

Struggling to Survive: Water Scarcity and Poor Sanitation in Colombia and Kenya

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Abstract

This article compares and contrasts the access to safe water and sanitation in Colombia and Kenya. Kenya has some serious issues with access to clean and safe water, whereas Colombia has a large majority of people able to have clean water. Yet, only a few cities in Colombia allow people to drink tap water due to some high levels of contamination. On the bright side, both countries have been improving access to water from an improved source for the last few years. But the major issue, for both countries, is access to safe water in rural areas. Surprisingly, Colombia struggles to have improved water sources for its rural areas, even though they have a high level of economic development. Even though Colombia is one of the most water-rich countries, it still struggles with water stress. Kenya has distant water sources that make getting water to rural areas a struggle. This article analyzes why both countries continue to struggle to create safe water and improved sanitation at their different levels. It will also examine how two different governments are trying to improve the issues that remain.

I. Introduction

Not having access to clean water is an issue that affects about 790 million people around the world.¹ This is most likely to get worse as climate change will increase water scarcity, especially in many developing countries. According to the World Health Organization (WHO) (2019), half of the world's population will be living in water-stressed areas by 2025. Safe water and sanitation are essential for human development and are two of the great drivers of world poverty and inequality.²

This article aims to understand the difference and similarities between Colombia's and Kenya's progress in getting safe water and sanitation to all of their population. Both Colombia and Kenya have struggled to improve their water and sanitation sectors, especially in rural areas. Kenya has a larger issue with access to safe water and sanitation than Colombia, which has recently been improving water safety. Even though there are still major issues with water safety in Colombia, it

¹ Centers for Disease Control and Prevention (2016).

² United Nations Development Programme (UNDP) (2006).

provides a great demonstration of how safe water and sanitation help the people and the economy.³ Through their differences and similarities, both countries can still learn from one another to find solutions to their water and sanitation issues. This article also aims to show possible solutions using new technologies that could reduce water scarcity within both countries.

Following this brief introduction (Section I), Section II offers a brief review of the literature. After that, Section III provides some background information on the two countries' socio-economic evolution. Section IV examines the evolution of access to water and sanitation in Colombia and Kenya based on the available data. Section V examines first the ethical origins for the human right on water and sanitation and then reflects on current water and sanitation policies, including the development of new technologies. Section VI provides the conclusion.

II. Brief Literature Review

Since water is a necessary resource for life, many articles and research are discussing why access to safe water and sanitation that provides solutions for developing countries. The water crisis has plenty of research in both Kenya and Colombia. Stratfor (2016), Salleh (2019), and World Bank (2016) discuss the water and sanitation issues of Colombia. Development Initiatives (2018) and Kamau and Njiru (2018) provide reports on the issues of water and sanitation in Kenya as well as the major issues within slums and possible ways to improve water and sanitation issues.

- Stratfor (2016) discusses that even though Colombia has an abundant resource of water does not mean Colombia is not experiencing water stress in areas or water scarcity due to pollution, insufficient infrastructure, unequal distribution, and weather changes due to climate change. The article goes in-depth about the location of water resources and how they are either polluted that makes them unsafe or is used primarily for agricultural production and hydropower. This article stresses that water scarcity is due to natural and human-made circumstances. The natural issues have to do with flooding from El Nino's and La Nina's and droughts from the long summer seasons. Human issues are the lack of revenue and investment in infrastructure to make the water crisis improve. Furthermore, this article mentions how Colombia's water scarcity will affect many regions, not just a small area.
- Salleh (2019) reports on a presentation made by Natalia Jiménex at the Nexus Seminar No. 33, which focuses on the safe use of wastewater from agriculture that ultimately will promote food security. Jiménex emphasized that the agriculture sector in Colombia is expected to grow 2.5 percent annually with an increase of 44 percent in land area in the next 15 years, which will increase the demand for water, and hence, using wastewater is a key alternative to increase water availability for agriculture in Colombia. However, Colombia faces various lacks, including awareness, technology, economic incentives, sectorial thinking, and administrative process. Jiménex suggests some solutions to these issues by adopting a multi-barrier approach, which implies applying measures at every stage of the process that considers health and environmental risks. Jiménex concludes with the suggestion to further discuss the energy consumption needed for the treatment of wastewater and the impact wastewater can have on crops within the Colombian community.

³ World Health Organization (2019).

