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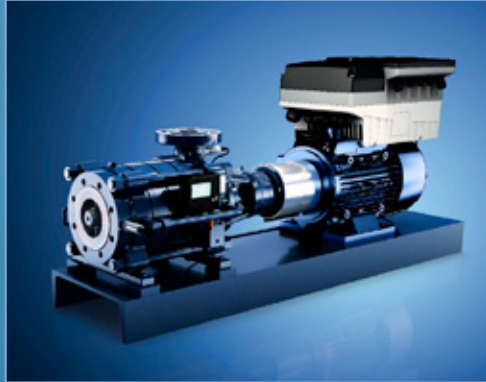
**EARLY XMAS PRESENT FOR
HAMMANSKRAAL**

**BYLAWS DURING THE
WATER CRISIS**



WATERLEAU
MAKING EVERY DROP COUNT
in Gqeberha

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ON THE COVER

Droughts are not new to Gqeberha (formerly called Port Elizabeth). Located in South Africa's Eastern Cape province, Gqeberha experiences a semi-arid climate with erratic rainfall, making it prone to periodic water scarcity. This has inspired a unique partnership between ABInBev, the Flemish government and Waterleau, a global leader in water technology. **P6**

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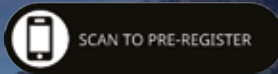


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There are many emotional stories that circle around the tragic sinking of the Titanic on April 15, 1912. Not least among these is the story of the ship's musicians who kept playing until the Titanic sank. Sometimes, I feel like this is what we are doing with this water crisis.

Like the musicians of the titanic

Life goes on, it seems. Neighbours are filling up pools, the leafy green suburbs remain very leafy and very green from all the watering, leaks keep leaking, polluters keep polluting and plans (oh the very many plans) keep being made and then remade.

Is it even a crisis?

I get anything between 150 to 300 press releases a day (if you were wondering how I could sometimes miss your emails). And many of them are highly critical, very emotive and resort to almost fear mongering around the water crisis. I avoid them. Water & Sanitation Africa Magazine showcases the very many solutions to the sector's problems and highlights the pockets of excellence.

But there are moments, where frustration kicks in. It could be year-end fatigue, or the press conferences that are giving me a sense of de-ja-vu. The same sentiments are uttered, with very few examples of actionable change.

Our former Water and Sanitation Minister (Senzo Mchunu) was not a fan of the word 'crisis'. Our current Water and Sanitation Minister (Pemmy Majodina) uses the word 'crisis' infrequently.

I believe the word 'crisis' is apt. A crisis demands a sense of urgent attention, but it certainly can be solved.

A crisis in numbers

One of my favourite quotes comes from Donny Miller: "In the age of information, ignorance is a choice."

So how can anyone play when reading these statistics?

- 46% of Gauteng's water supply is lost due to leaking pipes, aging infrastructure, and illegal connections. This equates to 2.5 billion litres wasted daily across municipalities.
- The demand for water often exceeds the supply. Johannesburg alone is consuming 24% more water than its target allocation, exacerbating the crisis.
- Rand Water is owed R7.5 billion by municipalities, impacting its ability to expand and maintain infrastructure. Water boards nationwide face similar financial strains.
- Johannesburg Water has an infrastructure renewal backlog of R26 billion, with water infrastructure accounting for R11 billion.

Like all crises – nothing is simple. We have criminal activity, human rights to consider, a severe lack of finances, a growing population and climate change. But it can be solved. We all need to stop playing. When the Titanic was sinking, no one on board had time to blame other people. I think it's time that Johannesburgers show what they are made of. Let's pull together and do our part to overcome this crisis. Phone your ward councillors, plant cactuses, drive a dirty car and for goodness sakes – show respect to the real gold in this city – WATER.

Last comment of the year from a very tired editor. Thank you to every wonderful human in this sector and to all the incredible support I have received from everybody. ●

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Inspiring passion for water

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- Anaerobic Sludge Processes
- Industrial Water
- International Water Association-Southern Africa (IWA-SA)
- Innovation for Water Supply & Sanitation
- Mine Water Lead
- Process Controllers
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COVER OPPORTUNITY

In each issue, **Water & Sanitation Africa** offers companies the opportunity to get to the front of the line by placing a company, product or service on the front cover of the magazine. Buying this position will afford the advertiser the cover story and maximum exposure. For more information, contact Sindi Moni on +27 (0)82 212 4574, or email sindi@infrastructurenews.co.za.

You said it in WASA

The opinions and statements shared by thought leaders in the water industry to **Water&Sanitation Africa**.



“ABInBev understands that while water is a key ingredient in their products and operations, water is also a critical resource for the health and well-being of the communities surrounding them. Over the past two decades, Waterleau has commissioned numerous effluent and water treatment systems for ABInBev around the world. The partnership allows ABInBev to focus on brewing while Waterleau—a water technology company – has the knowledge, expertise and experience to solely focus on water. We installed their first water recovery plant at their head offices in Leuven, Belgium.”

Laurenz Devers, general manager Sub Saharan Africa, Waterleau

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“Introducing new regulations often meets with resistance, and the water sector in South Africa is no exception. Regulation 3630 is an example and stems from various sources, including institutional inertia, stakeholder interests, and socio-economic factors. Understanding these challenges and proposing viable solutions is crucial for successful regulatory reform.”

Dr Lester Goldman, CEO, WISA

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“The DWS, alongside the City of Tshwane and Magalies Water, are committed to ensuring that the people of Hammanskraal get clean water. Because Hammanskraal was facing a crisis in terms of water supply and water quality, conventional solutions like building a traditional water treatment plant were not an option as that would have taken many years to implement. We therefore opted for a package plant.”

David Magae, spokesperson, Magalies Water

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“The current water situation illuminates the need for good data to make informed decisions and transparency. Transparency between the department, the various stakeholders and the water users is crucial if we are to lift ourselves into water security.”

Peter Varndell, CEO, NEPAD Business Foundation who serves on the secretariat of SWPN

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“When we think about the water crisis, we often visualise dry taps, but we don’t think about all the processes that require water-like flushing toilets. Wastewater is the often-underappreciated element in South Africa’s water woes.”

Kate Stubbs, group director: Business Development and Marketing

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“These bladders are used by multiple large companies such as Sasol, Coca-Cola and Sanlam primarily as backup water supply, but can adapted to many different uses. In addition, in terms of smaller scale use, the bladders are regularly employed by pool repair companies who pump the water into the bladder, repair the pool, and pump it back, saving water in the process. The scale is really from as small as needed to as large as needed. Multiple bladders on one site can be easily connected together as well.”

Simon Cotton, Owner of Silver Solutions

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"We cannot solve one problem (access to safe, dignified sanitation) but then create an environmental problem in terms of faecal sludge as a waste product. The effective management of faecal waste is critical for preventing environmental contamination and health risks. Furthermore, the disposal of this faecal sludge at wastewater treatment plants poses a significant cost. Toilets are often located in geographically challenging areas, that are difficult to reach and usually far away from wastewater treatment plants, making the transport costs (without even considering the discharge rates) very expensive."

Eben Mbhele, director of business development, Loowatt

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"Residents living in South Africa's informal settlements are a vulnerable group. They typically suffer from a lack of sanitation service delivery, with little space for toilets and waste management facilities.

When provided, toilets are communal and often placed on the periphery of a settlement, causing residents to walk long distances. Users of these toilets can be exposed to danger and violent crimes on their way to or at the actual toilets themselves. Furthermore, these toilets are sometimes locked at night, or are unlit, causing people to use buckets to store their waste, which they then need to get rid of in the morning."

Alvin Anderson, country director, BORDA South Africa

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"The Sanitech name was registered in 1974 by Grant Murray in KwaZulu-Natal. Initially, it was a small plumbing business, but Murray quickly identified a market for portable sanitation services. Over the years, Sanitech expanded, albeit on a limited scale, by partnering with various agents. In the 1990s and early 2000s, private equity ownership proved further growth. Then in 2007, Sanitech became part of the Waco International Group." **Robert Erasmus, managing director, Sanitech**

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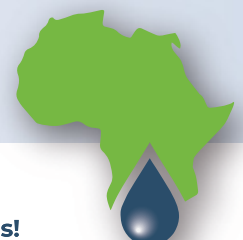
"When we speak of non-sewered sanitation (NSS), we make the discussion between safe and unsafe, dignified, and undignified. Pit toilets are unsafe and undignified, whereas NSS seeks to collect and treat waste properly, and safely. The difference between NSS and pit toilets or the dreaded bucket system is the systemic management of waste, often treated and used as a byproduct with economic potential." **Birger Lundgren, CEO of Sanitation Ambassadors NPC**

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"Water is climate change's canary. Excessive rainfall and prolonged droughts relate to changes in water systems. Civilisations primarily spring up around water, so changing water behaviour is a bellwether for sustaining the modern world." **Chetan Mistry, strategy and marketing manager, Xylem Africa**

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MAKING EVERY DROP COUNT in Gqeberha

Droughts are not new to Gqeberha (formerly called Port Elizabeth). Located in South Africa's Eastern Cape province, Gqeberha experiences a semi-arid climate with erratic rainfall, making it prone to periodic water scarcity. This has inspired a unique partnership between ABInBev, the Flemish government and Waterleau, a global leader in water technology.

