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Gauteng Water Crisis

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Introduction

As a water scarce country, South Africa is not new to water shortages. The current water challenges in Gauteng and its cities add to a long list of other cities and towns in the country that have had to contend with the fragility of their water resources and dilapidated water infrastructure. From the drought of 2019 in rural KwaZulu-Natal to areas in the Western Cape marginally escaping "day zero" between 2017 and 2019, there should be sufficient experience gained with managing water shortages and the appropriate mechanisms of proactively handling these crises developed. Like many other countries in the world which are bereft of natural resources, what we lack in abundant supply of water, we can make up for with proper planning and careful management of the fewer resources at our disposal, if these materials are to last us generations more to come.

Gauteng, the economic mecca and industrial heart of the country confronts its own looming day zero as Rand Water, the province's water utility, warns that failures by municipalities to control the excessive usage of water are weighing heavily on our drinking water systems which may lead to the province facing a shortage of water.[1] As the most populous province in the country, the over 15 million residents who call Gauteng home could see their taps run dry, which will spell disaster for the province as well as the country's economy.

Background

According to the Department of Water and Sanitation (DWS), Gauteng's drinking water infrastructure issues are precipitated and exacerbated by disproportionate demand and supply requirements.[2] The government has not fulfilled its plans of increasing the capacity of its water resources and as a result, the swelling and ever-growing population of Gauteng has increased the demand for water and has placed water supply under immense strain.[3] Whilst Rand Water attempts to keep water usage within the limitations placed on it by the abstraction licence – a permit granted to it by the DWS that in this case allows it to withdraw 1,347 million cubic metres (Mm3) of raw water from the Vaal Dam under regulated conditions – it has previously had to request the DWS to exempt it from the licence's restrictions in order to accommodate increased water demand in Gauteng.[4] Between 2018 and 2024 demand rose from 1,668 Mm3/a in 2018 to 1,793 Mm3/a currently.[5]

In 2023, Rand Water issued several warnings to municipalities, primarily that it was detecting overconsumption and advising that due to the integrated nature of their distribution systems, the consequences will equally be experienced by those who use water sparingly. The utility was sounding the alarm on waning levels of water in reservoirs, stipulating high consumption by municipal end users as the cause.[6]

That same year, Rand Water Gauteng's water demand reached 4,563 megalitres per day (Ml/pd) in comparison to the utility's supply 4,431 Ml/pd, causing a shortfall of 132 Ml/pd,[7] as the province experienced a 2.33% growth in demand.[8] The utility's stance places the bulk of the burden of shortages in water supply on residents rather than municipalities and their lack of controls in limiting water usage. It ignores that less water is able to reach and fill the reservoirs which raises the difficulty of maintaining adequate levels of water capacity.

These leakages are the consequences of many of the failures by municipalities to repair and perform maintenance on infrastructure and to adopt a proactive approach that would prevent water losses from occurring in the first instance. It pardons the local government institutions from being held responsible for their abdication and dereliction of one of the most fundamental human rights in the South African constitution, namely access to water. A proper diagnosis of the issues preventing the supply of constant and reliable water will reveal that similar to loadshedding, watershedding has been a long time coming. The government had ample opportunities to introduce contingency measures to mitigate the crisis that is well within sight.

Factors affecting supply

Gauteng's primary source of water is the Vaal Dam (as part of the Integrated Vaal River System), where Rand Water operates an abstraction licence from the DWS that permits it to take the water from the dam at a cost and sell it to its municipalities.[9] The licence also places a cap on how much water can be abstracted. Despite this, Rand Water has been guilty of over abstracting due to failure to manage efficient use of water resources by municipalities. Gauteng obtains 75% of its potable water from Rand Water, which it shares with other provinces including North West, Mpumalanga, and the Free State as well as with the mining and industry.[10] The entity can distribute up to 5,063 million litres of water in a day, making it Africa's biggest water utility.[11]

The lack of rainfall has left South African dams parched and water supply inconsistent, with the Vaal Dam suffering the most in the region. According to the Weekly State of Dams, the Vaal Dam was 36.2% full as at the week of 21 October 2024, the lowest of any of the dams in its home province of the Free State.[12] The movements in the dam's capacity tend to be volatile, as it reportedly achieved capacity of 120% in February 2023, compared to 36% capacity in September of 2020.[13] This also disrupts the sustainable and consistent supply of water.