- World Bank (2016) is a full report of the water and sanitation programs within Colombia for rural areas and small towns. This report studies the domestic private sector provision of water and sanitation services in rural and small towns and the role of the public sector. It provides both background information into the development of public services at the municipal level and the positive effects and achievements of domestic private sector participation (DPSP) within Colombia. This report also emphasizes the lack of attention given to the provision of water and sanitation services in rural areas. There is background information on Colombia's economic situation as well as regulations and policies in place for the water and sanitation sectors. This report aims to find key factors that can help improve water and sanitation services in developing countries, especially for rural areas where water stress is far more common. It concludes with areas for improvement and ways to encourage DPSP.
- Development Initiatives (2018) is a report on Kenya's water and sanitation issues and how there can be progress towards getting universal access to water and sanitation in Kenya. This article estimates that by 2030, access to water will fall below the water scarcity level of 500m³ (132,086 gallons) per person per year due to population growth. This report gives specifics as to which of Kenya's counties have had significant improvements in access to safe water like Kisii, Nyamira, and Migori. There is also a discussion of how access to improved sanitation services has not improved much since 2009. This report also shows the investments made by the national government as well as the county governments towards water and sanitation programs between the years of 2016 and 2018. This report ends with the barriers that remain for poor households due to a lack of pro-poor tariffs and access to facilities.
- Kamau and Njiru (2018) conducted a study to examine the water, sanitation, and hygiene situation within Kenya's more urban slums. They discuss the rapid urbanization from increasing population growth, which has led to overcrowding due to poor infrastructure. The majority of individuals without improved sanitation, which is about 70 percent, live in rural areas. Kamau and Njiru (2018) also discuss the major health issues from a lack of sanitation and access to clean water. Four of the seven slums used for this study were randomly selected around the capital of Kenya. They also dive into hygiene knowledge and the factors that affect water and sanitation in these slums. They concluded that individuals living in slums are far more vulnerable to health-related issues due to a lack of clean water and sanitation.

III. Socio-economic Background

Kenya is located in Eastern Africa, and its agricultural sector constituted 31.5 percent of the nation's gross domestic product (GDP) in 2017.⁴ However, due to climate change that causes flooding and droughts, Kenya's agricultural sector is struggling. Yet, Kenya has made considerable improvements over the last decade towards significant political, structural, and economic reforms that have increased economic growth and human development.⁵ In 2017, 38 percent of the total population worked in agriculture.⁶ As detailed in the next section, only 58.4 percent of Kenyans

⁴ World Bank (2019a).

⁵ World Bank (2019b).

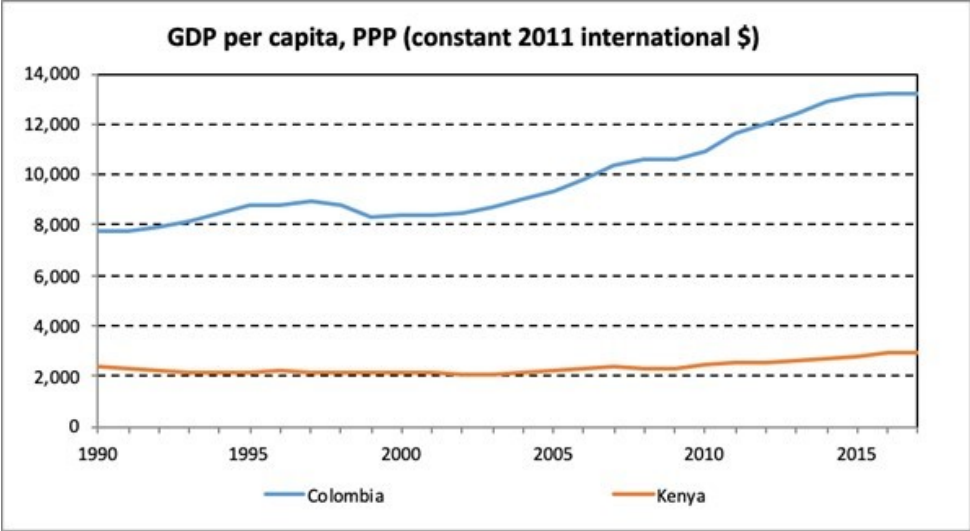
⁶ World Bank (2019a).

have access to improved drinking water, and only 29.8 percent have access to improved sanitation in 2015. If adequate access to water and sanitation improves, violent conflicts over water resources are likely to decrease, as well as a reduction in poverty and a boost in economic growth.⁷

Colombia is located in the north-western corner of South America, and its agricultural sector constituted 6.5 percent of the nation’s gross domestic product (GDP) in 2017, employing 16 percent of Colombia’s workforce.⁸ Colombia’s main sectors are public services and manufacturing, though Colombia’s agriculture sector attracted some foreign investments due to its large exports of coffee. Colombia’s GDP grew rapidly until the commodity crisis in 2014 sharply reduced oil revenues.⁹ As detailed below, 96.5 percent of Colombians have access to improved drinking water, and 84.4 percent have access to improved sanitation in 2015.

