the population had access to sanitation facilities in 1990 and that percentage increased to 32 percent in 2015. Again, Ethiopia has made much more progress than Kenya, but more than two-thirds of the population in each country had not access to improved sanitation in 2015.

**Figure 4: Access to Safe Water in Kenya and Ethiopia, 1990-2015**



Source: Created by author based on World Bank (2017).

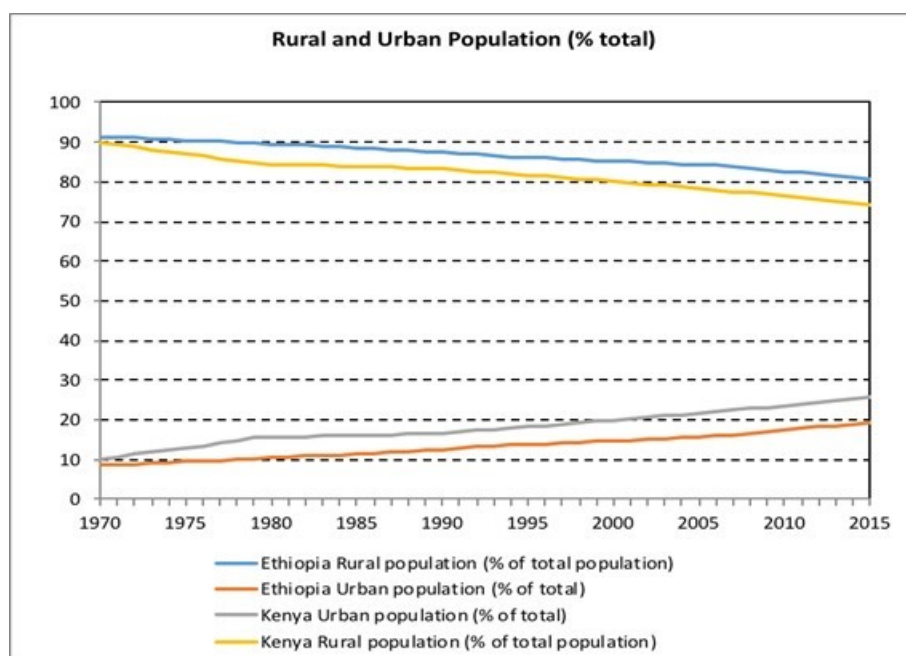
**Figure 5: Access to Improved Sanitation Facilities in Kenya and Ethiopia, 1990-2015**



Source: Created by author based on World Bank (2017).

Both, Ethiopia and Kenya have experienced moderate urban growth during the last few decades. As shown in Figure 6, Ethiopia's share of urban population has slightly increased from 8 percent in 1970 to 19 percent in 2015, while Kenya's urban population increased from 10 percent in 1970 to 25 percent in 2015. Mentioning this, the rural population has decreased. In Kenya, the rural population decreased from 89 percent (in 1970) to 74 percent (in 2015), while it decreased from 91 percent (in 1970) to 80 percent (in 2015) in Ethiopia. The reverse applies to the urban population shares. Keeping these moderate rates of urbanization in both countries in mind, we now review the access rates to water and sanitation in rural and urban areas of Kenya and Ethiopia.

**Figure 6: Rural and Urban Population in Kenya and Ethiopia**



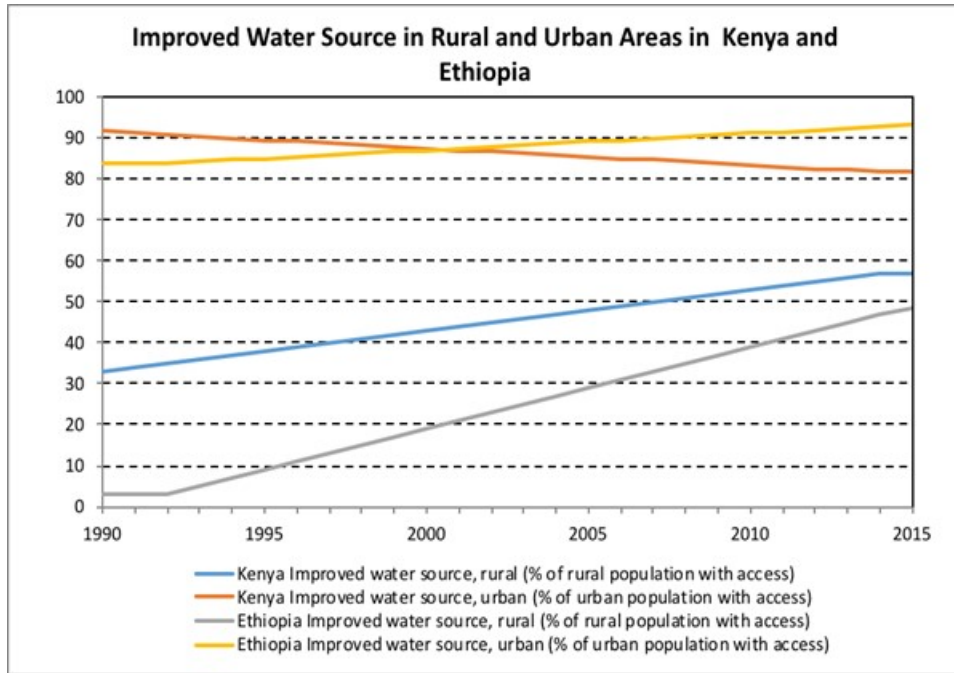
Source: Created by author based on World Bank (2017).