Plans to increase overall dam capacity for the growing needs of Gauteng were deferred by 8 years as the Lesotho High Lands Project Phase 2, a water supply treaty between South Africa and Lesotho, encountered delays.[14]

This has caused the completion date for the project, which was scheduled for 2020, to be pushed to 2028 and has meant the current water resources which were built over 70 years ago, are actively being stress tested to cater to a far larger population than initially designed. Once again, failure to plan for the future has placed the country in serious trouble.

These limitations on our water resources are further compounded by ageing infrastructure. Gauteng's blatant negligence costs the province's municipalities millions of rands and millions more in losses of litres of safe, drinking water in the form of non-revenue water as well as water losses. It is important to measure the volume of water that is lost as it provides an overview of the efficiency of the water utility. When assessing the wasted water in Gauteng as well as where the bulk of the wastage occurs, it presents a clearer picture as to where the issues lie.

First, we must provide definitions of the terms. Non-revenue water (NRW) refers to water that enters a particular water distribution system but does not yield any revenue.[15] NRW comprises water losses which includes both real and apparent losses where there are physical losses of water such as through burst pipes and leakage and non-physical water losses in the form of unaccounted for consumption through to inaccurate metres readings.[16] NRW also occurs as a result of unbilled authorised consumption from unbilled and billed metres; as well as unauthorised water consumption.[17]

According to 2023 DWS data, of the total annual volume of water that entered through the Gauteng distribution system, 43% ended up as non-revenue water.[18] Six of the nine regions reported on by the DWS achieved non-revenue water levels of all being above 30% which by the department's own standards denotes a performance that ranges from poor to extremely poor.[19] Emfuleni in the south of the province recorded the highest volumes of NRW out of all the Gauteng regions at 48.8%, followed by Rand West City at 43.6% with Ekurhuleni coming in third place at 37.34%.[2021] It is crucial to identify where in the supply network these losses occur in order that they be addressed and curtailed.

As at June 2024, Rand Water reported that 7.65% of the NRW losses occurred internally, which in keeping with measuring how efficacious the utility is, demonstrates a high level of efficiency by the entity. However, the total NRW experienced within the Rand Water Area of supply totalled 42.5% with a national average of 47.7%.[22] The poor management of these water resources have led to a huge deficit in our water supply and left a burning hole in our municipal finances.

Municipal mismanagement is a prominent driver of the national average NRW as municipalities are primarily responsible for Gauteng's escalating water crisis. Johannesburg Water is one of these municipal distributors responsible for managing and distributing water to Johannesburg residents.

It purchases bulk water from Rand Water, treats it, and distributes it across the city. This makes them directly responsible for maintaining pipelines, reservoirs and treatment facilities. Warnings of leaking and deteriorating reservoirs, corroded pipelines, persistent backlogs in responding to reported issues, and an imminent collapse have circulated for some time, The situation has now escalated, and stricter water restrictions are in place. However, Johannesburg Water recently revealed that 42 reservoirs are leaking, though the current budget allows for repairs to only of 20 of them. This means that in the meantime, significant amounts of water continue to be lost before reaching consumers.

Slightly more than half (54%) of the water Rand Water supplies to Johannesburg reaches residents.[23] The rest is, for all intents and purposes, slipping through cracks, crooks, and careless books. In the case of Johannesburg, 35% of the water it receives is lost through leaks – a substantial increase from 25% at the beginning of 2024.[24] This gives perspective on the city's failure to address leaks swiftly and explains the importance of immediate repairs; where there is a drip today, expect a puddle tomorrow and a river by next week.

These leakages leave municipalities struggling to distribute enough water and generate sufficient revenue from the reduced supply. As a result, Gauteng municipalities owe Rand Water R2 billion. This growing debt, alongside revenue losses from inefficient infrastructure, makes it increasingly difficult to secure funds for indispensable upgrades and repairs.[25]

At the same time, as mentioned above, Rand Water is bound by strict abstraction limits imposed by the DWS, meaning it cannot increase the amount of water it can remove from the existing Vaal River System to meet the demand.