As shown in Figure 1, there is a very large difference between Colombia’s and Kenya’s GDP per capita (in constant 2011 international dollars). Colombia’s GDP per capita (in constant 2011 international dollar) increased from \$7,534 in 1990 to \$13,255 in 2017. This is a cumulative increase of 76 percent over 27 years. On the other hand, Kenya’s GDP per capita increased by only 25.7 percent over 27 years, from \$2,380 in 1990 to \$2,993 in 2017.

Figure 1: GDP per capita, PPP (constant 2011 international dollar), 1990-2017



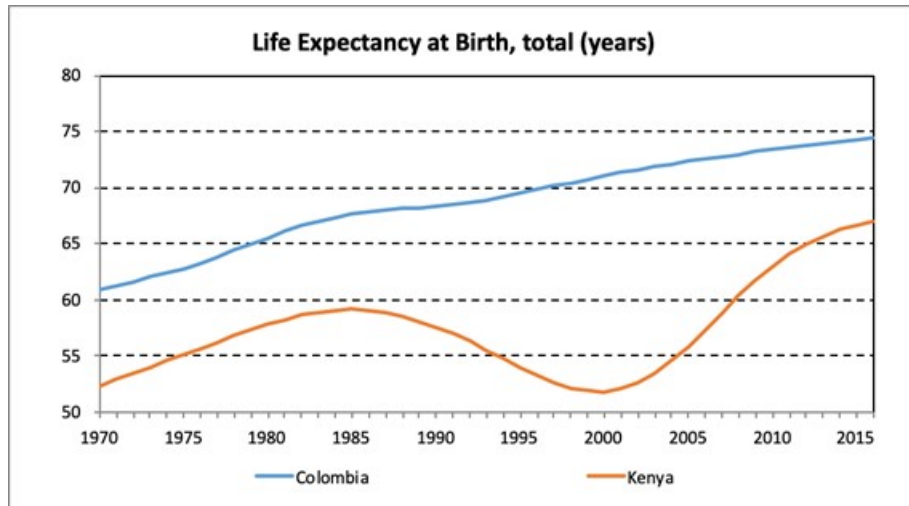
Source: Created by author based on World Bank (2019a).

Given these large differences between GDP per capita for Colombia and Kenya, Figure 2 shows large differences in life expectancy as well. Kenya’s life expectancy has been unstable, while Colombia’s life expectancy has risen fairly constantly between 1970 to 2016. The gap between Colombia’s and Kenya’s life expectancy had remained about the same except when Kenya took a very drastic dip between 1990 and 2000, mainly due to HIV/AIDS crisis happening during this

⁷ Development Initiatives (2018).
⁸ World Bank (2019a).
⁹ Colombia Reports (2018).

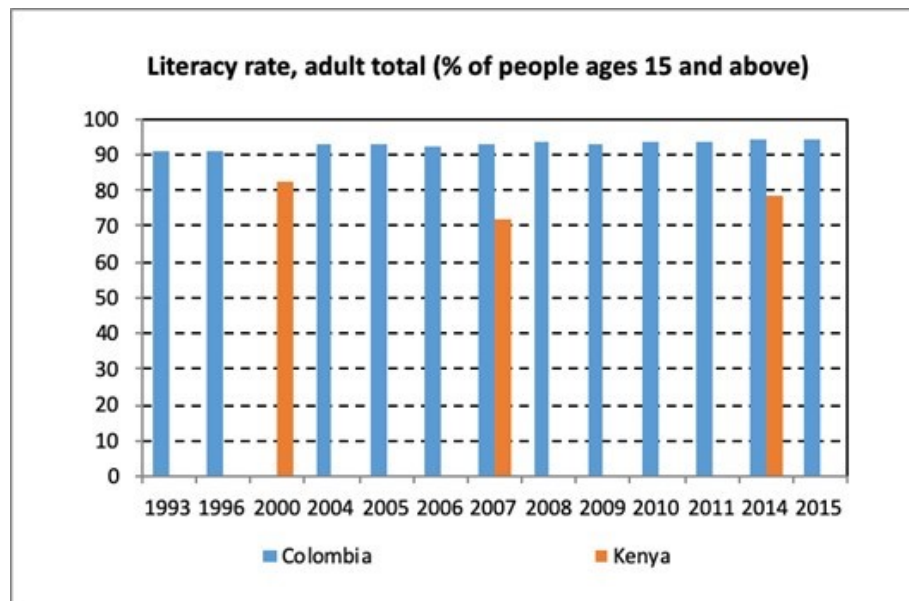
time.¹⁰ This dip is also reflected in Figure 1 when Kenya's GDP per capita fell from \$2,380 in 1990 to \$2,107 in 2002. However, overall, both countries have seen an increase in life expectancy since 1970. Colombia's life expectancy reached 74.4 years in 2016, which is an increase of 13.5 years since 1970. Kenya's life expectancy was only 67 years in 2016, though Kenya's life expectancy increased by 14.8 years since 1970.