“**B**etween 2015 and 2023, Gqeberha experienced its longest drought in history – lasting eight years. On the 21st July 2021, dam levels plunged to a record low of 9.98%, with only 3.43% usable water when accounting for dead storage. At one point, just 36 days of supply remained in the two major dams. It was frightening. It was unprecedented,” says Laurenz Devers, general manager Sub Saharan Africa, Waterleau.

Ibhayi Brewery, Gqberha

Like most businesses, breweries such as ABInBev are increasingly vulnerable to water-related risks, including water scarcity, poor water quality, and climate-related disruptions such as floods and droughts.

“Added to this, ABInBev understands that while water is a key ingredient in their products and operations, water is also a critical resource for the health and well-being of the communities surrounding them. Over the past two decades, Waterleau has commissioned numerous



The average brewery uses around 40% of its water to manufacture the product and 60% of the water for its actual operations. The average ratio of water to beer is between 3 and 4 hl water to 1 hl of beer

effluent and water treatment systems for ABInBev around the world. The partnership allows ABInBev to focus on brewing while Waterleau – a water technology company – has the knowledge, expertise and experience to solely focus on water. We installed their first water recovery plant at their head offices in Leuven, Belgium,” adds Devers.

The proverb – Necessity is the mother of invention – is most applicable at the ABInBev/SAB Ibhayi Brewery in Gqberha where, in light of the persistent droughts, they have implemented a successful water reuse project with the aim to increase

water security through extracting less water from the dams.

Project Imfino (Spinach)

Some years ago, ABInBev/SAB Ibhayi Brewery went into partnership with Taylormade Water Solutions, who is using the effluent from the brewery's anaerobic digestors for crop production (mostly

Laurenz Devers, general manager Sub Saharan Africa, Waterleau

Fortune Maharaj, a process engineer at Waterleau

PROJECT TEAM

- Waterleau South Africa: Engineering, design, installation, co-financing and operation assistance
- Taylormade Water Solutions: Crop production, water optimisation and operation
- ABInBev/SAB Ibhayi: Global brewer and water off-taker
- Rhodes University: Academic research on the project
- Flemish Government/UNIDO/Waterleau: Co-financers of the project



Over the past two decades, Waterleau has commissioned numerous effluent and water treatment systems for ABInBev around the world

spinach) in a 2000 m² wetlands system next to the brewery.

Called Project Imfino, the system uses integrated constructed wetlands and raised hydroponic beds to grow different kind of crops. This system is optimally designed to capture the nutrients in the effluent, necessary for crop growth, and grow fresh, certified crops as a result. Partners such as Rhodes University, Water Research Commission and the National Research Foundation of South Africa have been supporting this project since its inception.

The project provides 1 500 kgs of fresh produce per month for the local community as well as eight permanent jobs. There is no need for additional water, or fertilizers. It is a great example on how to integrate crop production and effluent treatment to create a profitable, sustainable local value chain from brewery wastewater.

The wetlands system ultimately produces effluent that is free of all nutrients and organic compounds (taken up by the plants) and has a volume of 250 000 l/day. A few months ago, this effluent was always discharged into the municipal drain.

Further treatment

As Project Imfino operates in a water scarce region, employs and trains unskilled people and provides a source of income and food to the surrounding community, it attracted funding from the the Flemish Government through the United Nations Industrial Development Organisation (UNIDO). There is also

The plant has been running successfully since September and has been fitted with SmartLab® technology to digitise interactions and leverage data-driven intelligence



co-funding with Taylormade Water Solutions and Waterleau.

The aim of the project is to take Project Imfino a step further by installing an ultra-filtration plant and treating the effluent (that would have been discharged) for reuse in ABInBev's operations. While the reused water will not be used to make beer or ever come into contact with the beer, it will be used for the heating and cooling plants, the washing and cleaning of the plant and other cleaning activities for crates and bottles.

Interestingly, the average brewery uses around 40% of its water to manufacture the product and 60% of the water for its actual operations. The average ratio of water to beer is between 3 and 4 hℓ water to 1 hℓ of beer. ABInBev is dedicated to lowering this ratio, with initiatives like the Waterleau water recovery plant at Ibhayi Brewery playing a key role.

"Ordinarily, development aid is given to government, but this was development aid from the Flemish government

Effluent from the Ibhayi Brewery's anaerobic digestors is used for crop production (mostly spinach) in a 2000 m² wetlands system next to the brewery



that is focused on creating a positive connection between an industrial player (ABInBev), Belgium technology (Waterleau) and the surrounding community," explains Devers.

Waterleau has designed, engineered, manufactured and installed a fully mobile and containerised ultra filtration water reticulation plant, where the effluent that passes through the wetland system is further purified for reuse.

Devers adds that while water reclamation technology has existed for a few years, this project is still unique in that a typical wastewater plant consists of two steps: anaerobic treatment technology and aerobic treatment technology. "Normally effluent from a brewery will pass through an anaerobic digester where approximately 80% of impurities are removed. From there, an aerobic digester will remove any nitrogen, phosphorus and COD (chemical oxygen demand). Effluent is then further processed through a water reclamation plant. In this instance, the wetland replaced the aerobic digester, saving ABInBev from chemical and energy costs. By recycling this water after anaerobic treatment over a wetlands system and using ultra filtration, the IBAYI brewery will not need aerobic treatment for polishing. Aerobic treatment is energy consuming and produces sludge. This smart solution produces clean water, and fresh crops instead of this sludge, with minimal energy use," states Devers

Before Waterleau installed the plant, water went through an anaerobic digester, the wetland and into the



The aim of the project is to take Project Imfino a step further by installing an ultra-filtration plant and treating the effluent (that would have been discharged) for reuse in ABInBev's operations

municipal sewer. With the Waterleau plant, no water is wasted and discharged into the sewer. Around 75 000 m³/year or 250 000 £/day of water will be diverted back by the brewery as service water. The project will not only save of water from the dam intake, but also 70 - 80 MW/year of electricity compared to biological (aerobic) systems in other breweries. Ultimately, this project will make water more available for the local community.

There is a desire to increase the capacity of the plant going forward and an intention in rolling out the project on other sites.

SmartLab® with IoT and AI

"The plant has been running successfully since September and has been fitted with our SmartLab® technology to digitise interactions and leverage data-driven intelligence. All the data from the plant is uploaded onto a secure cloud with firewalls. The data is analysed through artificial intelligence

(AI) and operators then receive feedback on the performance of the plant. This aids in optimising operational efficiency and aligning a company's Environmental, Social, and Governance (ESG) standards. With our digital water platform, we can reduce chemical and energy costs. AI can also predict and prevent equipment failure," says Fortune Maharaj, a process engineer at Waterleau.

Both Taylormade Water Solutions and Waterleau will operate and maintain the plant for 18 months, free of cost to ABInBev. During this time, academic research will be done on the project, and a more in-depth life cycle assessment, water and energy impact study will be done.

Waterleau has an impressive global and African footprint, with offices in South Africa, Ghana, Ivory Coast, Morocco and Egypt and has installed or operates over 200 water and wastewater treatment plants for breweries and other food and beverage plants on the continent. "The quality as well as the automation level is a key differentiator for Waterleau. We also have strong relationships and have built a reliable network of local suppliers and contractors," concludes Maharaj. ●



Waterleau has built or operates more than 200 water and wastewater treatment plants in Africa.

WATERLEAU

www.waterleau.com

Introducing new regulations often meets with resistance, and the water sector in South Africa is no exception. Regulation 3630 is an example and stems from various sources, including institutional inertia, stakeholder interests, and socio-economic factors. Understanding these challenges and proposing viable solutions is crucial for successful regulatory reform.

By Dr Lester Goldman, CEO, WISA



RESISTANCE TO CHANGE

CHALLENGES

1 Institutional inertia: One of the primary challenges is the resistance from within the institutions responsible for implementing the new regulations. Employees and managers may be reluctant to adopt new methods, fearing increased workload or disruption of established routines. This is especially evident with municipalities, where inadequate budgeting and skills is being touted as a challenge.

2 Stakeholder interests: Conflicting priorities among stakeholders, such as municipalities, private companies, and local communities, can impede progress. For example, municipalities might resist costly infrastructure upgrades, while private companies may oppose operational cost increases.

3 Economic constraints: Implementing new regulations often require substantial financial investment. Many municipalities are already struggling with budget constraints, so finding the necessary funds can be a significant hurdle.

4 Lack of awareness and understanding: Stakeholders may not fully grasp the benefits or the necessity of the changes, leading to opposition based on misinformation or fear of the unknown. We have seen this from many who have not thoroughly read the regulation, and assume that it

refers to all professionals, and not the specifically mentioned professional process controllers.

5 Historical and social context: South Africa's history of inequality fosters distrust of government initiatives among marginalised communities. Many process controllers perceive the regulation as a constraint rather than an empowering tool.

PROPOSED SOLUTIONS

1 Stakeholder engagement: Transparent communication and active involvement of stakeholders in planning and implementation can build trust. WISA has been doing numerous regional meetings with municipalities and are available for more of such.

2 Capacity building: Broader education on the benefits of the reforms can also foster acceptance. Training programmes can address institutional inertia by equipping stakeholders with technical and leadership skills.

3 Financial support and incentives: The government can offer financial support or incentives to municipalities and private companies. This could include grants, low-interest loans, or tax breaks for investments in water infrastructure. We have already received support from the WRC and EWSETA and are seeking even more support.

4 Public awareness campaigns:

Tailored campaigns to educate stakeholders on the benefits and necessity of Regulation 3630 can reduce resistance fuelled by misinformation. Addressing specific concerns for different groups is critical.