Figures 7 and 8 show the access rates for the rural and urban populations in Ethiopia and Kenya, respectively for safe water and sanitation.

- In Ethiopia, only 3 percent of the rural population had access to safe water in 1990, which increased drastically to 48.6 percent in 2015. With regards to sanitation, the access rate of Ethiopia's rural population increased from close to zero percent in 1990 to 28.2 percent in 2015. With regards to Ethiopia's urban population, the access rate to safe water increased from 83 percent in 1990 to 93.3 percent in 2015, while the access rate to sanitation increased from 21 percent in 1990 to 27.5 percent in 2015.
- For Kenya's rural population, access to water increased from 33 percent in 1970 to 56 percent in 2015, while access to sanitation facilities increased by only 5.5 percent (from 24.2 percent in 1990 to 29.7 percent in 2015). For Kenya's urban population, the percentage of access to water decreased by 10 percentage points (from 92 percent in 1990 to 82 percent in 2015) while access to sanitation facilities increased by 4.6 percentage points (from 26.6 percent in 1990 to 31.2 percent in 2015).

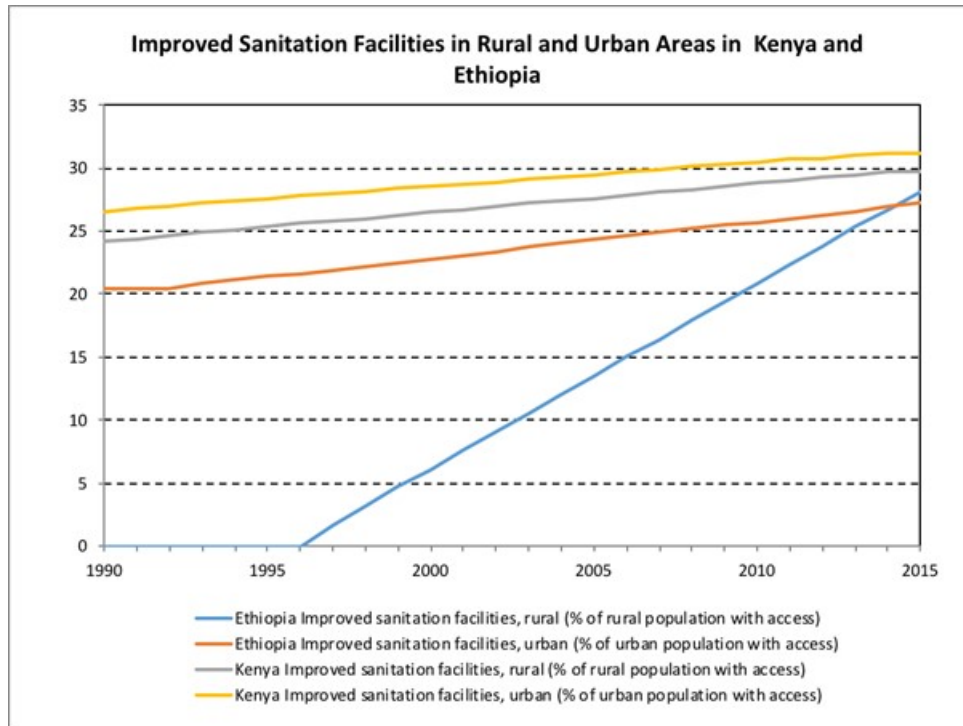


**Figure 7: Access to Water in Rural and Urban Areas in Kenya and Ethiopia, 1990-2015**



Source: Created by author based on World Bank (2017).