Vandalism and theft add another layer of complexity. Vandals frequently target core infrastructure like pipelines, valves, and water treatment plants, causing sudden and unplanned damage and further disruptions. Repairing vandalism-related damage diverts resources from leak repairs and ongoing maintenance, stretching tight budgets thinner.

Proposed actions

The water crisis in Gauteng is a story of invisible losses and visible neglect. Municipal mismanagement and misuse of water revenues are at the core of Gauteng's water crisis. As John-Kane Berman, former CEO of the Institute of Race Relations, warned: "As long as municipalities remain in control, there is always a risk that they will use water revenues for purposes other than recovery of water costs and financing the maintenance and upgrading of water infrastructure." For this reason, control must be transferred to independent regulatory bodies who will guarantee that funds are strictly dedicated to maintaining and improving the water network.

However, South Africa has a track record of keeping resources state-controlled thus making a shift to independent management unlikely in the short term. Dwelling on this now will not solve the immediate crisis that short-term actions will.

While some may consider using pricing mechanisms to incentivise leak repairs, imposing additional costs when many municipalities and water departments are already struggling with high debt burdens, does not strike as productive.

A practical intervention with real potential to resolve the issue of municipal leaks is the use of pressure-reducing valves (PRVs). PRVs are low-hanging fruit that can help to manage high water pressure, particularly during off-peak times like late at night, which puts additional strain on corroded pipes, leading to leaks and bursts. By installing PRVs at strategic points in the water distribution network, water pressure can be automatically adjusted to lower levels during lower-demand times to control the amount of water loss for existing leaks and lower the risk of new leaks developing. Without controlling pressure, no other intervention will hold. Pressure management is the essential first step to getting the leaks under control and restoring water security to Gauteng.

As part of this reform initiative, a skills development program should be established, focused on training municipal workers to service and regulate pressure valves. Proper training is a very important step – if this step is omitted, the issue will persist and the risk of wasted funds, and double replacements are much higher.

However, before any significant action can be taken, a comprehensive report is needed to identify which areas suffer most from leaks and pressure-related issues. This report should be compiled by independent experts and stakeholders, including engineers, economists, and public policy experts, to ensure that the problem areas are accurately diagnosed.

After gathering this information, a structured plan for installing PRVs must be developed. This should include the estimated costs involved, funding options, including potential private sector involvement, providing municipalities with all the necessary details to implement the plan immediately.

Finally, absent pressure from the public, very little is likely to be done. For this reason, it may be necessary to explore whether the courts can enforce water management standards. Two immediate actions could be considered. First, assessing the potential for legal action against responsible parties, like the municipal manager, in cases of serious negligence or mismanagement. Holding leaders accountable could drive real change. Second, establishing a trust account, managed independently, where residents can directly contribute funds for urgent repairs – especially if the community has been stepping in to resolve the issues themselves.

These decisive steps – anchored in accountability and direct action, offer Gauteng a real shot at resolving its looming water crisis. Clear choices are now on the table: seize this chance to fix what's broken or face the unwashed hands of its citizens. The call to action is loud and clear – citizens won't sit idle, waiting for it to get worse. They're prepared to hold those responsible to account until water flows reliably to their taps.

Conclusion

Water shortages and the looming threat of a Day Zero event are not limited to Gauteng. Areas like Govan Mbeki in Mpumalanga, serviced by the Wildebeest Reservoir, have also had to deal with prolonged interruptions and uncertainty. However, Gauteng remains the highest priority for immediate action because it is the economic and industrial hub of South Africa as well as being the home to the majority of municipalities facing water shortages.

Solving Gauteng's water crisis relies less on increasing supply – though that remains important given the growing demand – but more immediately on addressing the extensive leaks. Fixing these leaks provides an actionable solution that could recover nearly a third of Gauteng's available water, which is currently being lost. This will improve water supply and return revenue-generating water to municipalities, enabling them to repay Rand Water and invest in the necessary long-term maintenance.

But municipalities and distributors must be held accountable by more than their own efforts; citizens, businesses, and the courts must apply pressure on responsible entities to enforce their recommendations. Approaching the courts for mandates on compliance with water management standards will be an important part of compelling municipalities to prioritise repairs and infrastructure integrity. This will serve as a strong catalyst for action to prevent pressure breaking the pipes and the future of our economic mecca.

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