5 Addressing historical inequities:

Ensuring that the new regulations are designed to address historical inequities can help build trust and support among marginalised communities. This involves actively seeking input from these communities and ensuring that their needs are prioritised in the regulatory framework.

6 Pilot programmes:

Implementing pilot programmes can demonstrate the effectiveness of the new regulations on a smaller scale before full-scale implementation. Successful pilot programmes can serve as proof of concept and help build broader support for the reforms.

Resistance to change is a natural response when introducing new regulations, especially in a complex and vital sector like water management in South Africa. By understanding the sources of resistance and proactively addressing them will not only ensures the sustainability and efficiency of water resources but also promotes social equity and economic development. ●

STRUCTURED SUPPORT: A LIFELINE FOR MUNICIPALITIES

Municipalities have a direct responsibility to water service provision and water security.

But they are often overwhelmed by aging or inadequate infrastructure, financial constraints as well as a lack of technical expertise. They need focussed, structured support from the private sector, civil society as well as associations and academic institutions. **By Harrison Pienaar, chairman, WISA**

This support must address the pressing issues of water security and wastewater management.

Too often, we assume a one-size-fits-all approach, failing to recognise the diverse landscapes and resource dependencies across our country. We need to move beyond generic support and instead focus on solutions that are specifically designed to meet the unique needs of each local government. It is important to understand that municipalities have differing local conditions, such as the availability of natural water sources, existing infrastructure, climate variability, and socioeconomic factors. Therefore, a blanket approach will never suffice.

For example, when considering alternative water resources for better water security, municipalities in the Northern Cape would focus on groundwater while municipalities along South Africa's coastline would look to desalination.



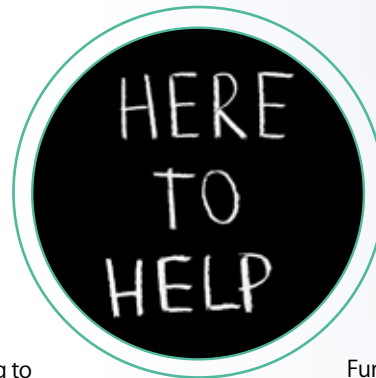
Furthermore, structured support in wastewater management can help municipalities upgrade and maintain their wastewater treatment infrastructure, ultimately contributing to better water quality and a more sustainable environment.

Legal mandate

Providing municipalities with support is not a mere "nice-to-have". There are a range of legislative frameworks:

- The Constitution of South Africa (Section 154) places a responsibility on both national and provincial governments to assist municipalities in strengthening their capacity to manage their own affairs and exercise their powers. This provision underpins the cooperative governance approach, ensuring municipalities receive the necessary support and resources to meet their developmental goals.
- The National Water Act (Act No. 36 of 1998) focuses on sustainable and equitable water resource management. It encourages municipalities to explore innovative water use and conservation methods.
- The Municipal Systems Act (Act No. 32 of 2000) outlines the responsibilities of municipalities to ensure effective service delivery. It promotes integrated development planning, which includes water resource planning, aligning municipal strategies with national and provincial support initiatives.

By aligning our efforts with the existing legislative frameworks, we can ensure



that our support is not only effective but also firmly grounded in the responsibilities and obligations of local governments.

Governance

Furthermore, there is a need to address the broader governance and enabling environment within municipalities. Effective governance, capacity building, and resource allocation are all crucial elements in empowering local governments to fulfil their sustainability roles. Municipalities need support with the creating local development, spatial and sector plans (that include water services development plans).

By providing tailored, structured support that aligns with their legal mandates and addresses their unique challenges, we can unlock the full potential of municipalities to be the custodians of our natural resources, the drivers of local economic growth, and the champions of community resilience.

There are many technologies that can be made available to municipalities but little appetite for uptake. While unqualified and clean audits are important, municipalities should be judged on service delivery, which is why the Drop reports are crucial when assessing municipal performance.

WISA and its members are here to provide this support. WISA is also the custodian of the professional process controller designation and will assist process controllers in maintaining their professional status by honing their skills as well as provide guidance and support to new entrants into the field. ●

MENDY SHOZI:

WATER'S IMPORTANCE CANNOT BE OVERSTATED

Water is scarce, wasted, and taken for granted. It is also a vital source of life and dignity. Mendy Shozi, President of the South Africa Youth Parliament for Water and project manager at Bremen Overseas Research and Development Association, is in her words "water obsessed."



Mendy Shozi, Project Manager at Borda, and President of the South Africa Youth Parliament for Water

“WASH or SHAW is important globally but specifically important in the South African context where access to sanitation is still not 100%. Sanitation is layered as there are sewered and non-sewered systems, and hygiene plays a significant role in keeping people healthy. WASH specifically talks to social needs - be it economic or gender - and it is really a fascinating sector but also an important one,” states Mendy.

The South Africa Youth Parliament for Water

The World Youth Parliament for Water (WYPW) is a branch of the International Secretariat for Water (ISW) that acts as a network for young water professionals who seek to implement sustainable and practical solutions to global water problems. Water is a global issue but context-dependent and thus there are many regional chapters of the Youth Parliament for Water that contribute to global knowledge with regional-specific inquiries and solutions. In 2021 Mendy heard about the WYPW and decided she wanted to join the local chapter, “I went to inquire about our local chapter but found that not only did we not have one but there were no chapters in Southern Africa either. I took this as a challenge for myself and started the South Africa chapter, getting the paperwork in order

in January 2022 and we were formalised in March 2022 at the WYPW 5th General Assembly,” says Mendy. Noting the growing chapters among African countries there is now a general African Youth Parliament for Water to synergise the knowledge between various African countries. Mendy says, “The platform is important as it allows young water leaders to make decisions that directly impact them regarding climate change and other water concerns.”

As president of the South African chapter, Mendy was tasked to help guide the decisions and projects that the chapter engaged with, “It’s a democratic organisation so my role was to guide,

Many people in South Africa lack safe sanitation. Part of Mendy’s work at BORDA involves facilitating non-sewered sanitation systems in communities where sanitation is unsafe



not decide,” adds Mendy who is now leaving the chapter. “I am now past the ‘youth’ age and this chapter must be focused on the youth. It is still important to me, but I must now leave it in the hands of the next leaders,” adds Mendy.

Youth Climate Adaptation Action Day

Mendy’s 2024 highlight is serving as an adviser for the Youth Climate Adaptation Action Day, organised by the Global Center on Adaptation. Reflecting on the event, she emphasises the importance of involving young people in climate change discussions, noting their high levels of awareness and ability to disseminate knowledge. “Hearing diverse perspectives from schoolchildren, teachers, and parents highlights the complexity of climate change and the unique insights each group brings,” she says.

Mendy also challenges the misconception that older generations, particularly those practising traditional beliefs, lack awareness of climate change. Drawing from her upbringing in KwaZulu-Natal, she explains that Indigenous knowledge, deeply rooted in environmental observation, recognises the impacts of climate change in profound ways.

She advocates for bridging Indigenous historical perspectives with the technical understanding of climate change embraced by younger generations. “Combining these approaches creates



Mendy says that if we are serious about climate change, we must educate and engage with the youth.

a more holistic response to climate challenges,” she remarks.

Youth Climate Adaptation Action Day, observed globally on 12 October, showcases young leaders engaging in climate decision-making and raising awareness. Mendy highlights the critical role of involving young people early to influence behaviours and drive momentum in addressing climate change.

“Simply showing people the problem and offering potential solutions makes a difference,” Mendy notes, emphasising the power of education, career guidance, and modern tools such as social media to inspire action. She calls for collaboration across disciplines, including science and the humanities, to ensure a sustainable future.

The Bremen Overseas Research & Development Association (BORDA)

Mendy also works for the Bremen Overseas Research & Development Association (BORDA) as a project

manager in the South African office. BORDA is a German NGO operating in over 25 countries that aims to “enhance living conditions and preserve the environment by expanding climate resilient water services, promoting liveable city planning, and improving communal planning processes and sanitary supply structures across different city scales, all while emphasizing the importance of development cooperation at the municipality level.”

“BORDA works in 3 year cycles, and I came on board in 2023 and worked under the main goal of sustainable cities. We must ensure our work is fit for purpose in the South African context, and we must meet goals and deadlines within the project. Specifically, we had to work towards capacitating the sector by working with municipalities, experts, and the private sector. The project involves training people in these spaces to ensure they can implement sustainable

approaches to cities. This involves getting the right research, ensuring that research is legible, and turning that research into goals with training material.

Mendy’s second project, funded by P4G, is a multistakeholder initiative aimed at accelerating early-stage enterprises driving net-zero transitions in food, water, and energy systems. In partnership with Kaloola, a sanitation company providing non-sewered solutions to underserved areas, the project supports the commercialisation of their toilet. To meet P4G’s requirement to collaborate with an NGO, Kaloola partnered with BORDA, chosen for their reliability and experience as grant managers.

“We manage the grant and also contribute to research,” Mendy explains. Collaborating with UKZN, the team explores cost-effective methods for handling faecal waste, addressing a critical sanitation challenge.”

Durban is also the sister city of Bremen, so there is additional funding to aid the eThekweni Municipality in “school infrastructure and sanitation projects, career engagements and mentoring.”

Mendy concludes by saying, “WASH, water, and infrastructure is a passion-driven sector and to be involved with these projects is truly fulfilling.” ●

Rural communities may not call it climate change, but Mendy says that indigenous knowledge may be useful in fighting it.