Figure 2: Life Expectancy at Birth (in years), 1970-2016



Source: Created by author based on World Bank (2019a).

Figure 3: Total Adult Literacy Rates (all available years)



Source: Created by author based on World Bank (2019a).

¹⁰ Fengler (2012).

Data available for Kenya’s adult literacy rates are poor compared to Colombia’s data availability. Still, as shown in Figure 3, Kenya’s literacy rates have been considerably lower and more volatile than Colombia’s literacy rates. Kenya had an adult literacy rate of 82.2 percent in 2000, which dropped down to 72.2 percent in 2007, and then rose to 78.7 percent in 2014. This evolution is similar to Kenya’s GDP per capita between 2000 and 2014, as it fluctuated as well, but it is inconsistent with the steady increase in life expectancy during this same period. Colombia’s literacy rates showed a small but steady increase from 91.1 percent in 1993 to 94.2 percent in 2015.

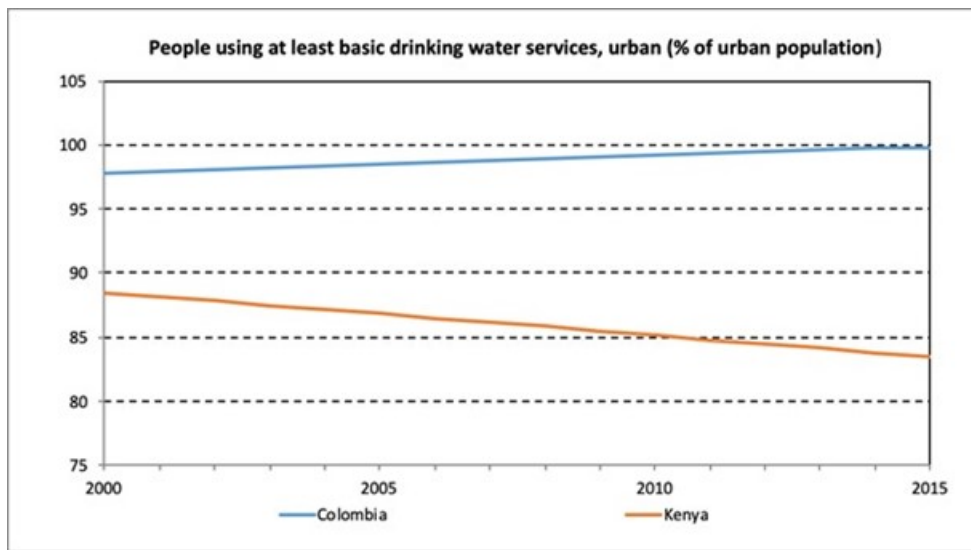
IV. Access to Water and Sanitation in Colombia and Kenya

IV.1. Access to Basic Water Services

Figures 4 and 5 display, respectively, rural and urban access to basic drinking water services in Colombia and Kenya. Access to basic drinking water services are defined as access to drinking water from an improved source, which includes piped water, boreholes, protected dug wells, protected springs, and packaged and delivered water.¹¹

Figure 4 shows that percentage of people with access to at least basic water services has decreased for Kenya’s urban population. This development is very concerning and has been explained by cycles of long droughts, which are increasing as time goes on. Rainfall in Kenya has significantly decreased in the past five years.¹² This decrease in urban access rate is also due to population growth, urbanization, and the destruction of water catchment areas for settlements and farming in urban areas.¹³ However, in Colombia, urban access to at least basic water services has reached 99.8 percent in 2015.

Figure 4: Urban Access to Basic Water Services, 2000-2015



Source: Created by author based on World Bank (2019a).

