



South Africa's water crisis and solutions

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Water is a basic necessity for life. It is essential for human survival, playing a critical role in various aspects of life from health and wellbeing, economic and social aspects, to spiritual life. We need water for our physical health, especially for hydration, digestion, waste removal and skin health. We need it for our brain and mental function. We use water for economic and social purposes, for example, food production, energy generation, industrial processes, and recreation. Water balances the ecosystem, supporting biodiversity and influencing weather patterns. We use it for spiritual and cultural purposes in rituals and ceremonies. Like air, water is both a natural resource and a critical source of life. It is one resource no household can live without.

Yet, statistics on access to clean water are staggering. According to the World Health Organization (WHO) one in nine people globally lacks access to clean water. The United Nations says that 40% of the global population is affected by water scarcity. UNESCO reports that 80% of wastewater is released untreated, contaminating the very same resource required for drinking and hygiene.ⁱ These statistics point to a global quagmire to which South Africa is not immune.

How deep is the South African water crisis?

The water crisis in South Africa is severe. Low rainfall, droughts, leaks, and aging infrastructure compound the water crisis. Although there are many rivers flowing from the northern parts of the country into the Indian and Atlantic oceans, South Africa is considered a water-scarce country by global standards. Nature did not favour her with high rainfall. South Africa's average annual rainfall is a mere 500 mm, far less than the global average of 850 mm. This is 40% less than the world average, making South Africa ranked one of the 30 driest countries in the world. To make up for water shortages, South Africa receives large volumes of up to 1.27 billion m³ of water – equivalent of 508 000 Olympic-sized swimming pools – from Lesotho, satisfying 60% of Gauteng's water demand.ⁱⁱ

Water leaks

Surface-water resources are estimated to be around 43 to 48 cubic km³ per year. However, the water usage is unsustainably high at 61.8% higher than the world average. Nearly half of the water piped through the country's infrastructure is lost owing to leaks, illegal connections (theft), or non-payment. The percentage of water losses is between 37% and 42%.ⁱⁱⁱ *The Infrastructure Leakage Index* compiled by the Department of Water and Sanitation indicates that it has deteriorated drastically in the recent past. The rate of infrastructure leaks was high at 7.0 in 2023. To put this into perspective, a single dripping tap or leaking toilet can waste up to 30 liters of water per hour. Multiply this by thousands of leaking pipes and taps across the country, and you get an idea of the sheer scale of the problem. In monetary sense, these leaks translate to a loss of around R7 billion in revenues annually.

Aging infrastructure

Aging infrastructure adds to South Africa's water woes. Water treatment plants, supply pipes, and drainage systems have been neglected and are aging without adequate maintenance. The construction of new dams has been far outpaced by population growth and rising demand, pointing to poor planning by government. About 98% of South Africa's water resources are already allocated, with very limited reserves. Meanwhile, 14% of households have no access to piped water.^{iv} Every drop must count, Efforts must be made to harvest, preserve, and use water sparingly.

Illegal connections

The extent of illegal water connections in South Africa is a significant issue. There is a culture of non-payment for services on the one hand and lawlessness on the other. However, at the centre of both these cultures are the economic challenges facing the country. Too many people are unemployed and those who work find the cost of living too high to afford. Payment of services such as electricity, water, and other municipal services, is the last on their list of priorities. The temptation to stop paying is high and illegal connections are rife. The loss of revenue owing to unpaid water services, is hindering municipalities' ability to maintain and upgrade infrastructure. However, to mitigate and resolve this challenge, water authorities and government must improve access, expand safe and reliable water services to underserved areas; and invest in modernising and maintaining water infrastructure such as metered water supply to monitor usage and detect water leaks. It is important to note that economic conditions need to improve if the problem of illegal connection is to be resolved. The cost of these services must be made affordable for those who can pay.

Borehole water

Whilst most rural areas are heavily dependent on groundwater, estimated at 1 km³ per year, groundwater accessed through boreholes has become a health hazard in some areas. A study by the University of Venda and the Tshwane University of Technology found that 33% of water found in borehole deposits near Vhembe rural areas in Limpopo was contaminated with *E. coli* bacteria.^v These bacteria can cause severe stomach cramps, bloody diarrhea, and vomiting – the symptoms of cholera. Over dependence on borehole water is therefore a serious health hazard.