AN EARLY CHRISTMAS PRESENT from **MAGALIES WATER**

Hammanskraal is another Gauteng region where water supply is erratic in the best of times and non-existent in the worst of times. But good news has finally arrived to its residents, nearly 18 months after suffering from a Cholera outbreak. Magalies Water has commissioned Phase 1 of the Klipdrift Modular Treatment Plant.

The Klipdrift Modular Treatment Plant is the largest of its kind in Africa, adding 50 Mℓ/day capacity to the existing Klipdrift Water Treatment Plant (42 Mℓ/day), bringing the total capacity to 92Mℓ/day.

Built next to the existing Klipdrift Treatment Plant, the Klipdrift Modular Treatment Plant is being built in four phases. Each completed phase will bring in 12.5 Mℓ/day of potable water into the bulk supply scheme. The current, completed first phase will supply water to parts of Mandela

Village, Marokolong, Ramotse, Kekana Gardens, Kudube Unit 9 and Babelegi Industrial and Bridgeview informal settlement. The next phases of the project will continue into 2025.

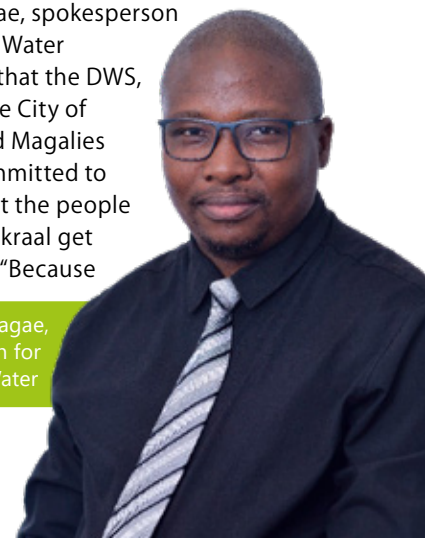
Magalies Water is the implementing agent for the project and manages the Klipdrift Treatment Plant. The water utility already supplies parts of Hammanskraal, but the additional capacity of the package plant will allow it to take over Tshwane's supply area.

To improve drinking water provision to the residents of Hammanskraal, the Department of Water and Sanitation

(DWS) last year allocated R758 million for the project.

David Magae, spokesperson for Magalies Water emphasises that the DWS, alongside the City of Tshwane and Magalies Water, is committed to ensuring that the people of Hammanskraal get clean water. "Because

David Magae,
spokesperson for
Magalies Water



Hammanskraal was facing a crisis in terms of water supply and water quality, conventional solutions like building a traditional water treatment plant were not an option as that would have taken many years to implement. We therefore opted for a package plant."

Advantages of package plants

Tecroveer, a leader in water and resource recovery solutions, was appointed as contractor by Pro-Plan Consulting Engineers.

Package plants are not a new technology, they have been deployed around the country for many years. But it is a first to have a 50 Mℓ/day packaged plant that is one of the largest in the world – both in terms of individual unit size and total capacity.

"When it comes to infrastructure roll out in South Africa, we want to build better, faster and more efficient infrastructure, while considering climate change and demand by growing communities. This package plant is one such example," states Deputy Minister David Mahlobo, who was present at the launch.

Compared to traditional water treatment infrastructure, package treatment plants have a reduced footprint, saving land space and are faster to deploy. Speed of construction is a particular advantage – phase 1 of the project was completed in seven months.

The design combines all traditional water treatment steps in a single modular unit, with capacities ranging from 1 Mℓ/day to the current largest of 12.5 Mℓ/day. The process steps – degritting, flocculation, dissolved air flotation desilting, continuous filtration, and disinfection – are all achieved within a single unit, without any interconnecting pipework or pumping. The total head loss over these steps is less than 1 metre.

Unlike traditional gravity filters, continuous filtration technology means there are no backwash pumps, no complex automation, no downtime during backwashing, and consistent water quality at all times. The units are simple, with bulk mixing and distribution achieved hydraulically, having only two automated valves and a power consumption of less than 2 kW per Mℓ of water

treated. The units are enclosed in a building with an overhead crane to accelerate installation and for ongoing maintenance.

A purpose-built manufacturing facility has been erected at Tecroveer's factory in Glenhovie, where two 12.5 Mℓ/day units can be manufactured in parallel. Thanks to the pre-engineered modular design and the purpose-built manufacturing facility, the time from order placement to delivering safe and pure water is achieved in an unprecedented four to five months.

Everything else, apart from mechanical items such as gearboxes the modules 100% locally implemented and manufactured.

"There were a few factors that played in our favour as the source of raw water was readily available. There was also existing infrastructure such as a pump station and reservoirs that could absorb the new load," notes Magae.

As with most construction projects, there are often unforeseen hurdles. One such example was the bedrock that needed to be excavated for construction to take place. A process of chemical blasting was used to crack the rock, which was then broken into pieces with rock breakers and removed.

Potable water produced from the package plant will eventually be supplied across Limpopo, North-West and Gauteng Provinces.

Vandalism

"We are in the final stages of designating this plant as a national key point, ensuring its recognition as a site of strategic importance and protecting it against sabotage. We are also



working closely with our security cluster to make sure that all necessary security measures are implemented in accordance with national key point requirements. We currently have armed security protecting all assets at the Klipdrift Water Treatment Plant," adds Magae.

Unfortunately, the Hammanskraal community have experienced the effects of vandalism first hand where, just before the launch of Phase 1 of the Klipdrift modular treatment plant,

and Sanitation as well as the City of Tshwane to ensure that the water was of a potable standard. All water that passes the reticulation system must be of good quality and meet the standard as required by the law. The Minister also called on all water quality tests to be published openly and communicated to the public.

The battle against illegal utility connections continues with the City of Tshwane enlisting the services of the Tshwane Metro Police Department (TMPD) and the South African Police Service (SAPS) to improve ways of identifying and eliminating illegal utility connections.

Talking about measures that needed be taken to curb infrastructure vandalism, Deputy Minister Seithloho called on the municipality to work with communities and the SAPS to curb vandalism and to bring to book those who commit malicious damage to water infrastructure. "Vandalism is costing this country millions of rands and is a key issue faced by municipalities across the country. This is also an example where illegal water connections also threaten the health of ordinary citizens. There needs to be more engagement with law the police," says Seithloho.

He adds that often infrastructure is vandalised by people who benefit from either providing water tanks or replacing the broken infrastructure.

Another example of vandalism in the area was the recent fire at the Pyramid substation that left parts of Rooiwal, north of Pretoria, without power and water was believed to be a blatant act sabotage. The Leeuwkraal Dam was contaminated because the Rooiwal

Wastewater Treatment Works did not have electricity and the plant had to temporarily cease operations and, consequently, discharged untreated sewage into the Apies River, which feeds the Leeuwkraal Dam.

Fortunately, Phase 1 of the Klipdrift Package Plant has been completed just in time to lift some spirits this festive season to address the Hammanskraal community's urgent need for safe water and an end to having to allocate a large portion of their monthly income to purchase bottled water.

Conclusion

"While the innovative modular design and the associated agile project management processes are key elements in the success of this emergency intervention, they are not the only factor. The collaboration, openness, integrity, clear intention, commitment, and vision of all parties involved – from National and Local Government to Magalies Water Board, ProPlan, Tecrover, community stakeholders, and the people of Hammanskraal – have been equally vital. Without this collective effort, the project could never have materialised or been completed in such record time," states Izak Cronje, CEO, Tecrover.

"Magalies Water is excelling as an implementing agent and the project thus far and been carried out in a timely, environmentally sensitive and sustainable manner. The completion of Phase 1 is a huge milestone for us, as it exemplifies what's possible when stakeholders come together to address critical needs with urgency and innovation. A special thank you to Minister Pemmy Majodina for your leadership and vision, which made this success possible," concludes Magae. ●



www.magalieswater.co.za



some water coming from the new plant along the reticulation pipeline was contaminated. This was due to a linked pipeline system from the Temba Water Treatment Plant and illegal connections, that backwashed into the system. This resulted in the need for further water analysis and a slight delay. Once the vandalism was dealt with and the illegal connections closed and the pipes were flushed, further testing was conducted by Magalies Water, the Department of Water



COMPLYING WITH **BYLAWS** DURING THE WATER CRISIS

When load shedding was at its peak, people bought inverters and switched to solar. Now the water crisis has citizens weighing their options for alternative and augmented water supply. Navigating this landscape can be difficult, so it is important to ensure that you remain above board. **By Duncan Nortier**



Testing water to see if it is drinkable and free from contaminants can save lives

The difference between electricity and water is that it is almost impossible to rely completely on your own supply, and quick fixes are not as available. There is no equivalent to a generator for water. However, there are options, but water expert Ayesha Laher, director at AHL Water, urges people to do their due diligence and ensure they act in accordance with their local bylaws. "I understand the frustration, and the impulse to do anything to help like drill a borehole, but there are serious considerations to consider," says Ayesha.

What are the options?

- **Boreholes:** Boreholes are a great way to augment your water supply, they are, however costly and subject to a variety of laws. "People are under the impression that you can just drill a borehole and use the water to your heart's content, but that is not the case," says Ayesha and adds, "Firstly depending on where you live

you would have to comply with local bylaws."

