

Stella Olson
Wayzata High School
Plymouth, MN
South Africa, Water Scarcity

South Africa: Long Overdue Solutions for a Three-Year Drought

South Africa is a country located at the southern tip of Africa as the name suggests. The country has a population over 55 million people. The population breaks down to roughly 65% urban and 35% rural (South Africa - Urban Population). The nation has a parliamentary and constitutional republic, meaning their government has a constitution that is based around a parliament of elected officials to interpret that constitution.

South African cultivation, is known for a handful of crops and exports. Their main exports consist of maize and wheat; however, the nation is also well known for their deciduous fruits and citruses such as lemons, papayas, mangoes, and peaches (World). Along with a handful of crops, South Africa produces roughly 900,000 tons of red meat each year (South Africa - Livestock). The main red meat produced in South Africa is cattle products.

South Africa is often referred to as the “Rainbow Nation” due to the cultural and ethnic variation of its citizens. Within the country, the main ethnicities present are, Native Africans, Europeans, Indians, and those of mixed race. This variation in culture is reflected in many aspects of the nation. For example, there is a large discrepancy in the wages between ethnic groups. The average wage of a South African of European descent is \$45,000, whereas the average wage of Indians is just over half of that at \$27,000 per year. An even more unsettling statistic is that black citizens of South Africa make just \$5,101 on average annually (South Africa - Arable Land).

In South Africa, by law, k-12 access is provided for everyone. Not is this required by law, but they actually spend more money on education than any other government sector. Although the nation dedicates a significant amount of its financial resources to education, the South African education system often ranks near the bottom when compared to other nations.

Another shortcoming of South Africa is its source of water. South Africa has been in a drought since 2015. At the start of 2018, the world was informed about “day zero”. Day zero was the day Cape Town, South Africa was to run completely out of running, fresh water. That day is currently estimated to be April 12th, 2018. Day zero has been looming over the citizens of South Africa, drastically changing their way of life. Many citizens have had to adjust almost every aspect of their life from their profession, to their social life, to their home life.

Because of the long lasting impact of the drought, the South African government declared on February 13th the water crisis an official natural disaster (Shone). As the water levels in reservoirs have declined dramatically, they are more susceptible to waterborne disease, rendering what is left unsafe to use. The climate of South Africa has much to do with this drought. With drastically varying rainfall and being, “an oasis surrounded by desert with a Mediterranean climate,” (Welch) it is no surprise that Cape Town is dealing with a drought. But how did this drought escalate to becoming a natural disaster? It is hard to pinpoint the exact missteps that led to the escalation, however many blame the government for not taking action soon enough. When the drought began, around 2015, the South African government refused to fully address the problem. They were relying on rainfall to resolve the problem as they have done in the past.

There are many aspects of South Africa that have led to the unfortunate, inevitable drought. The agriculture and livestock production in South Africa uses a significant amount of available water resources. The deciduous fruits grown in the country use a lot of water. For example, it takes 28.5 gallons of water to grow one ounce of mango (Larson). However, the water used to produce fruit does not compare to the amount used in the production of livestock. To produce one pound of beef, it takes 1,847 gallons of water. Multiply that by the pounds of red meat produced each year that add up to 3 quadrillion gallons of water. This number is enormous and incomprehensible.

Due to agriculture and livestock being such a huge part of the economy of South Africa, this water usage is unavoidable. Some argue that the water usage from these industries is the cause of the drought in South Africa, however these numbers have been this high for decades so it may be safe to say other factors have had a larger impact on the drastically low levels of water in the country.

Another impact on water levels in South Africa that was uncontrollable was the low rainfall in the past 3 years. The country relies heavily on large reservoirs that catch and filter rain water so that it can be used by the public. With rainfall averages dropping through the years, these reservoirs began to run dry, and any water that was left became susceptible to disease and bacteria rendering it useless.

With water playing such an important role in the daily lives of humans, it is expected that a drought would have extreme negative effects on people. South Africa is known for its horrible gaps between the affluent and the poor in their nation. To no one's surprise, those with more financial struggle, are having a much harder time with the drought. Because much of the water supply to houses have been shut off and wells have run dry, people are forced to go out and buy packaged water. To anyone with enough money to spare, this is merely an inconvenience. However, for those who were already scraping by, this makes access to water almost impossible. According to the Washington Post, "For the poor, it means waiting to see what the government comes up with, and contemplating whether you can afford to cut back on food to be able to buy water," (Staff). For many the choice is water. This is leading to an increase in malnutrition and famine among those already in poverty. Not only are people being affected by this drought, but agriculture is also being hit hard. In an NPR interview with farmers in the areas surrounding Cape Town, Tony Largier expressed his concerns and fears, "We start planting in a month, and there's no water. We've ordered the plants. We've paid for the plants. What are we going to do?" (Granitz). So far there is no plan. There are possible solutions but none have been implemented.

As the general public around the world becomes informed about this three year long drought, individuals and organizations, such as "The Water Project", are working to find a solution. The Water Project is, "a charity that provides access to clean, safe and reliable water and sanitation solutions across sub-Saharan Africa, one village at a time," (The Water Project). The first plan enacted by the South African government was to limit water consumption. At the beginning of the drought this was an understandable solution. With evidence from the past, the government has the right to assume that come the next season, rainfall would increase and reservoirs and dams would fill back up. Unfortunately, this did not happen. As a year, then two years, than three passed. The rainfall never increased nor did the water levels of the reservoirs. This brings us to today, the drought has been declared a national disaster. Day zero, the day when all water will run out and be shut off for the general public, is becoming a feared reality. Yet little to no long term solutions have been implemented. This is where The Water Project comes in, they go community to community building wells that get water from nearby natural springs. They have also done a few projects where they built a water catching system for communities. The Water Project's versatility in how they provide clean water to a community it allows for a specialized approach to for each community depending on the resources available.