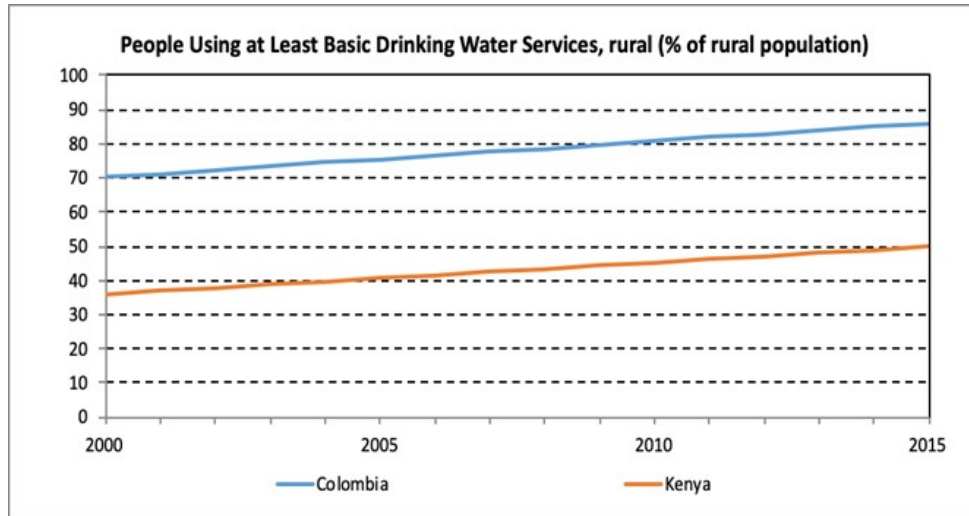
¹¹ This is different than the category in the World Bank (2019) database titled “people using safely managed drinking water services”, which is defined as using drinking water from an improved source that is accessible on premises, available when needed, and free from fecal and priority chemical contamination.

¹² Barton (2019).

¹³ Development Initiatives (2018).

Fortunately, as shown in Figure 5, Kenya is making steady progress in improving access to basic water services for the rural population. Yet, this progress only reaches to just barely 50 percent of the rural population in 2015. Figure 5 also shows that Colombia is improving its access to basic water services for the rural population, reaching 86 percent in 2015.

Figure 5: Rural Access to Basic Water Services, 2000-2015



Source: Created by author based on World Bank (2019a).

IV.2. Access to Sanitation

Figures 6 and 7 show, respectively, the percent of the urban and rural populations that have access to basic sanitation services in Colombia and Kenya. Comparing Figures 6 and 7 (access to sanitation) with Figures 4 and 5 (access to water), we can see that access to sanitation is lower than access to water in both urban and rural areas for both countries. This is a kind of obvious as people consider access to water more important than access to sanitation. However, as stressed in UNDP (2006), this is problematic because poor sanitation does not only contaminate water but also spreads diseases. Without proper sanitation systems, having clean water does not prevent the spread of some diseases. Having sanitation facilities also enforces and teaches the proper way of washing hands and hygiene knowledge. Because of the lack of knowledge with hygiene due to the lack of sanitation services, many soaps within rural households were used for laundry and bathing, and not for washing hands.¹⁴

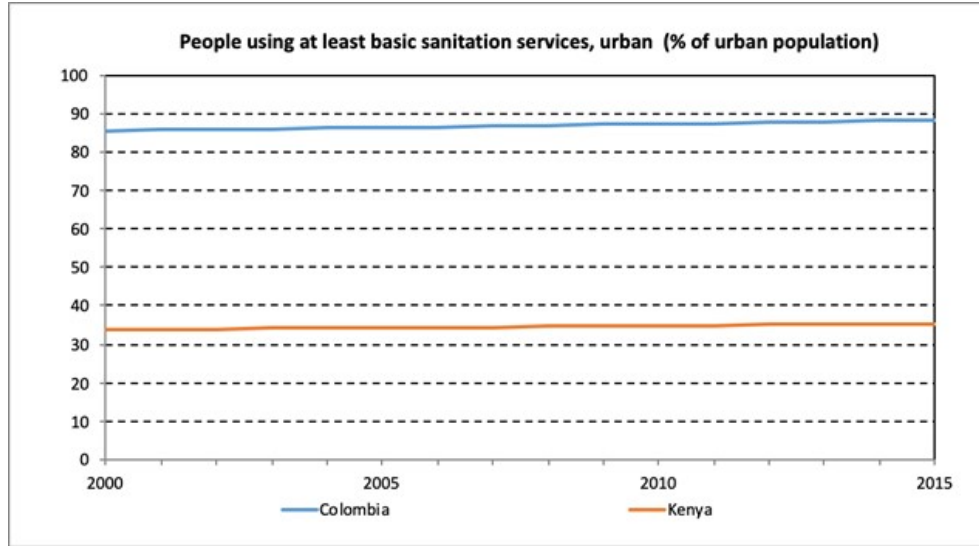
As shown in Figure 6, Kenya’s urban population is lacking access to basic sanitation services with only 35.3 percent having access in 2015. Colombia has had slow but steady progress in improving its urban population’s access to basic sanitation services. In 2015, 88.2 percent had access to basic sanitation services compared to the 85.6 percent in 2000, which is a marginal improvement over 15 years.