In the City of Johannesburg: In order to drill a borehole you must get permission from the Council, which if given the go-ahead will ask you to test the water and only if it adheres to the water quality standards set out by the city will you be able to commence drilling. This is also done at the cost of the person requesting permission. "There are plenty of companies willing to just drill a borehole, it is better to go with a reputable company that will do the proper work and all the associated testing. It's also important to follow the extraction allowance as not doing so will cause sinkholes," adds Ayesha. Similar rules apply to the Ekurhuleni Municipality.

- **Water retaining tanks:** These simple tanks provide water in times of need, Ayesha says, "If you are planning on drinking the water from the tank it's important to buy a simple UV light that will kill bacteria."

Over extraction of a borehole can cause sinkholes and damage to the environment and infrastructure

It is worth noting that the City of Johannesburg does not allow borehole water to be used for commercial purposes, a problem that Ayesha says many businesses are facing. "Recently we applied for special permission to extract borehole water for a private hospital and we were refused," highlighting the severity of these laws, "when everything is working properly this isn't an issue but having a hospital rely on tankers is not great."

Common problems

It is essential to note that if you

are considering augmenting your water supply there are some issues associated with this practice.

- **Quality of the groundwater:** As previously mentioned, it is vital to check the water quality of your source. In Randburg, there are cases of high concentrations of nitrates which can lead to acute health problems in adults and death in infants and toddlers.
- **Sinkholes:** The extraction volumes are not just guidelines but are put in place to ensure the water supply is sustainable as well as structurally

sound. Over-extraction can lead to sinkholes, which is a growing problem in urban and residential areas.

- **Illegal drilling:** With the ongoing crisis, some people might feel that they are entitled to water from a borehole, but illegal drilling can lead to acid mine drainage being surfaced and entering the water system.
- Ayesha concludes by saying that it is important to ensure that citizens act within the law despite how frustrating it might be. ●

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Peter Varndell is the CEO of NEPAD Business Foundation and serves on the secretariat of SWPN



Alyssa Jooste, the Africa Sustainability Manager: Water Stewardship & Smart Agriculture for The South African Breweries and Private Sector Co-Chair for the SWPN

HOW THE GAUTENG WATER USER DASHBOARD HELPS SOLVE THE WATER CRISIS

The current water crisis in Gauteng affects both industry and home use, with the 15 million residents worried about long-term water security in the province.

The Strategic Water Partners Network (SWPN) is a co-chair arrangement between the Department of Water and Sanitation (DWS) and the private sector. The SWPN has three core functions:

- **Leadership and elevating action on water to an executive level:** Communicating with the sector as well as water users to improve the water situation through leadership.

- **Partnerships:** Creating strategic and catalytic partnerships around specific interests and expertise within the water sector. The main drivers as of 2024 are addressing non-revenue water (NRW) and leaks within municipalities and creating water security in Gauteng.
- **Projects:** Working on projects in the public and private sectors that action the main drivers and reduce demand. Live projects are in Polokwane and Nelson Mandela Bay, with MOUs

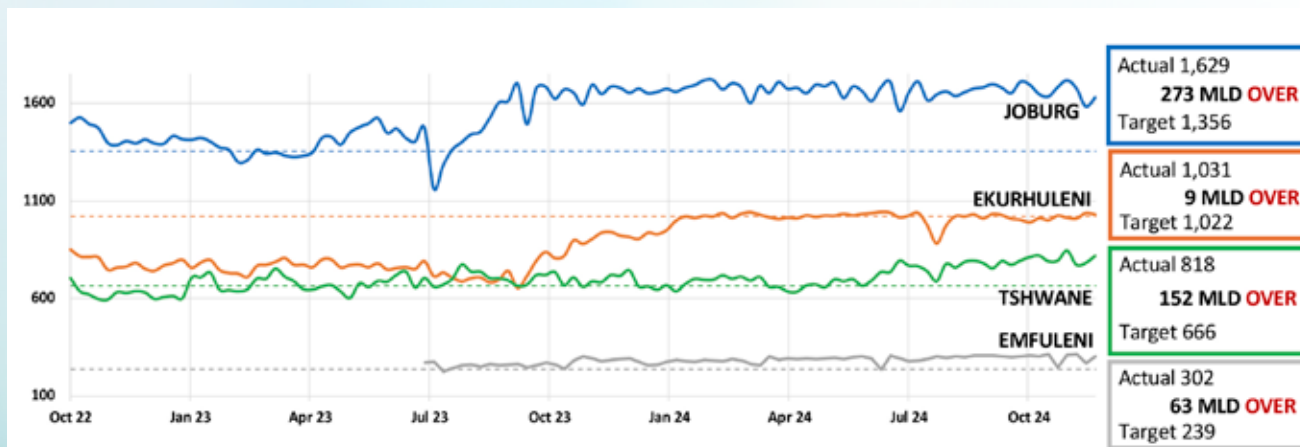
signed with Rand Water and Johannesburg Water. Currently, in Gauteng, there is an R70 million investment into increasing the water supply, but as Johannesburg Water reduces daily use from 1 750 Mℓ per day to 1 356 Mℓ per day by September 2025 the focus also needs to shift to reducing non-revenue water, fixing, and preventing leaks, and focusing on water-wise usage on the consumer’s end.

Gauteng’s water dashboard

“The current water situation illuminates the need for good data to make informed decisions and transparency. Transparency between the department, the various stakeholders and the water users is crucial if we are to lift ourselves into water security,” says Peter Varndell the CEO at NEPAD Business Foundation who serves on the secretariat of SWPN.

Alyssa Jooste, the Africa Sustainability Manager: Water Stewardship & Smart Agriculture for The South African Breweries and Private Sector Co-Chair for the SWPN adds, “As a partnership between the DWS, water users, and the private sector our goal is to achieve the water and sanitation master plan set by the department. Closing the demand and supply gap and reducing NRW must be done collectively with accurate data that is also publicly available.”

The need for transparency is vital, as Johannesburg Water implements level 1 restrictions and water users often ask why they are bearing the brunt of the supply problems. As intermittent supply hits parts of Johannesburg - especially the commando system - asking consumers to reduce water usage can



A snapshot of the weekly water consumption for Gauteng’s municipalities for November. All four are currently overusing water as per their mandate and goals

METRO WATER CONSUMPTION	TOTAL	Joburg	Ekurhuleni	Tshwane	Emfuleni
This Week Average Daily Use (MLD)	3,780	1,629	1,031	818	302
Last Week Average Daily Use - corrected (MLD)	3,672	1,583	1,039	782	268
Water Use Efficiency Target Use (MLD)	3,283	1,356	1,022	666	239
DIFFERENCE BETWEEN TARGET AND ACTUAL (MLD)	497	273	9	152	63
% Deviation from target use	15%	20%	1%	23%	26%
Gross Per capita use (l/cd)	267	267	254	205	418
Increase/Decrease from previous week	↑	↑	↓	↑	↑

* ↓ Decrease from last week, but above target ↑ Increase from last week, but in target ↓ Decrease, within target ↑ Increase

- MLD = millions of litres per day, the common measurement of total water use for cities
- WUE = Water use efficiency targets is the target demand that matches the licence conditions of Rand Water. This is shown as target demand in dotted lines on the graph. The three metros & Emfuleni comprise ±90% of the WUE target
- Weekly demand figures are from Rand Water meter readings. System balancing and reconciliation due to meter inaccuracies sometimes result in corrections to previous weekly readings.
- Metro water use has increased overall in the past week due to a heatwave, with combined use now 15% above target. All major users are using more water than their water use efficiency targets.

A snapshot of the Gauteng Water Security dashboard showing average daily use in different municipalities in Gauteng. As time progresses the goal is to make the dashboard more reader friendly

make them feel confused- "Why reduce water if I haven't got any?"

The ongoing efforts by Rand Water, Johannesburg Water, and the DWS must be visible if consumers are to trust them, and this is why the SWPN and the DWS along with various stakeholders initiated the Gauteng Water Usage Dashboard. The aims of the dashboard are to provide:

- Real-time water consumption patterns and trends
- Current system status and capacity levels
- Detailed infrastructure performance metrics
- Non-revenue water monitoring
- Updates on municipal water management initiatives

Jooste says, "This dashboard allows for data-driven decisions on the top end while providing insights to water users who wish to understand their usage better." Varndell adds, "The information available can be overwhelming and contradictory, so to have a 'single source' that the entire sector can rely on is invaluable."

Jooste and Varndell agree that the dashboard can inform and change consumer behaviour. It showcases the impact of using water-saving principles at the ground level and allows water boards and utilities to implement plans and actions that can be benchmarked and tracked with solid data.

Varndell explains "The dashboard sources its data from a mix of smart metering, regular manual metering, and information provided by municipalities." As the "single source of truth" this dashboard is the result of collaboration and partnerships. The director general of DWS Dr Sean Phillips who led this project says, "This dashboard exemplifies what we can achieve when different sectors unite around a common purpose. "It's designed to evolve based on stakeholder needs and feedback."

Non-revenue water

As a main driver for the SWPN, NRW represents both the failure to be proactive and an opportunity to implement real change that will secure Gauteng's water for the future. Varndell says, "Municipal water is the DNA of the SWPN. The No Drop report, as well as the real need to support municipalities as they combat NRW, is at the heart of our decision making." NRW is a massive issue within the South African water sector. Nearing 50% NRW is a mix of unbilled water, flat rate water usage, illegal water connections and leaks which account for 24% of the total water usage in Johannesburg.

Jooste elaborates, "Failure to collect revenue is undermining the entire system. NRW represents future revenue that could be collected and reinvested

into infrastructure and water conservation strategies. Additionally, NRW is not a monolith and should be dealt with on a case-by-case basis, considering the local context. Part of the SWPN's projects entail tailoring the project to meet the specific needs of a municipality rather than a one-sized approach."