Regional crisis can easily become national disaster

The water crisis is not new. Several regions and municipalities have been grappling with this crisis. The Western Cape region, particularly Cape Town, experienced a severe water crisis from 2015 to 2020, with dam levels dropping to around 13.5%^{vi}. This crisis nearly led to a "day zero" of no water supply in the region. The situation has improved, but the region remains vulnerable to droughts. The Western Cape receives rain mainly in winter and the previous few decades saw a drop in the amount of rain both in Summer and Winter. The Eastern Cape has also been affected by droughts, with some areas experiencing severe water shortages. Other municipalities, such as those in the Northern Cape, Limpopo, and Mpumalanga, have also faced water scarcity challenges owing to droughts, infrastructure issues, or inadequate water management.

Meanwhile Gauteng's water crisis is real. The province is heading for "day zero", with leading scientists warning that the water crisis is at near-term climate change tipping point. As the economic hub of South Africa, accounting for over a third of the country's GDP, a water deficit in Gauteng will have far-reaching consequences locally, nationally, and beyond. The crisis is caused by a multiplicity of issues. Prolonged dry spells have significantly reduced water levels. Outdated water management systems and pipes lead to leaks, bursts, and inefficiencies. The high rate of inward migration has put additional strain on limited resources as the population of the province continues to swell. Ineffective governance, mismanagement, and lack of maintenance have worsened the situation.

The quality of the water in Gauteng is also of concern. Only 26 out of 958 water-supply systems earned Blue Drop certification, whilst 29% were in a critical state. A staggering 46% of water-supply systems have poor microbiological scores, posing a direct water-quality threat.^{vii} The consequences of this crisis will be dire for the province and the nation. The fact that Gauteng is an economic hub means that an outbreak of waterborne diseases can easily spread nationally as people move to and from Gauteng into other provinces in large numbers every day. A day zero for Gauteng will bring the national economy to a halt. Thus, South Africa cannot afford a Gauteng water crisis to reach emergency state. It is, therefore, essential to recognise the severity of the water crisis in Gauteng and the need for urgent, coordinated action to mitigate its impacts.

From electricity loadshedding to water rationing

South Africa's electricity crisis significantly impacted water supply. The country's power generation relies heavily on coal-fired plants, which require massive amounts of water to operate. In fact, Eskom, the national power utility, uses around 10 000 liters of water per second, equivalent to the annual consumption of one person.^{viii} This substantial water usage competes with other essential needs, such as drinking water, sanitation, and irrigation. South Africa has experienced an intermittent supply of electricity from Eskom. The blackout, also known as loadshedding, has been a desperate attempt by Eskom to avoid a total collapse of the electricity grid. However, the loadshedding has had an enormous impact on other industries, including water supply. Water reservoirs that depend on electricity to pump to fill up and distribute, have been affected by power cuts, reducing both supply and water pressure. This has created a double jeopardy for many households, leaving them with neither electricity nor water. The electricity crisis has also disrupted water treatment and supply infrastructure. Power outages affect water pumping stations, leading to intermittent water supply and increased risk of water contamination. This situation has exacerbated South Africa's water crisis.

Worst-case scenario

South Africa's worst-case water crisis scenario could have devastating consequences in the short- to long-term. Water shortages would lead to widespread rationing, impacting households, businesses, and industries. Health risks, environmental degradation, and economic consequences of such a scenario would be severe. Water-borne diseases, such as cholera, thrive in water-scarce environments. Food security cannot be guaranteed, and the ecosystem deteriorates in a water-scarce environment. Water is the resource needed in surface industries and underground-mining activities. Without water, the economy would be doomed. The consequences of a lack of industrial activity and economic growth would be joblessness, deepening poverty, and social unrest. There cannot be social stability when people are dying of cholera and starvation. Such a situation is a witches-brew of chaos and mayhem. Action is needed urgently to avoid a worst-case scenario. Citizens must not wait until government declares a national water emergency or a state of emergency because of a water crisis before they embark on a water-saving campaign. They must make every drop count, preserve, and use water sparingly. Plans to mitigate the water crisis must be short- and long-term based. In the short term, the objective must be to avoid a day zero. Long-term solutions must be focused on building a sustainable water system. This must include building and maintenance of water infrastructure, curbing illegal connection and theft of water, campaigns to promote water conservation and awareness, and finding alternative water sources such as desalination.