Figure 7 shows that there has been a very large increase in basic sanitation services for Colombia’s rural population, reaching 72.0 percent. However, for Kenya, there was a decrease in basic sanitation services for its rural population, dropping from 30.3 percent in 2000 to 27.9 percent in 2015. This reduction can be explained by the slow progress in scaling up the provision of sanitation

¹⁴ Kamau and Njiru (2018).

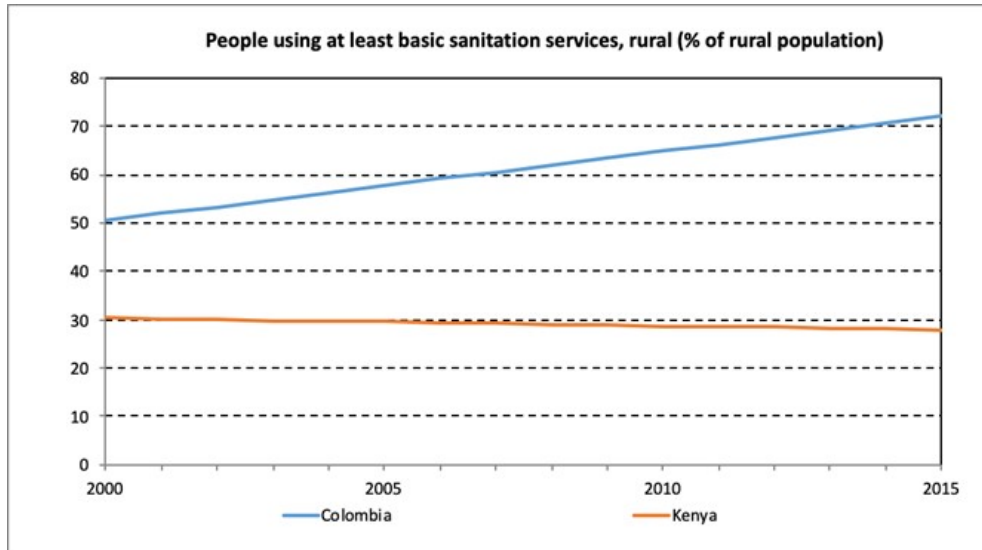
services in response to increasing needs. These basic sanitation services are low quality with many washing their hands in household toilets, increasing the risk of spreading diseases.¹⁵

Figure 6: Urban Access to Basic Sanitation Services, 2000-2015



Source: Created by author based on World Bank (2019a).

Figure 7: Rural Access to Basic Sanitation Services, 2000-2015



Source: Created by author based on World Bank (2019a).

¹⁵ Development Initiatives (2018).

V. Ethical Origins and Ethical Reflection on Current Policies

V.1. Ethical Origins

Water is a fundamental necessity for human life and a part of nature. So, there are two forms to discuss about the human right to water: a right to safe drinking water, and a right to sanitation.¹⁶ For individuals involved in water resource management and public health, it is important to understand the moral values and ethical reasoning for the significance of water as a human right. The use of water for agricultural, manufacturing, and land-use practices all over the world are contaminating groundwater that causes many to suffer from water-borne diseases that can lead to death.¹⁷ This affects both Colombia and Kenya by bringing down life expectancy.

Water ethics is a response to challenges like violent conflicts over scarce water resources, reseeding rivers, ocean pollution, and illnesses.¹⁸ There are two crucial points that make water a justice issue: water is life-giving and non-substitutable and water is part of nature.¹⁹ The idea too that freshwater is not as infinite as once thought since it only makes up about 30 percent of the water on earth that kickstarted a stronger push for water ethics.²⁰ So, humanity ultimately collectively owns the earth making each person possess a set of natural rights with a status of co-owners. But this is complicated due to the separation and borders developed from nation-states. Once nation-states or institutions start to dominate, they must guarantee that the co-owners of the planet will not be forgotten and that they will not violate their natural rights.²¹

The first major global agreement on water was adopted at the 1977 United Nations Conference on Water held in Mar del Plata, Argentina. The adoption of the Mar del Plata Action Plan was the first internationally coordinated approach to Integrated Water Resources Management (IWRM). However, it was not until July 28, 2010, that the United Nations General Assembly “explicitly recognized the human right to water and sanitation and acknowledged that clean drinking water and sanitation are essential to the realization of all human rights.”²²