The dashboard monitors all water usage, and therefore NRW's impact is transparent. This viable data allows for actual intervention rather than relying on general fixes.

One of the barriers to addressing NRW is funding and economic viability, something the SWPN has addressed through multiple projects. A project in Polokwane facilitated by SWPN addressed the dire situation of the municipality through public-private collaboration and achieved significant results in its implementation. "The project which sought to address water security in the region was a success and importantly it showed that there is a short payback period when addressing NRW," says Jooste.

As Gauteng proactively battles the water supply crisis, the Gauteng Water Security Dashboard, which can be found on the DWS website, along with the results of other projects in South Africa lays down a path to closing the water supply gap, reducing demand, and increasing supply before 2030. ●



Wastewater is often not fully appreciated for its usefulness and impact on water usage. Finding creative and innovative ways to reuse this neglected resource is a possible solution to the water crisis

UNSEEN BUT ESSENTIAL: WASTEWATER'S ROLE IN GAUTENG'S WATER FUTURE

Water is at the centre of many social and economic problems throughout South Africa, and the ongoing water issues don't only affect drinking water, but crucially wastewater too.



Kate Stubbs, group director for business and marketing for Interwaste

Kate Stubbs, group director for business and marketing for Interwaste, a waste management company operating in Southern Africa, says "When we think about the water crisis, we often visualise dry taps, but we don't think about All the processes that require water- like flushing toilets." Wastewater is the often-underappreciated element in South Africa's water woes.

"Globally, there is a consensus that water being a finite resource, will lead to a bigger water crisis.

From the South African perspective, we are already a water-scarce country as a baseline even before we add infrastructure problems and non-revenue water to the mix," adds Kate.

Water, infrastructure, and the need to invest

South Africa has struggled with infrastructure development and maintenance, according to the World Bank the country would have to spend \$4.8 trillion dollars to close its infrastructure gap and meet its SDG goals. "We know that South Africa has infrastructure problems, but the scope is often not fully appreciated. Waste management infrastructure and systems are inadequate, and this leads to serious pollution of our water sources, industrial pollution and wastewater treatment plants not working also contribute to the ongoing problem," says Kate.

The Green Drop Report, which looks at the wastewater in South Africa, has shown a significant decline over the last 10 years, Kate adds, "Water is a system, so problems feed each other. When wastewater treatment plants are not operating properly, they pollute the water systems, and these polluted water systems then need additional treatment, which our infrastructure is struggling to do, this is then made exponentially worse with non-revenue water and leakages."

Failing the proper maintenance of South Africa's infrastructure in the face

of climate change provides yet another obstacle. "Climate change has become very tangible, the impact of droughts and severe storms on our already ailing infrastructure has shown that our infrastructure doesn't just need maintenance but also to be climate-proofed, another layer effecting the water in South Africa," says Kate.

Waste, water, and you

"Waste is something people don't think about until it affects them. It is very much hidden from our minds and sight, but waste has a profound impact on our water," says Kate. The fact is that if waste is not managed correctly, it becomes pollution, and this pollution affects our water supplies, and groundwater quality. There is also a dissociation that takes place in the minds of people in homes, businesses, and industry, who through using water create wastewater. Wastewater is not just the sewage produced, but it is also the water used in industrial practices: washing, cleaning, and manufacturing.



While leakages represent a significant amount of the water loss in South Africa, flushing 9 litres of water every time the toilet is used is seen as normal. This is unsustainable and especially egregious during times of water insecurity

It is also the water used in agriculture that becomes contaminated with chemicals. "Wastewater is much larger than most people imagine, but there is a unique opportunity with wastewater, in that effective systems can re-use and repurpose wastewater for greater efficiency," says Kate. Utilizing wastewater for industrial purposes can alleviate the stress on South Africa's freshwater systems or even be treated and put back into South Africa's potable water system. "The stats

vary, but between 5-10% of South Africa's wastewater is reused efficiently. For a water-scarce country, this is a problem. Other water-scarce countries reuse their water at a far higher rate. Especially those in the Middle East, who reuse their recycled water for irrigation. In South Africa, about 60% of the total water used is for agriculture which provides a significant opportunity to reuse South Africa's wastewater in this sector to become more water-efficient," says Kate of the opportunity in the crisis.

The changing environment and greater emphasis on sustainability have also forced businesses to relook at their practices, "the emphasis on ESG reporting, and businesses becoming more aware of their impact has shown an uptake in the private sector looking to have their own wastewater treatment on-site to repurposes their

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water. Corporate responsibility is reshaping the way wastewater is viewed within the industry," adds Kate.

Waste management

Liquid waste and water are banned from landfill sites, Kate says that this shifts the responsibility onto the producers of wastewater, but cautions that all wastewater should be treated differently because the contaminants vary per case and that wastewater producers ought to not look for a 'silver bullet' but do their due diligence in treating their waste.

Wastewater is banned from landfills because the waste and water mix to become leachate, a seriously damaging liquid that is exceedingly difficult to treat and poses the risk of contaminating groundwater.

While waste and its associated infrastructure are adding to the water issues of South Africa it is also a solution. In 2024 Interwaste launched a state-of-the-art Leachate and Effluent Treatment Plant, Kate says, "Typically wastewater from landfills have no solutions as it is very difficult and specific to treat but this plant is capable of taking wastewater from landfills and treating it, providing 80-90% recovery of clean water."

The plant is capable of treating 43 million Liters of water per year, a

significant achievement considering the lack of solutions that preceded the plant. Kate adds that the plant does not produce potable water, but water clean for reuse, this is aimed at relieving the burden on our potable water supply.

The drive for better wastewater treatment facilities is also coming from the national and municipal level, Kate adds "government is looking at upgrading their wastewater treatment plants and making treated wastewater more available to the market. Reusing water will be an important feature of the plans to solve the water crisis. In Cape Town, industry can purchase treated water at a lower cost than freshwater and expanding this market will be a big step for the wastewater sector." Kate also says that it's not just the public sector but from an industry perspective, larger water users are looking at on-site effluent treatment plants. They're able to then reuse and repurpose their water for their own purposes, once again, over the longer term, reducing costs, and reducing reliance on these freshwater systems, "from a business perspective it makes economic sense."

Skills and investment

Just as with the energy crisis, the water crisis has the government

looking at adding skills to cope with and navigate the new landscape. This interest in reusing water is going to inform what skills will be invested in. This reuse principle is also driven by multiple stakeholders, public, private, and public-private partnerships which result in a variety of investment pools that will go towards infrastructure and skills development.

Businesses are driven by profit, and while the initial investment may require some capital, Kate says "the impact of zero water on your business with productivity and the risk to your business, you know that investment starts making sense very quickly. Securing water for yourself is an asset."

That being said, Kate says that one misconception companies have is the cost of becoming compliant. As countries become more ecologically minded, water, wastewater, and waste compliance become harder to achieve, as well as costlier. "Companies are often shocked at the cost of compliance but when the risks of no water, and water loss are thoroughly accounted for the investment still makes sense."

As South Africa, and specifically Gauteng, navigates its water supply issues wastewater will play a crucial role in achieving water security as well as better environmental practices. ●





WHAT IS JOHANNESBURG WATER DOING TO AID THE WATER CRISIS?

Gauteng's water worries hit a new level this month with many residents complaining of no water due across Johannesburg. Johannesburg Water responded to the concerns by addressing the media on the 28th of November to outline their strategy for a water-secure Gauteng. **By Duncan Nortier**



The Johannesburg Water team at a media briefing, from left to right: Nolwasi Dhlamini, External Communications Officer; Nombuso Shabalala, Spokesperson for Johannesburg Water; Logan Munsamy, Operations Manager for Johannesburg Water; and Ntshavheni Mukwevho, Managing Director

Johannesburg Water has taken a proactive approach to dealing with the supply-side water fiasco before it reaches a critical point. Since Rand Water's announcement that they were worried about over-extraction and over-demand, Johannesburg Water has implemented aggressive tactics to curb consumption and reduce usage.

Mid-November saw an increase in the concern for water supply as the Commando system failed to recover after emergency maintenance by City Power at the Eikenhof booster station.

In the context of the ongoing crisis management and the concern from Johannesburg residents about access to water, the managing director of Johannesburg Water Mr Ntshavheni Mukwevho says, "it is important for us to communicate what we are doing, and what we aim to do for our water users to trust us and understand what the reality of the water situation is."

Logan Munsamy, operations manager for Johannesburg Water says, "While the strategy we have adopted is not new, it is in line with what we were already doing, we have updated and accelerated it in some areas to bring our water usage down to sustainable levels."

Bulk water supply

Rand Water supplies Johannesburg with 1 750 Mℓ per day, accounting for 35% of its current extraction license of 4 936 Mℓ per day. This license will expire in September 2025, and be lowered to 4 383 Mℓ per day, but much earlier from December 1st 2024, Rand Water will only supply Johannesburg Water with 1 600 Mℓ a day. This reduction is aimed at ensuring the storage levels of the bulk supply remain stable in this time of dry weather and heat waves.

Johannesburg Water has implemented immediate reforms

of deemed consumption, where flat rates are replaced with metered consumption. Logan adds that "we are also scheduling water supply reduction between 21:00 to 04:00 starting on 14 November 2024 with the possibility of increasing the duration from 16:00 to 04:00 should we not observe a reduction of demand. This restriction will include the supply of informal settlements."

