



## Nigeria Water Well Needs Analysis

### **Background**

In comparison to other countries in Africa, Nigeria is abundant with fresh surface water. Nigeria has 215 cubic kilometers available, while other countries like South Africa only have 50 cubic kilometers. However, only 67% of Nigerians have access to a basic water supply. In rural areas, only 54% of people have basic water access. Those with access can still be affected by contaminated water due to various parasites and bacteria. Despite 67% percent of the population having access to a basic water supply, only 19% of the population have access to a safe drinking water supply. The scarcity of clean water has never been more apparent as the population has surpassed 200 million with a 2.54% population growth rate. This paper analyzes the problems that prevent Nigerians' from accessing clean drinking water and emphasizes the need for relief assistance.

### **Inequality**

In metropolitan areas, surface water is often highly polluted due to runoff and local air pollution. For example, heavy metals such as lead and cadmium have been sampled in the Lagos Lagoon, which is the city's main water source. Polluted runoff has become an issue as groundwater that is being used to drink can be contaminated with pollutants, such as limestone and dirt or sand. Those in large cities like Lagos have the opportunity to purchase prefiltered water to avoid drinking the contaminated water, but outside of the city there isn't the same accessibility. In rural areas, the markets where food and goods are frequently exchanged results in many pollutants being spread. Some of the pollutants that trickle into drainage systems and then end up in local reservoirs consists of cosmetics, animal and human waste, plastics, food waste, and dust funnel. Agricultural practice in these areas have runoff problems as well due to animal waste, pesticides, fertilizers, and soil erosion. The fertilizers and pesticides are especially threatening as they can infiltrate groundwater sources easily. Many people dig small wells and boreholes to gain access to water, but these are far too close to the surface to avoid these chemicals.

## **Waste and Hygiene**

Many villages lack an infrastructure for the clean disposal of human waste. Coliform counts are on average much higher than is safe for drinking water, due to feces contamination in the water. These coliform counts explain the thousands of cases of cholera every year. In 2010 alone, there were over 41,000 cases in Nigeria. According to UNICEF, a quarter of the population openly defecates outside, due to the lack of access to toilets. Waste sites like landfills are poorly managed across the country to accommodate for the leachate created from these sites. Without proper regulation for seals, the leachate easily infiltrates into the groundwater filled with toxic contaminants.

## **Mining**

Another major issue for future groundwater health of Nigeria is from the constantly increasing presence of oil and fracking in the country. This industry is considered the most profitable and one of the biggest drivers of economic advancement in their economy. According to the CIA Factbook, Nigeria has the tenth largest oil reserve in the world, which is worth \$37 billion. The Niger River Basin is particularly affected as it contains the most available shale. There are very limited restrictions on the safety of drilling and the lack of policy has led to frequent spills. According to the Department of Petroleum Resources, between 1976 and 1996, a total of 4,647 incidents resulted in the spill of approximately 2,369,470 barrels of oil into the environment. A quarter of these spills can be attributed to oil piracy, which has become a large problem over the past two decades and correlates with an increase in spills, explosions, and fires. Groups will break open pipelines to steal crude oil and sell it on the black market. Fracking has also caused significant air pollution, which has led to a major increase in acid rain. In many areas, rainwater collection is no longer viable as it is too poisonous to consume along with the groundwater. Furthermore, mining has become another source of polluted water in the country as Nigeria is the home to many rare minerals. While the mining industry significantly contributes to the economy and currently makes up 20% of Nigeria's overall GDP, the dangers to water safety have also been documented. Environmental toxicity has been further exacerbated by runoff and pollutant ponds

called tailings. According to the studies done, 6 states found uranium in their water supplies in the year 2010.

### **Geography**

The ability to filter out contaminants in local water supplies is hindered by the flat topography of Nigeria. Due to the land's flatness, the water stays local based on a lack of groundwater movement. The stagnation means the water is more easily able to travel downwards into the soil and therefore into local groundwater. Mountain stream runoff is a great source of clean water, but the only mountain ranges that lie nearby are along the Cameroon and Chad borders which contribute to a multitude of rivers and streams that move across Nigeria. However, the significant pollution issues have made these rivers an almost unusable source of water. The amount of available clean water across the country is highly variable as some aquifers produce as much as 37 liters per second, while others produce as low as 0.7 liters per second.

### **Future Outlook**

Nigeria is a country that is particularly vulnerable to climate change. As the climate changes, there will be shifts in the rainfall patterns as well as the temperatures. One of the many problems associated with shifts in climate change is that gaining access to clean water becomes even more difficult. First, ocean waves will begin to crash further onto the beach from more intense storms and sea level rise. The salt water will then inundate the land and salinate the water to make it undrinkable. Another issue is that they will see longer droughts and stronger floods. Stronger floods will increase the amount of soil erosion and runoff from farms and other industrial plants, which makes it easier for contaminated water to enter the ground. Increased flooding can also be correlated with a larger presence of cholera in communities that have poor hygienic practices.

### **Implications**

The increases in toxic metals from mining operations and industrial processes can be easily linked to spikes in cancer rates, especially for young children. These chemicals have also been found to disturb people's reproductive systems and have even led to birth defects. One of the biggest issues currently facing the country is the disease-ridden water that Nigerians suffer from.

These diseases include schistosomiasis, typhoid fever, diarrhea, and dysentery. It is estimated that over 70,000 children under the age of 5 die every year from waterborne diseases. Nigeria has an infant mortality rate of 7%, which makes it the 8th highest in the world. Cholera outbreaks are common as well with 27, 927 cases reported just from January to September 2018 of which 517 people died . Lower quality of life restricts Nigerians' ability to advance themselves in their economy, because of all the costs associated with treating the sick. It is also inefficient to have workers spend hours walking to get water as they are able to produce far less than they could with locally accessible water. The significant human and environmental impact caused by the lack of clean water in Nigeria reveals a clear need for intervention.

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