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South Africa, Water, and Sanitation

### **South Africa: The Pollution of South Africa's Rivers**

This year hasn't been an easy one, to say the least. For underserved communities and countries, it has been even harder. Most countries went into national lockdowns, shutting down schools and businesses. Just about every normal aspect of life was stripped away from citizens around the world imagine the impact that this Pandemic has had not only in terms of lack of products, but it has also made food, water, and proper sanitation even harder to access. South Africa has been at the center of this pandemic recently with the South African strain of the Covid-19 virus. That has been proven to be significantly more infectious than the original strain of the virus. With South Africa's already poor economy, sub-par infrastructure, and very visible corruption throughout the country, it has exacerbated already very complex problems. These problems in South Africa are now being observed around the world. They have led to the deaths of thousands through water-borne diseases. In this paper, I will outline the infrastructure of South Africa, disclose some of the problems that have arisen for South Africans due to the lack of infrastructure, and finally, recommend some solutions to the contaminated water problem that too many South Africans face.

South Africa's population has been increasing significantly over the last 30 years from 37 million in 1990 to 58 million in 2020. The politics, history, and make-up of South Africa make it difficult to understand and problem-solve, namely in terms of trying to get people to access clean water. South Africa operates under a constitutional democracy, which is the same government as the United States, with three tiers of government. Instead of a congress like the United States, South Africa has a parliament. Ninety-six million hectares are cultivated in South Africa every year, with their major exports being citrus, wine, table, grapes, corn, and wool. South Africa has 97,000,000 million hectares of agricultural land and they have an average size of 264 hectares per farm (Only 0.2% of South Africa's Farms Are bigger than 12,000 Hectares and May Qualify for land Expropriation, 2018-8).

South Africa is dry with an average rainfall of 464 mm. The terrain is made up of high flat areas called plateaus. It is covered with rolling grasslands and tree-dotted plains, all according to the South African government. The typical South African family isn't large compared to most African countries with an average household size of just 3.2 people, unlike countries like Niger, Chad, Sudan, and South Sudan, which boast an average household with families of 5.8 to 6.0 ("Data Center: International Indicators." Population Reference Bureau, 2021) Most families in South Africa live off maize, rice, bread, and cheap-cut meat. Most families get their food from farming or market and grocery stores. The average monthly salary in South Africa is 21,432 rand (This is the Average Salary in South Africa Right Now, BusinessTech, 26 Sept. 2019, ) which seems like a lot but it isn't. It is only a little over 1,400 in USD. When the average monthly salary in the U.S is 3,741 dollars in 2017 ("The Average American Monthly Salary." Work, 1 July 2018). The South African healthcare system is run by the government because they have universal health care. It works for them because they have a high rate of poverty. In most cases, people wouldn't be able to afford health care so the government takes care of it for them. Almost all families pay for education in South Africa but lower-income families have the government cover their fees. They have a general education system which consists of grades Kindergarten to grade 9 and then

further education which is grades 10-12. Most kids in South Africa only finish a general education. Most families need their kids to go into the workforce after general education to help support their families.

Water and sanitation are becoming a bigger problem in South Africa. More people are gaining access to basic sanitation but their old infrastructure is now leading to the problem. South Africa's sewer systems are outdated and old. It's hard to be able to fix this huge problem with constant corruption throughout the country. Their water is constantly being polluted because old sewer line pipes are breaking and thus water that is already contaminated by the sewer is pouring into access points, containing sewer water. Their rivers are polluted by fecal matter because 15 million people in their country lack basic sanitation. I have seen firsthand how bad the sanitation is in South Africa, particularly in their shantytown communities, such as Soweto. South African shantytowns feature outhouses right next to their water pumps. The water pumps are where people obtain their drinking water. where they get their drinking water. South Africa is running out of water. They have addressed that problem now by having 3 of 7 direct potable reuse plants in the world. These plants are used for the reuse of water. Stormwater or wastewater is sent to these plants where it is cleaned and reused. Direct potable resume plants use steps of filtration and reverse osmosis to get the sewage water and stormwater back to water standards. It is a very new technology that is very effective in the reuse of water. It will be a huge factor in human sustainability in the future. The problem now has become about protecting this resource.

In 2013 researchers at the University of Stellenbosch in South Africa reported that some rivers are so dangerous that human contact could lead to death. Most of this water pollution comes from raw sewage leaking from waste management plants throughout South Africa and thus human contact, as a result, The solution to this complex problem is just that, complex. The solution requires a great deal of money and resources to ensure their rivers are clean and the water is used for agriculture is clean.