There are also many large companies working to help the water crisis. These companies are mainly global beverage companies. For example The Coca-Cola Company is working, "to replenish 100 percent of the

water [they] use in [their] global sales volume,”. They list three main bullet points on their website of what they are doing to help water sustainability around the world; they are “helping provide access to safe water and improved sanitation... protecting watersheds... [and] providing water for productive use,” (The Coca-Cola Company). Large companies such as Coca-Cola tend to focus on one community at a time when working on water sustainability. The work they do is much needed and leaves a lasting impact on the communities they reach however they are not a sole solution to the drought due to the scale of South Africa and the areas affected by the drought.

South Africa’s government’s current plan to counter the drought is to place a government water consumption limitations states that each person can have 50 liters of water per day. 50 liters sounds like a lot but in reality it is not. To put it into perspective, a six minute shower uses around 90 liters of water. That is already 40 liters over the allowed amount. Then you have to factor in, cooking, drinking, washing dishes, laundry, and plumbing. At this point one has already reached upwards of 100 liters used even when attempting to conserve water, (Said-Moorhouse). This is double the amount permitted by the government restrictions. In order to maintain a semi normal lifestyle, citizens must now buy water to meet their needs. Unfortunately, much of South Africans affected by the drought are in poverty, so they do not have enough money to buy more water so they cut every bit of water usage down as possible. Citizens are now taking 90 second showers and catching the shower water to use while washing dishes, watering plants, or cleaning other parts of their house (Murphy).

To enforce water restrictions, police officers check in on local businesses such as car washes to make sure they are not using tap water. It is required by law under the drought natural disaster restrictions for car washes to reuse water. If they are caught using tap water they can be fined upwards of 3,000 rand which is equivalent to roughly \$229 (Petersen). This number may not seem too extreme however the majority of people who run these car washing services are in poverty and can barely scrape up enough money to feed their families. With the fine equaling almost three months worth of pay, many workers are having to look to alternative methods to provide for their families. One car washer pleaded to a cop saying “If I don’t do this i’m going to break into somebody's house,” (Mahr). If the poverty rate continues to rise due to the decreasing water supply, it is safe to say that crime rates may also increase because of sheer necessity for some to do what they deem necessary to provide for their loved ones.

Another solution that has been discussed to address the water crisis is large scale desalination. Desalination is the process of removing the salt from ocean water to make it drinkable. If you ask any elementary school kid how to solve the drought they will tell you “get water from the ocean,” thinking they have solved Cape Towns crisis with one thought. Unfortunately you can not drink salt water because your body will actually use more water than consumed to remove the excess salt from your body. Therefore drinking salt water actually makes you more dehydrated. In order to utilize the ocean surrounding South Africa the water must be desalinated. In order to do large scale desalination a large facility must be built. According to the Texas Water Development Board, “it will cost approximately \$32 million to build a 2.5 MGD [Million Gallon Desalination] seawater desalination plant, and approximately \$658 million to build a 100 MGD seawater desalination plant,” (General FAQs). With the state of the South African government being nearly 2 Quadrillion rand in debt, equivalent to \$150 trillion, (South Africa...) they may not be in the position to pay hundreds of millions of dollars building plants that could take years to develop.

An independent company, I-Drop, has developed a product that allows for, “Safe drinking water everywhere, for everyone,” (Safe drinking...). The product is a water purifier that can be implemented in grocery stores and convenience stores. The idea is that people will buy reusable containers and pay a low, affordable amount for the water. Currently they are a start-up company and only have around 20 stations in stores today. However, the majority of these stores are in South Africa. The downside of this is that the water for these machines needs to be brought in from outside reservoirs and purifying plants due to the

true lack of any water in South Africa.

With a crisis such as this happening in nations around the world, it is important to look at solutions other areas have found. In the United States of America, the state of California deals with water scarcity from time to time due to the little amount of rainfall they receive. One approach California took was to drill for groundwater (Cameron). South Africa has already been using a significant amount of groundwater as a source of clean water for their citizens. According to Ground Water Division, 13% of the South African water supply comes from groundwater (Groundwater in South Africa). Unfortunately, the nation is already extracting as much groundwater as possible and are not seeing any relief from the drought.

With all three options, consumption limitations, contracting from outside organizations and desalination facilities, a combination of all would be best to solve the problem. For a long term solution, the best way to go is to develop desalination facilities around the nation. Due to the fact that these plants will take a year or two to fully complete, there will need to be another plan implemented for a short term solution. That is where I-Drop water purifiers and water consumption limits come in. These I-Drop purifiers allow for easy and affordable access to water however it would be best in combination with consumption limits in order to “share the wealth” among the citizens of the nation.

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Update:

Just three months after declaring the drought a natural disaster, day zero has been pushed to 2019 due to action taken by both South African citizens and the government (Mahr). The government has begun repairing water delivery infrastructures that became unusable due to being shut down for such a long period of time. They have also invested in desalination facilities to turn the salt water surrounding the country into clean, usable water. Government restrictions for water usage are still in place and each citizen is still only allowed to use 50 liters or less of municipal water per day. Agricultural users are required to reduce water usage to 60% of their average usage in 2015, before the drought. Along with agricultural use reductions, commercial properties must reduce water usage to 45% of their 2015 levels. Granting that the country is on the path for success, it is still important for citizens to be cautious about their water usage because it will take years for water levels to return to normal. It is estimated to take roughly two to three years to get the desalination facilities up and running. Although it will take years for things to return to normal, citizens of Cape-Town, South Africa, can see the light at the end of the tunnel.

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