**Figure 8: Access to Sanitation in Rural and Urban Areas in Kenya and Ethiopia 1990-2015**



Source: Created by author based on World Bank (2017).



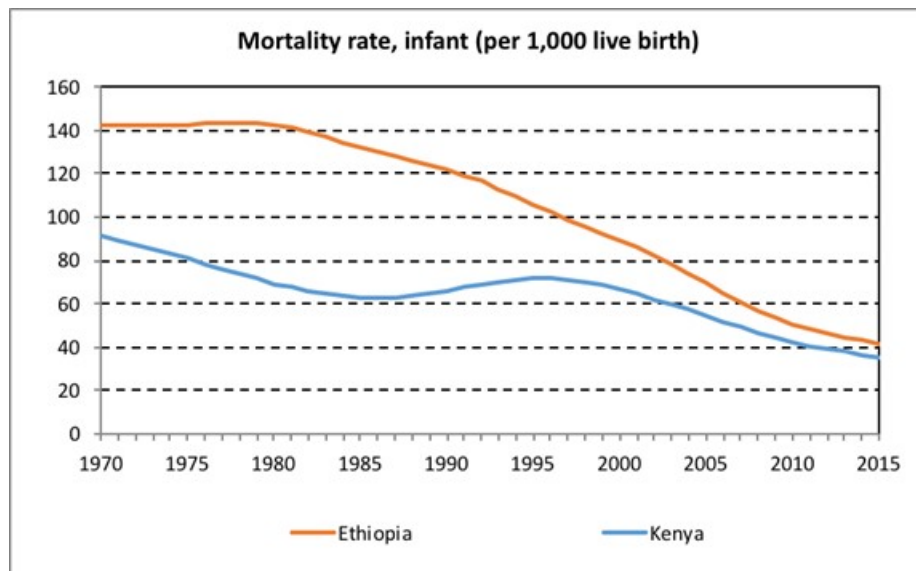
## IV.2. Implications on Infant Mortality

As detailed in Berman (2016), water-borne diseases (such as diarrhea and cholera) have become the leading cause of death in children under the age of five in Ethiopia. The same applies to Kenya, where water pathogen (causing cholera and diseases from parasitic worms) is a big problem. Sreenivasan et al. (2015, p. 873) explain how there are many clinics in rural western Kenya that do not have access to safe water, and this is an issue because it can lead to water-borne diseases and can claim the lives of many people. As a result, although Kenya has made progress, water-borne diseases are still an issue for the people who do not have access to improved sanitation, as well as in Ethiopia.

Comparing the data provided above on access to water and sanitation with Figure 9 below, shows a close correlation between a) increasing access to water and sanitation and b) a decrease in infant mortality. In 1990, Kenya's infant mortality rate was 65.8 per 1,000 live births, which is when 42.8 percent of the population had access to water and when 24.6 percent of the population had access to improved sanitation. But in 2015, when 63.2 percent of the population had access to water and 30.1 percent of the population had access to sanitation facilities, Kenya's infant mortality rate decreased from 65.8 to 35.5 per 1,000 live births.

In Ethiopia, the infant mortality rate in 1990 was 121.6 per 1,000 live births, which is when only 13.2 percent of the population had access to water and only 2.6 percent of the population had access to improved sanitation. However, in 2015, when access to water increased to 57.3 percent and access to sanitation facilities increased to 28 percent, Ethiopia's infant mortality rate decreased to 41.4 per 1,000 live births, which is a reduction by about two thirds within 25 years. As Figure 9 shows, since 1980, Ethiopia has made far more progress than Kenya. Ethiopia still has a higher infant mortality rate than Kenya, though it caught nearly up with Kenya. Clearly, with further progress in access to water and sanitation to come, it is expected that infant mortality rates will reduce further.

**Figure 9: Infant Mortality Rate (per 1,000 live births), 1970-2015**



Source: Created by author based on World Bank (2017).

### IV.3. Implications on Women's Development

Not having access to safe water means that people have to find their own ways to search for water. It is well documented that women and children have to spend many hours fetching water. For women in Kenya, collecting water is a challenging task every day. As documented in Wananchi (2017), in rural Kenya, approximately 26 percent of women and children spend one hour or more, 20 percent spend between 30 and 60 minutes, while 54 percent can get their water within 30 minutes. In urban areas, 78 percent of the households can collect water in 30 minutes, but 12 percent of households spend one hour or more.