This is aided by intensifying level 3 water disconnections, which remove water users from the city's supply due to illegal usage.

"We are implementing technical strategies on our side, but we also urge consumers to use water sparingly at this time," adds Mukwevho.

Technical interventions

Johannesburg Water states that it understands that consumption is not only a consumer issue but an issue within its own system. Johannesburg



Water's leakages account for 24% of the total water use and represent a significant hurdle to sustainable usage.

Munsamy says, "We have increased our responses to address non-revenue water, in particular leakages, and this effort will represent a large savings in water use from our side."

Some of the technical interventions are:

- Increase burst repair turnaround time from 48 hours to 24 hours
 - Expedite the procurement of a contract for the emergency repairs of water pipe bursts and allocate budget accordingly.
 - Expedite the procurement of critical material for the repair of leaking water network infrastructure.
 - Allocate overtime budget for additional teams during weekends and weekdays.
 - Procuring a contract for welding services to supplement the existing welding teams.
- Procure contractors to supply an additional 10 tractor-loaded backhoes (TLBs) – 1 per depot – so that water teams have 2 dedicated TLBS to use for emergency repairs.
- Intensify the use of first-line response teams to isolate the leaking water while waiting for the repair teams to come.
- Intensify the repair and maintenance of network pressure-reducing valves (PRVs) and reduce network pressure effected from October 2024
 - Expedite the procurement of a service provider to supplement internal resources. So far there are 204 completed PRVs out of the 685 total complement.

- Pressure management and installation of smart controllers utilising the existing frame contract
 - Additional Capex budget for installation of an additional 45 smart controllers.
- Advance leak detection utilising the existing frame contract
 - Additional Capex budget for procurement of an additional 200 noise loggers.

Munsamy adds, "Currently we fix around 2 000 leaks a month. Leaks are inevitable, and our response and maintenance need to improve to fix and stop bursts. With our commitment to smart technology, we aim to prevent and detect bursts earlier and move a reactive to proactive approach." As part of their active leak detection strategy, Johannesburg Water surveyed 12 000 km of pipeline and found: 2 396 burst pipes, 6 727 leaking meters, 442 leaking valves and 259 leaking hydrants. This intervention provided an estimated savings of 9 457 Mℳ per annum or 25 Mℳ per day. The entity also aims to invest 5,5 million rand into "noise loggers" which are sensors embedded into the system and provide passive early burst detection.

Using smart technology, especially in the area of pressure management, has a potential saving of 5 Mℳ a day.

Above these short-term interventions, Johannesburg Water makes use of its medium-long-term Water Conservation Water Demand Management strategy (WCWDM) – a 5-year strategy last revised in 2021. These include:

- Repairs of leaking reservoirs and tower infrastructure.

- Repair and replacement of zonal bulk water meters.
- Active and passive leak detection.
- Establishing new pressure management zones and minimum night flow analysis.
- Retrofitting and removal of wasteful devices (infrastructure upgrade and renewal).
- By-law enforcement (illegal connection cut-off and reconnections).
- Replacement and refurbishment of large gate valves.
- Water pipe replacement.
- Domestic and large consumer meter replacement.

Johannesburg Water also notes that 30 bulk water meters account for 97% of the total water used in the city, which has led to restrictions imposed on these high-water consumers.

The overall objectives

Johannesburg Water aims to decrease water consumption by 37 123 Mℳ per annum from the technical interventions. This is an effective reduction of 103 Mℳ a day from technical intervention alone.

Rand Water will reduce supply from 1 750 Mℳ a day to 1 600 Mℳ a day in December 2024, and then further reduce the supply to 1 550 Mℳ/d between February 2025 and April 2025, then gradually reduce supply to 1 356 Mℳ/d by September 2025.

This is a significant reduction that Johannesburg Water has to meet by improving its technical intervention and strategies to not impact the water supply to the public. ●

VIRTUAL WATER CAN INFORM BETTER AGRICULTURAL DECISIONS

Informed consumers can make better purchasing decisions; informed producers can manage water use better. Virtual water is a representation of the ‘water footprint’ embedded into the production process. Simply put, it is the litre value of a consumable item and can aid in both producer and consumer decision making.

In South Africa agriculture accounts for 60% of total water usage. With such high volumes of water being used, farmers and consumers who wish to be ‘water-wise’ can make use of virtual water to keep track of their usage and see how much water they are ‘using’ per purchase. Rainbow Reservoirs, a manufacturer of sectional steel, bolted-panel tanks used throughout Africa, put together a virtual water list that may surprise you.

Freshwater in litres per item

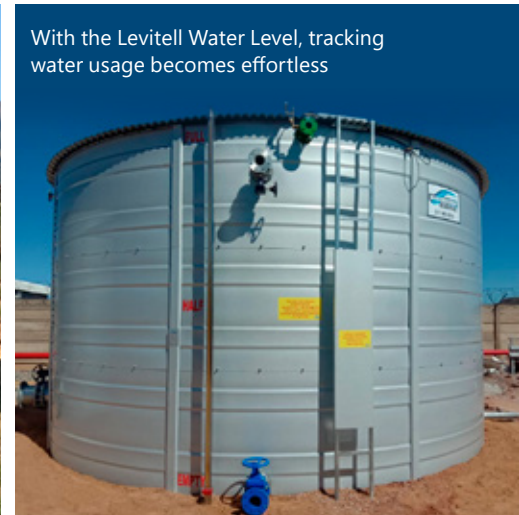
1 hamburger	2 500
1 ℓ of milk	1 000
1 slice of bread	40
1 packet of crisps	185
1 ℓ of apple juice	950
1 glass of orange juice (200 mℓ)	190
1 glass of wine (125 mℓ)	120
1 glass of beer (125 mℓ)	75
1 cup of tea (250 mℓ)	30
1 cup of coffee (125 mℓ, 7 g coffee)	150
1 kg of roasted coffee	21 000
1 apple	70

Freshwater in litres per kilogram

1 kg pulses	3 000
1 kg rice	2 500
1 kg citrus	2 000
1 kg maize	1 700
1 kg barley	1 200
1 kg wheat	800
1 kg potatoes	500
1 kg bread	1 500
1 kg pork (estimate for a pig of 10 months)	4 800
1 kg chicken (estimate for a chicken of 10 weeks)	3 700
1 kg beef (3-year-old animal/200 kg of meat)	15 000



Tanks can be sized according to specific needs, whether large or small



With the Levitell Water Level, tracking water usage becomes effortless



Farmers can use virtual water to ensure they have enough water for production while also promoting efficient water use

Keeping score

While virtual water lists may inspire behaviour changes in consumers, these values can also assist the agricultural sector by providing a benchmark for water usage. This can help track high water consumption and be used for future planning.

Rainbow Reservoirs manufacture tanks for water storage that are used in the agricultural space, and when farmers use virtual water to plan, they have to rely on properly manufactured tanks that can store and manage the water they need for production.

One piece of equipment that aids the agricultural sector is the Levitell Water Level from Rainbow Reservoirs, which eliminates the guesswork in tracking a

tank's water reserve. By actively tracking and managing water usage, farmers can ensure that water is directed where it is most needed.

Another measure of sustainable water usage is rainwater harvesting, and storage which can be used to augment water supply for stressed periods. Part of Rainbow Reservoir's offering is the installation of these rainwater harvesting reservoirs which are used throughout South Africa in the commercial, industrial, and agricultural sectors.

Using virtual water to benchmark practices, combined with purposeful technology, can ensure sustainable farming practices that conserve the planet's most valuable resource. ●

Water Bladders a flexible solution to water storage

Storing water is necessary in many industries, especially during this time of intermittent supply and water restrictions. With many available options, the right storage can be difficult to find. Simon Cotton, owner of Silver Solutions and Water Bladders, offers a unique solution to aid businesses with their water storage needs.



Simon Cotton, owner of Silver Solutions

The Water Bladder is a reinforced PVC 'sack' that can be used to store, and transport liquid, not just water. The Water Bladder can be used for wine, fertilizer, cane juice, blood, transformer oil, diesel, and other agricultural fluids. These bladders range from small custom sizing to 500 000 ℓ and are easier to transport than stationary tanks, for example, the dry weight of the 200 000 ℓ bladders weighs only 220 kg, and when folded it measures under one cubic meter.

"The idea is convenience, no construction, no hassle, a long lifespan and basically just an easy setup, ensuring the bladder meets the exact

needs of the job. All that is required is a clean, levelled out surface" says Cotton. While traditional storage relies on set sizes, Water Bladders can be completely customised. "One of our clients is a kennel association, and they wanted custom "ice" bladders to help keep the dogs cool during shows. We can supply many sizes for virtually any need," adds Cotton.

The advantages of a Water Bladder

The variety on the market today may get businesses to think about their storage solutions and the water bladder does come with some good advantages that make it an attractive option.

Cotton expands, "When we talk cost, the price per litre is really low compared to other storage products. No construction costs to prepare are a big

advantage and in general larger bladders can come in under 35 cents a litre for total storage."

Some of the advantages are:

- Zero sun penetration, the inner is completely black ensuring the water does not heat up with the sun and because the water always sits against the inner, whether the tank is half empty, the temperature remains constant.
- No algae growth. The environment inside the bladder is sterile and thus does not promote algae growth.
- No evaporation.
- Zero toxicity, as there is zero sun penetration there is no plastic erosion.
- Easily repairable, if needed.
- Easy to connect to downpipes, boreholes or irrigation systems.
- Can be supplied with fittings suitable for the correct connections to a variety of pipe sizes from 50 mm up to 300 mm.