South African cities need to renovate their entire sewer system to be able to stop this pollution from continuing. This could be done in stages. Planners could develop a ten-year vision that outlines how the sewer system can be redone over time. However, what makes this problem even more complicated is that South Africa is full of corruption. This plan needs to take the current state of security and safety into a plan. In Johannesburg, the pollution has become so bad with the waste management system that the South African government pledged 75 million to clean it up. As of 2019, no work had been done (Feature-Flushed with Fear Africa's Sewage System Collapses a Time Bomb, 24 Dec. 2019) according to Reuters. When work like this is being done there needs to be constant security as materials will be stolen. In addition to renovating the sewer system over a decade-long plan, another solution is to begin to build trust with underserved communities by initiating a nationwide campaign by educating people and teaching them ways to prevent this water pollution. There are a lot of different educational plans out there to teach people. I believe that South Africa needs to create a plan that would be specific to their country and their people. There are different problems that South African people face and I do not believe that a plan created for a different place or country would work for South Africa.

At first, I think this educational plan should focus on all ages throughout South Africa but should just focus on teaching communities that are below the poverty line because they are a lot less likely to have education on these topics. An educational plan could be very effective to focus on younger kids 18 and below. I believe that South Africa's plan should teach, but not be limited to, what is pollution, how pollution affects my community, ways to filter and have clean drinking water, and how and where to dispose of waste so it does not contaminate your drinking water? Most people in these communities haven't had the opportunity to have access to quality education and teaching them a safe way to dispose

of human waste would make the whole of South Africa cleaner. Most people living in vulnerable areas don't have much education and don't know the implications of drinking and using contaminated water. They need a change that focuses on educating the people living in the vulnerable communities and that gives them access to basic sanitation. Fifteen million people don't have access to basic sanitation which leads to a big part of the water population in South Africa. These programs would give them easy access to clean drinking water, bathrooms, and showers. It would make South Africa cleaner and start them in the right direction to a cleaner society. When I visited Soweto, I observed firsthand how their water comes from open troughs that are open to rainwater and pollution from agriculture. A plan like this is easy to talk about however when initiating something of this nature and magnitude in another country, a team would be remiss not to consider the culture of the country and the systems that employ it. There is a long history of mistrust between many groups of people living in South Africa. It's different than in South Africa where there is deep mistrust between many groups.

I also believe that educating people who live in vulnerable areas will empower locals to want to invest in their community. When fewer people are dying or becoming sick from drinking or using polluted water, it not only makes for healthier people and a better way of life, it also cuts down on health care expenses. By empowering local people with education, and by investing resources, strategies, and mechanisms that will reduce pollution, South Africa will be able to enjoy a healthier lifestyle. The South African government has the means to fix these obvious problems throughout their country. They need to invest their money in the right places and in the right people to fix this problem. They provided little to no services to people who are in poverty. Their unemployment rate is 32.5% (South Africa's Unemployment Rate Jumps to New Record High. 23 Feb 2021) They also should invest in building bathrooms, showers, and access to clean drinking water. It would give South Africa's poor citizens a safe place to get clean where it doesn't hurt the environment through pollution. Many places in South Africa are too rural for the government to be able to build bathrooms and showers and be able to get clean, consistent drinking water to people. So this is why education is so important to be able to teach these people how they can clean and create their drinking water. Many simple techniques could help these people in purifying their water. First boiling water at a rolling boil for a few minutes is a simple but super-effective way of cleaning water. Also, the government could provide citizens with iodine tablets that purify water with chemicals. The South African government should also teach on topics of how to dispose of human waste and waste effectively. A lot of South African citizens live in poverty and most do not have running water. So they use outhouses to go to the bathroom. I have traveled to South Africa and seen what it's like in these shanty communities. One I observed they had an outhouse right next to where they got their water from. It just shows these people aren't educated. They don't know how things like this can make people sick or even kill them. Proper education to South Africans in poorer communities will make them cleaner and safer for South Africans. It would reduce water-related deaths and the increasing pollution of rivers throughout South Africa. Culture also plays into how effective educating South Africans on this topic can be. This has been these people's way of life forever. Their culture is built around these hard living conditions. Change is hard and I think it will take time to push and break the habits of the underprivileged population of South Africa. South African culture has accepted that living in shanty houses, with no running water, living in the garbage is okay. The South African government has done a poor job of helping these people. But the change in culture and society's standards of proper living conditions in South Africa needs to change. No amount of money or education will help these people until they believe that they deserve a higher standard of living. They are born into this type of life and nothing ever changes. The chances of living a clean healthy life are stacked against many South Africans right as they are born. "Poverty is multidimensional. It extends beyond money incomes to education, health care, political participation, and advancement of one's own culture and social organization" Atal Bihari Vajpayee. I believe the culture of poor living conditions and lack of education throughout underserved communities is also part of the problem in South Africa.

In conclusion, all of South Africa's sewage issues, water population, and lack of education among its citizens lead to these almost impossible circumstances. With a failing sewer system and infrastructure, South Africa's waterways and systems are becoming increasingly polluted. Without the necessary many to fix this system and proper education on sanitation more people will continue to die and become sick across South Africa with waterborne diseases. No amount of education will ever fix all the problems around the world. In South Africa, these problems are real and can be helped. With the right people and achievable goals anyone could make a real difference in South Africa we know today.

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