Lessons from Cape Town Day Zero

The Cape Town water crisis offers a template on how to avert a day-zero water crisis. There are lessons to be drawn, experiences to be shared, and strategies to be adapted and implemented on a national scale. Cape Town's Day Zero water crisis was averted through a combination of efforts. The city implemented radical conservation measures, reducing water consumption by 57%. Residents were limited to 50 liters of water per day, and restrictions were placed on outdoor water usage.^{ix}

The city also reduced water pressure, which helped decrease overall consumption and leaks. The strategies included a mass-based public awareness campaign, educating residents on the importance of water conservation and exploring alternative water sources such as desalination, wastewater reuse, and groundwater extraction. These efforts paid off, and Day Zero, initially predicted for April 2018, was pushed back to July 2018, and eventually avoided altogether. The success of Cape Town's water conservation efforts has been recognised globally, serving as a model for other cities facing similar challenges. Government can learn from this experience and implement a national strategy to avert a water crisis.

Proposed solutions

National water-sharing system

The South African water landscape is paradoxical. Whilst the impact of climate change on the change of seasons and climate was expected, it is the paradox of floods on one side of the country and drought on the other that perplexes policy managers and water experts. However, therein lies a part of a solution to the problems. A long-term solution to South Africa's water crisis must include water harvesting and sharing across provinces. This will require huge investment in infrastructure to harvest rain/flood water and transport water across South Africa. Investment must be made in long-distance pipe systems for water transportation. Similar to electricity, a national grid is needed that can facilitate the monitoring and sharing of water resources.

Integrated approach

What the water crisis points to is that South Africa needs an integrated and comprehensive infrastructure management plan. Solving water leaks without attending to the electricity crisis would be futile. The supply of the two resources is interdependent and one cannot be solved and the other neglected. South Africa needs to address its electricity crisis whilst prioritising water conservation and efficient use. This includes investing in renewable energy sources, improving water infrastructure, and promoting water-saving practices.

Water master plan

There is no shortage of strategies and plans in South Africa. It is a nation that is good at churning out plans, but dismal in the implementation of those plans. Too much time is spent bickering and wrestling over plans and little or no action in putting the plans to use. This is the same case with the water situation. A national water master plan exists but its implementation has stalled. South Africa's 2019 National Water and Sanitation Master Plan aims to guide the water sector in investment planning for water-resource development and delivery of water and sanitation services until 2030 and beyond. The plan identifies key actions and allocates roles and responsibilities to various stakeholders, including government, the private sector, and communities. Yet, it has been undermined by inadequate investment and insufficient water-infrastructure maintenance. The current projected investment of R23 billion (between 2020 and 2025) is inadequate to respond to the crisis faced. Institutional funding arrangements, too, do not respond adequately to the state of emergency that the water crisis is posing. In as much as dams and water reservoirs are strategic national key points, the funding of water must also be a national priority. National Treasury must create a separate fund dedicated to funding water infrastructure nationally and not leave this to be the responsibilities of municipalities.

Practical immediate actions

Real change is usually not effected by big plans and ideas. It is small actions of ordinary people that bring real and impactful change. Similarly in the water crisis, it will be the small things that will save water and avert the crisis. A national campaign is needed that brings together civil society, the private sector and government to repair water leaks and reduce waste.

A municipal-led campaign that targets repairing 100 leaks per month would go a long way to reduce the water that is wasted owing to leaks. Parallel to this must be a law enforcement campaign to combat illegal connections. Public awareness campaigns to promote water conservation must also be initiated at a national level. Households must be encouraged to implement water-saving measures such as installation of showers and taking shorter showers; harvesting of rainwater; use of less water car washing techniques; and covering of swimming pools to reduce water evaporation.

Water is life. Life without water is unimaginable and impossible. A water crisis will have an enormous impact on human life. The scarcity of water will have a ripple effect. It will have a negative impact on economic growth, food security, health, and wellbeing. The crisis will bring unbearable living conditions characterised by waterborne diseases, poor sanitation, crop and livestock losses, and an industrial slowdown. This in turn will create conditions for social unrest, community protests and conflicts as communities fight for the scarce resource. In such a situation it is the poor that would be affected the most as they can neither afford to buy bottled water nor to dig their own boreholes.

Long-term solutions are required to resolve the water crisis. Such solutions must be focused on infrastructure upgrades and maintenance as well as investment in desalination as an alternative source of water. In the short term, water conservation must be promoted and implemented by water boards, households, and individuals. The City of Cape Town's day-zero strategy offers lessons that can be adapted and implemented nationally. Each household must understand their role and contribution to water conservation. Water is life. Every drop counts!

Sources

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