To exemplify the daily water-related struggles in Kenya, a video documentary by Reid (2017) tells the story of Cheru, an about a 5-year-old girl, who lives in the Chepoyotwo village in rural Kenya and has to help her mother carrying water every day in a 4.27 miles long round trip, which takes 3 hours and 32 minutes one way.

*Cheru's mother, Monica, wakes up early. She makes her children tea, with goat's milk. Cheru and her siblings drink tea and eat leftovers from their one meal a day. Monica checks why Cheru's teeth are hurting. She hands Cheru the empty tea kettle. Cheru joins other children from the community with their empty water jugs. They take a well-worn path. The difficult journey begins. Cheru falls on the steep slope. The route follows a dry river bed. A dirty puddle gives Cheru a chance to wash her face. The water is contaminated. She rests with her sister in the shade. Cheru races to catch up [with the other children]. Cheru scoops dirty water into her kettle. Her sister joins her, while goats wait their turn. Cheru cries when the bigger kids take away her kettle. Aggressive camels are thirsty, too. Cheru's kettle is full. It's time to walk home. Heavy water jugs make the walk back much harder. Each child carries as much water as they can. The sun is scorching. Swirling winds blow sand in the children's faces. The children make the walk every day, sometimes twice (Reid, 2017, transcript of video).*

Similarly, in Ethiopia's rural areas, many women and children have to walk up to six hours every day in order to collect water and they collect water from unprotected ponds that they share with animals. Stevenson et al. (2012) carried out a study in rural communities in South Gondar zone of Amhara regional state, in Ethiopia, which highlights the implications of the distance for getting water on women. Table 1 shows the demographic characteristics of participants and community water access conditions, which varies by season. It shows that 8 percent of women travel more than 60 minutes to a water source during the primary rainy season, which increases to 15 percent during the dry season.

Stevenson et al. (2012) also show that 18.5 percent of women said that they kept a girl home from school to help with the collection of water, which implies that the collection of water prevents children from going to school. Suriyaarachchi (2016) provides the perspective of a young Ethiopian girl named Aysha, who lives in a remote region of Ethiopia. Aysha must walk an eight-hour round trip every day in order to reach her closest river to get water. Given her situation, she is unable to attend school and does not have time to learn, play, or be a child. A website source of the Interamerican Network of Academics of Sciences (IANAS) (2013) shows that the burden of fetching water inhibits not only a female's access to education, but also her income generation, and political and cultural involvement. If there is an increase in the accessibility of water, women will suffer less and will have the opportunity to become educated.

**Table 1: Demographic Characteristics of Participants and Community Water Access Conditions (by kebele)**

	Gind		Lebet	Medeb	Soros	Total
	Atemem	Qoma	Eslam	Gubda		
	n=59	n=59	n=76	n=88	n=42	n=324
<b>Household characteristics</b>						
Mean age of respondents (SD)	38 (12.2)	39 (13.5)	40 (11.9)	38 (14.7)	43 (13.3)	39 (13.3)
Mean household size (SD)	5.6 (2.0)	5.4 (2.4)	5.3 (2.0)	4.9 (1.7)	5.7 (2.3)	5.3 (2.0)
Mean food insecurity score (SD) [scale 0-9]	1.9 (2.2)	3.6 (2.9)	2.8 (2.3)	3.0 (2.7)	4.4 (2.6)	3.0 (2.6)
Mean SRQ-F score (SD) [scale 0-29]	8.3 (6.3)	10.6 (5.8)	9.3 (5.9)	9.8 (5.6)	13.4 (6.4)	9.9 (6.1)
<b>Household WASH characteristics</b>						
Mean water insecurity score (SD) [scale 0-24]	4.9 (4.5)	11.0 (5.9)	6.0 (5.6)	3.1 (3.8)	9.0 (6.2)	6.3 (5.8)
% households with latrine	85	51	75	32	52	58
Mean liters of water collected per person/day (SD)	10.5 (6.5)	12.0 (11.0)	10.4 (4.3)	10.9 (4.5)	10.0 (5.7)	9.9 (6.1)
% using unprotected drinking water source for drinking in rainy season	61	81	50	56	74	62
% traveling >60 min. to primary rainy season water source	7	5	8	7	14	8
% queueing >30 min. at primary rainy season water source	17	7	29	1	29	15
% using unprotected drinking water source for drinking in dry season	56	98	51	53	69	64
% traveling >60 min. to primary dry season water source	10	44	3	8	14	15
% queueing >30 min. at primary dry season water source	21	49	63	5	54	41
WASH intervention by CARE	yes	no	no	yes	yes	--