V.2. Ethical Reflection on Current Policies

As was shown in the previous section (Section IV), the water and sanitation supply in Colombia has improved in a variety of ways over the past years, and the coverage is relatively high. However, the relatively low coverage in rural areas remains a problem that is unethical. The unequal distribution of water shows the importance of having ethical policies that determine water access. What improved water and sanitation so much in Colombia was the establishment of private sector participation in the poorest parts of the country, where utilities were not as abundant and up to date in the 1990s.²³

According to the World Bank (2016), unlike in many other countries, the privatization of water supply and sanitation had a positive effect in Colombia due to adapting ethical models and developing homegrown solutions to particular circumstances based on the culture of Colombia.

¹⁶ Risse (2014).

¹⁷ Jennings, Gwiazdon and Heltne (2009).

¹⁸ Grunwald (2016).

¹⁹ Risse (2014).

²⁰ Schmidt and Peppard (2014).

²¹ Risse (2014).

²² See https://www.un.org/waterforlifedecade/human_right_to_water.shtml.

²³ World Bank (2016).

There was also the establishment of key institutions like the *Comisión Reguladora de Agua Potable y Sanemiento* (which regulates water supply and sanitation tariffs) and the Vice-Ministry of Water and Sanitation (which implements policies and programs in the water supply and sanitation sector). The Colombian Constitution establishes that it is the State's duty to provide public services for all inhabitants in the national territory through utilities, companies, or municipalities.²⁴

Ethically, the government is doing a fair job of implementing policies and programs to evenly distribute water and sanitation to areas that are lacking. However, Colombia still needs to work on building new and expanding existing infrastructures to improve water supply and sanitation. This will require greater revenue and more investments in new technologies to improve water supply and sanitation.²⁵ That means that the government will need to focus on water infrastructure projects rather than other projects because access to water is ethically a higher priority. If water inequality continues, poverty will also continue to thrive.

On the other hand, Kenya's government struggles to implement ethical programs and policies to improve water supply and sanitation because of the lack of engagement with communities. As has been established, an improvement in water supply and sanitation will improve the economy as well as improve health and wellbeing. Reductions in violent conflicts will also occur when water resources are improved.²⁶ Like Colombia, Kenya's Constitution recognizes that access to safe water and improved sanitation is a right to every Kenyan, regardless of location. It is the responsibility of the national and local governments to provide water resource management and services. Yet, these governments struggle to do so. There needs to be more investment in the water and sanitation sectors, including through private participation. Since climate change is affecting water availability for all countries and there is such a heavy reliance on water for many aspects of life, the development of new technologies is what will continue human development.

Nanotechnology allows for the removal of microbes, bacteria, and other harmful microorganisms from water through the use of composite nanoparticles, which emit silver ions that destroy these dangerous microorganisms.²⁷ Nanotechnology was promoted and headed by countries in Latin America, like Brazil, Mexico, and Argentina. This technology has been encouraged by policies within Colombia. However, there is very unequal development in nanotechnology, especially in the development of research labs within Latin America.²⁸ Larger countries have more endowment for their research labs, leaving smaller countries like Colombia to scramble to find funding for their research labs.

Figure 8 shows the money invested in water and sanitation with private participation in Colombia from 1995 to 2013 (which is the last year such data is available for Colombia). According to the definition provided by the World Bank (2019a), these amounts refer to "commitments to water and sanitation projects that have reached financial closure and directly or indirectly serve the public, including operation and management contracts with major capital expenditure, greenfield projects (in which a private entity or public-private joint venture builds and operates a new facility), and divestitures." As Figure 8 shows, there is considerable volatility, which is however difficult to interpret, especially as there were seemingly no such investments from 2007 to 2012.

²⁴ World Bank (2016).

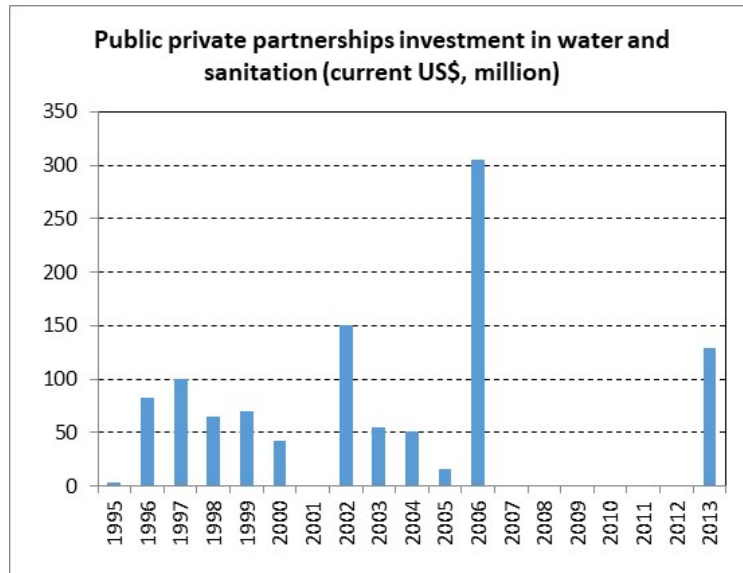
²⁵ Stratfor Worldview (2016).

²⁶ Development Initiatives (2018).

²⁷ Henley (2013).

²⁸ Foladori and Invernizzi (2013).

Figure 8: Investment in Water and Sanitation with Private Participation in Colombia (current US\$, million)



Source: Created by author based on World Bank (2019a).

It is important to notice that Kenya is not included in Figure 8 due to the lack of information on such investments in Kenya. There is no data for any years between 1970 to 2017 for Kenya in the World Bank (2019) dataset, even though about 87 percent of the people in Kenya who pay for water are provided with water from private businesses.²⁹ This is problematic as it shows that there is a lack of transparency in investments in Kenya’s water and sanitation sectors. What we do know based on various reports is that Kenya has tried privatizing water supply and sanitation, which was, however, not successful because of the lack of water ethics in their policies. The privatization of water supply and sanitation sectors can only be effective if Kenya has strong stakeholder engagement and community consultations.³⁰ Such communication with local communities will be needed to ensure that ethical policies are being proposed as well as implemented.

The fact that about 87 percent of the people who pay for water in Kenya are provided with water from private businesses is also ethically problematic. If water is indeed a human right, and we are co-owners of the water on the planet, it is concerning that poor people have to pay for access to a minimum amount of water. This is where the privatization of water supply and sanitation sectors becomes an issue. Providing clean water should not be profitable for private companies. If companies do charge for water and sanitation, then it is the companies’ responsibility to ensure that poor households receive a minimum of safe water and sanitation services. If they do not, this makes poor citizens vulnerable to environmental health-related conditions.³¹

Since the development of the Safe Use of Wastewater in Agriculture (SUWA) in Colombia in 2016, water access has been improving.³² This is because the use of wastewater stops farmers from

²⁹ Kamau and Njiru (2018).

³⁰ Ndungu (2018).

³¹ Kamau and Njiru (2018).

³² Salleh (2019).

using drinking water for their crops. Since they now use less clean water and are reusing repurposed wastewater, this allows clean water to be redirected to the population for sanitation and drinking.

There is also still a lack of funding for water supply and sanitation services in rural areas for both Colombia and Kenya. In order to improve these services, new technologies need to be proved, and the only way to do this is by investing in it. Nanotechnology is a great way to improve sanitation. Seawater desalination is another way to provide more water supply. This technology would remove the saltwater from seawater and microorganisms that would enable it to become something usable. However, this technology is still in the works and is extremely expensive, which makes it inaccessible to developing countries.³³ There are other water technologies that can provide new sources of water supply and sanitation at affordable costs. It is just a matter of both countries prioritizing the water supply and sanitation sectors over other areas of the economy. The Kenya Environmental Sanitation and Hygiene Policy hope to ensure that everyone in Kenya has 100 percent access to improved sanitation services by 2030,³⁴ but it is unlikely that this goal will be achieved.

VI. Conclusion

Both Kenya and Colombia have to improve various issues in the water and sanitation sectors. These improvements include investments from both national and local governments in water supply and sanitation services, funding new technology, focusing equally on rural and urban populations access, and involving the thoughts of the community in policy and decision making. This will require more focus from both governments into the human right of water rather than other areas. Since water is a human right, this is a major priority over other economic areas. If both countries want to improve human development and lower poverty rates, they first must improve the water and sanitation sectors.

The water and sanitation services in both Colombia and Kenya have room for improvement, especially in rural areas. This improvement can be made through investments in new technologies that have the power to improve limited water sources. Furthermore, it appears that the ethical and moral wrongdoings of both countries are catching up to them a bit due to the decreases in past improvements. It is also clear that both countries would do best by learning from one another. Kenya would be able to catch up to Colombia if it followed by incorporating ethical ideas in their policies through communal communication. Further research will be needed to determine the new technologies to improve water and sanitation as well as to understand how developing countries will be able to invest in these technologies.

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³³ Henley (2013).

³⁴ Development Initiatives (2018).

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