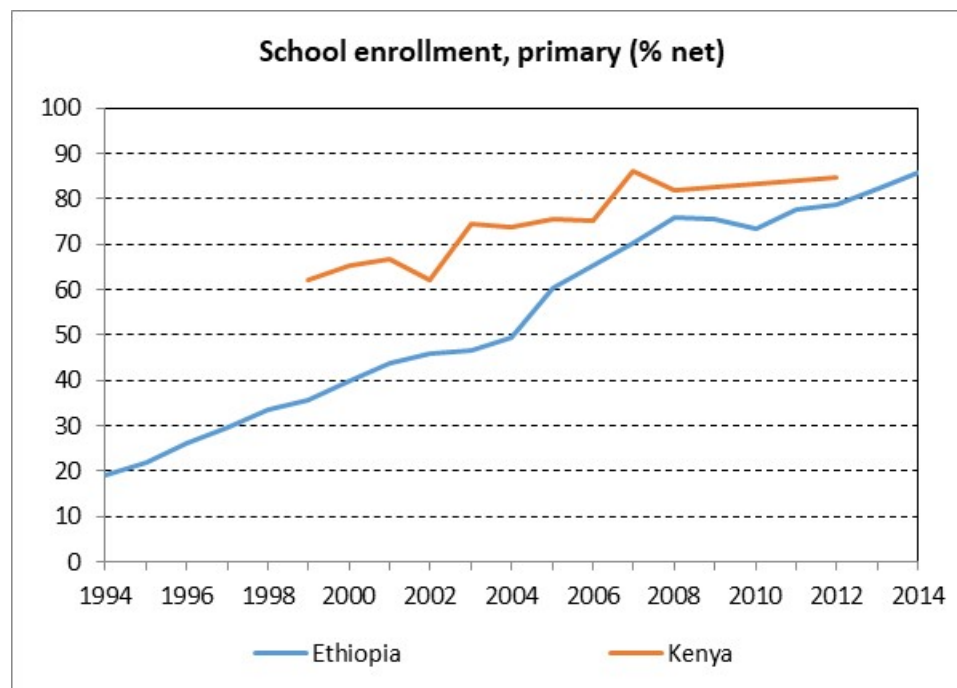
Source: Stevenson et al. (2012), Table 1.

#### IV.4. The Role of Education

Education is an essential factor to reduce the amount of water-borne diseases in both Kenya and Ethiopia. Not having enough understanding on clean water and water treatment makes them short sighted on the topic of water that could potentially cause diseases. In many developing countries, people use any water sources that are available to them and that is because of the lack of adequate resources and the lack of knowledge of the consequences of drinking contaminated water. This is a major issue that forces children to have to miss school to collect water, resulting in missed educational opportunities for children and women.

Figure 10 shows the percentage of primary net school enrollment in both Kenya and Ethiopia. Even though there is limited data for Kenya, the figure shows that school enrollment has been increasing in both countries, relatively quickly in Ethiopia (where it increased from 19.2 percent in 1994 to 85.9 percent in 2014) and relatively slowly in Kenya (where it increased from 62.3 percent in 1999 to 84.9 percent in 2012). Not only has Ethiopia made much more progress than Kenya, Ethiopia's recent trend is promising, while Kenya's recent trend indicates a slowdown in increasing net school enrollment.

**Figure 10: Primary School Enrollment in Kenya and Ethiopia (all available years)**

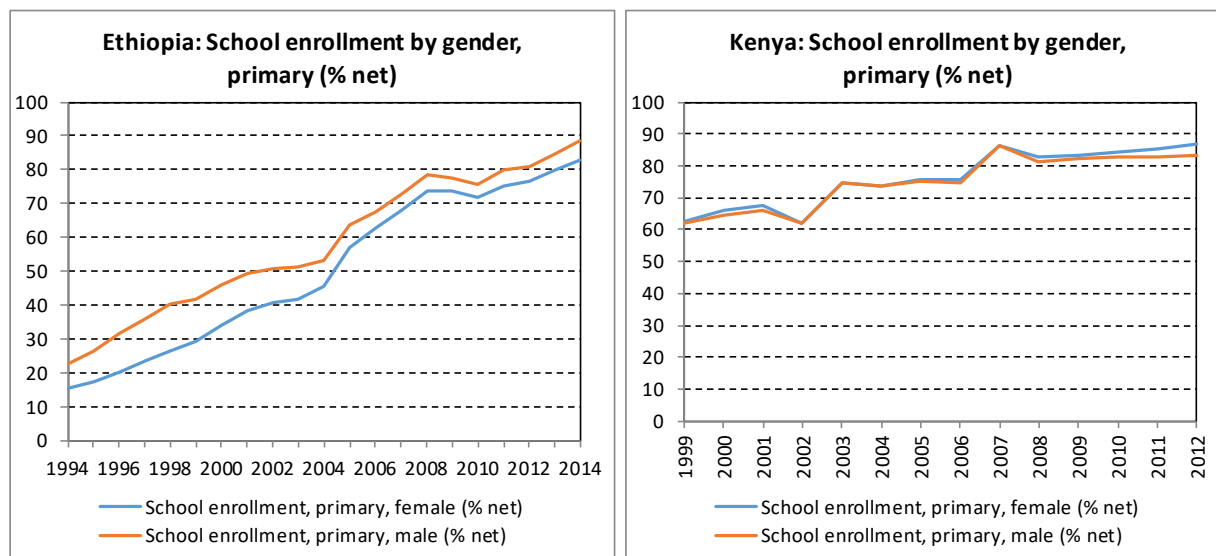


Source: Created by author based on World Bank (2017).

Figure 11 shows the difference between males and females in net school enrollment. The left panel shows that compared to the late 1990s (when the gender gap was 13 percentage points), Ethiopia's gender gap has decreased steadily until 2009 (when it was 3.6 percentage points) but has increased once again during the last few years. In 2014, the gender gap was 5.8 percentage points. This disparity is mainly due to the fact that young girls in Ethiopia need to work, like helping their

mothers with family responsibilities, such as collecting water. On the other hand, though Kenya has made far less progress than Ethiopia in terms of increasing the overall net primary school enrollment ratio, Kenya's gender gap has been very narrow and at least since 2010, there is a solid and growing gender gap of girls overtaking boys.

**Figure 11: Female and Male Primary School Enrollment in Ethiopia and Kenya**



Source: Created by author based on World Bank (2017).

In Kenya, there is a school-based safe water and hygiene intervention program in 45 primary schools. O'Reilly et al. (2007) evaluated this intervention program in order to determine the impact on students' knowledge and how parents adopt the practices their children learn. As part of their study, O'Reilly et al. (2007) surveyed 390 students and also their parents. The survey demonstrated that there was improvement on the students' knowledge on water treatment and they also knew when they had to wash their hands. This type of intervention program demonstrates that they have a positive effect in improving the school and home environments because it can increase awareness, knowledge and most importantly, change the behavior of people related to water safety in schools as well as at home. These programs could develop and improve the access to safe water, and if effective, they reduce diarrheal diseases and will therefore also increase school attendance (O'Reilly et al. 2007).

In other words, due to the lack of some children going to primary school, they lack the education they need about water safety and contamination. Like with the example of the school-based water and hygiene intervention program, when children are not going to school, they cannot learn about this water crisis issue. When they do not learn and get this education, they cannot make changes in their homes and those families will keep on getting water-borne diseases just because they are collecting water and not getting educated about this issue and how to prevent getting sick.

## V. Conclusion

Ethiopia has a lower GDP per capita than Kenya, but in terms of access to safe water and sanitation, Ethiopia has made significantly more progress during the last three decades than Kenya, in both rural and urban areas. Although that is true, the lack of access to water and sanitation facilities is still impacting both Ethiopia and Kenya in many ways, especially in health and education.

Far too many women and children still have to travel many hours in order to collect water, and in many cases, that water is contaminated by water-borne diseases. Despite progress, more than two thirds of the population do not have access to improved sanitation, in both countries. Although both countries have made progress in reducing their mortality rates, they should really keep focusing on the accessibility of water and sanitation when dealing with water-borne diseases, so they can reduce mortality rates, especially child mortality rates further.

In order to achieve this, it is very crucial for children who go to primary school to have education on water contamination and sanitation. The populations of both countries need to learn more about water and sanitation hygiene to further reduce water-borne diseases. This relatively simple solution of being educated is very important, because it will reduce the negative impacts of the looming water crisis, it will reduce the incidence of people drinking unsafe water and getting water-borne diseases. Education is the key in Ethiopia and Kenya.

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