The product is also manufactured in South Africa and comes with a 10-year warranty,





Water Bladders installed for Sasol mining

looking to the long term for water storage, and is fully backed up with service and after-sales support.

“The relatively low weight of the Water Bladders makes them easy to transport and can be delivered anywhere. We have clients from all over South Africa and Africa, with an agent in Perth, Australia as well,” states Cotton.

The chemical resistance of the product ensures a spread of different fluids that can be stored in PVC material. Specialised materials such as TPU (thermoplastic polyurethane) are used specifically for petrol and diesel storage.

Practical use

These bladders are used by multiple large companies such as Sasol, Coca-Cola and Sanlam primarily as backup water supply, but can adapted to many different uses. “In addition, in terms of smaller scale use, the bladders are regularly employed by pool repair companies who pump the water into the bladder, repair the pool, and pump it back, saving water in the process. The scale is really from as small as needed to as large as needed. Multiple bladders on one site can be easily connected together as well,” says Cotton.

These Water Bladders have been used in abattoirs to store and transport blood, or a company transporting molasses. The customizable nature of these bladders allows them to be deployed for a variety of applications. Cotton explains that Sanlam had a tunnel under their offices and requested a custom Water Bladder to be fitted in the tunnel, “we made a custom 20 m x 3 m bladder to fit into this space which they otherwise wouldn't have been able to use as efficiently.”

Not just a storage solution

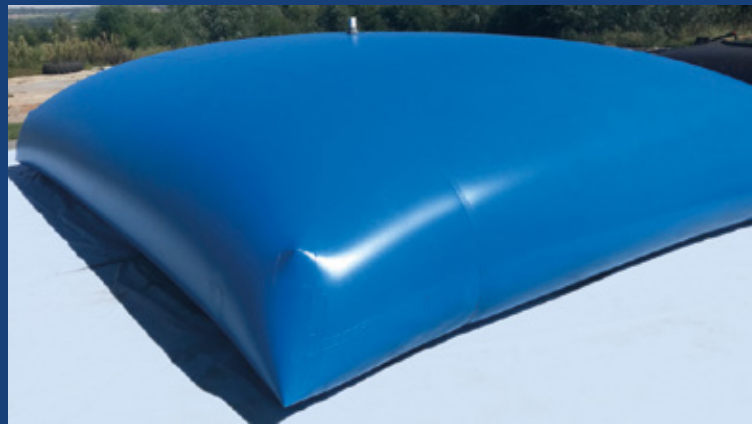
The solutions offered by Silver Solutions go far beyond just storage. They also offer dam liners to line earth and concrete dams that have leaks, including a loose liner to sit atop a dam to prevent evaporation. “We have also developed an “instant dam” option where the dam perimeter walls are made using water bladders, and once secured, sheets of HDPE liners are welded together and used in between the perimeter bladders. No other construction is required, such as mass excavations, soil removal etc,” says Cotton.

Cotton concludes with “The easy-to-use and versatile bladders are a strong option for water storage, especially for custom needs where a traditional tank won't cut it”. Price is always an issue in life, as is life span – water bladders satisfy both of these needs.” ●

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Robyn McGuckin,
executive director, P4G



Eben Mbhele, director
of business development,
Loowatt



Alvin Anderson,
country director, BORDA
South Africa



Samuel Getahun,
senior research scientist,
WASH R&D Centre UKZN

HITTING THE SANITATION TRIFECTA: WATERLESS, ACCESSIBLE AND CIRCULAR

Kaloola and BORDA have formed an exciting partnership to improve upon and then commercialise a waterless toilet system that incorporates circular economy principles for processing and managing waste. P4G has awarded this partnership with US\$369 689 in grant funding.

An initiative funded by the Netherlands, Denmark and South Korea through their ministries of foreign affairs, P4G is hosted by the World Resource Institute, which works at the nexus of environment, economic opportunity and human well-being.

“The cruel irony of climate change is that the regions facing the largest increases in temperature variability also have the least economic potential to cope with the impacts,” says Robyn McGuckin, executive director, P4G.

This is where P4G comes into play, striving to empower and accelerate climate startups that develop innovative technologies to protect the world’s most vulnerable populations in the areas of food, water and energy.

Informal settlements

Residents living in South Africa’s informal settlements are a vulnerable group. They typically suffer from a lack of sanitation service delivery, with little space for toilets and

waste management facilities. When provided, toilets are communal and often placed on the periphery of a settlement, causing residents to walk long distances. Users of these toilets can be exposed to danger and violent crimes on their way to or at the actual toilets themselves. Furthermore, these toilets are sometimes locked at night, or are unlit, causing people to use buckets to store their waste, which they then need to get rid of in the morning.

“Rapid urbanisation and the high cost of providing and maintaining these sanitation services adds further pressure on municipalities. Often toilets that, for example, should cater for 400 people, are used by 2000 people. As a result, they are usually broken and dirty with blockages where these toilets can overflow, causing illnesses. Communities residing in informal settlements generally lack the ability to choose the sanitation services they receive. Given the constraints of space and infrastructure,

their options are limited,” adds Eben Mbhele, director of business development, Loowatt.

The solution

Designed for low income, urban settings where electricity and water are scarce, the Loowatt toilet (branded in South Africa as Kaloola)

uses a waterless flush system to seal faeces, urine and toilet paper inside a polymer film. It prevents users from seeing or smelling the stored waste and is a good technical solution for informal settlements. After an initial feasibility study to test user acceptance of Kaloola, it was found that the technology compared favourably to flush toilets.

Kaloola toilets are rented out at R350/month and are serviced weekly as a pilot project at four informal settlements (that have government provided free municipal toilets) in Durban, KwaZulu Natal where there are currently over 125 paying households. Payment is made up front, on a monthly basis, and prepaid vouchers can be bought at the local spaza shops and other more established retailers like Pep and Shoprite. The Kaloola toilet is also rented out

in commercial locations such as construction sites and events as toilet trailers or single toilet cabins.

Work has been done to reduce the cost of the toilet and the outside structure, while still manufacturing a product that is durable, light and easy to transport. For durability purposes, Kaloola has moved away from its original design with a wooden outside structure and now uses a composite of fibre glass and concrete that is surprisingly lightweight, durable, modular and easy to deploy on site.

Circular economy

"We cannot solve one problem (access to safe, dignified sanitation) but then create an

environmental problem in terms of faecal sludge as a waste product. The effective management of faecal waste is critical for preventing environmental contamination and health risks. Furthermore, the disposal of this faecal sludge at wastewater treatment plants poses a significant cost. Toilets are often located in geographically challenging areas, that are difficult to reach and usually far away from wastewater treatment plants, making the transport costs (without even considering the discharge rates) very expensive," explains Mbhele.

He adds that fortunately, the Kaloola toilet opens up circular





economy opportunities.

“This is where our partnership with BORDA becomes extremely beneficial.

BORDA is an international organisation specialising in integrated decentralised sanitation solutions in the fields of wastewater, sludge and solid waste management. They bring significant expertise in monitoring, learning and evaluation and will share best practices on the feasibility and treatment options for container-based sanitation. Due to BORDA’S experience, in a short time, we are now very close to finding a viable solution to the faecal waste. There is already a tangible benefit to municipalities by removing faecal sludge from their wastewater treatment plants. We are also investigating options of treating faecal sludge on site.”

Kaloola excited about the potential of turning the faecal sludge into a resource. Opportunities for the processed waste to be reused include biochar, biogas, bricks, fertiliser and the use of black soldier flies to digest the sludge.

“The profits from one of these alternatives can then be used to sustain the business and subsidise vulnerable people in need of a toilet, especially the elderly,” says Mbhele.

Waste characterisation

“One of the key activities of this partnership is to characterise the waste from the Kaloola toilets. This involves the description of sludge behaviour in treatment processes and disposal. Waste characterisation facilitates an understanding and prediction of sludge properties. It will help us ascertain the viability of certain treatment options and uses for the sludge. We have appointed the WASH R&D Centre UKZN – a leader in WASH research, development and innovation – to do the waste characterisation as well as an economic analysis on the financial feasibility of these treatment options and uses,” states Alvin Anderson, country director, BORDA South Africa.

Characterisation includes analyses of properties such as moisture, potential pathogens, biochemical oxygen demand (BOD), total nitrogen and total phosphorus, fats oil and grease (FOG), sludge volume index (SVI), pH and alkalinity.

“These properties play a role in deciding upon the end use of the faecal sludge. For example, faecal sludge with a high moisture content cannot be used to create biochar because it would be costly to dry the material,” explains Samuel Getahun, a senior research scientist at WASH R&D Centre UKZN.

Faecal waste – Kaloola

The faecal waste in the Kaloola toilets

is trash-free. This is because the patented flexible rubber roller in the bowl of the toilet regulates the size of the waste stored in the barrel, ensuring that only human waste is retained. Furthermore, the faecal waste has no chemicals or water.

Over 400 kg of faecal waste is collected per week.

“However, one of the concerns is the polymer liner. The liner is inserted into the toilet covering the bowl and captures any solid or liquid waste. When the flush button is pushed, the liner and waste are drawn into the barrel below. When the toilet is serviced, that barrel is removed containing the waste that is inside the polymer liner. Even though the polymer liner forms just under 1% of the total waste collected, we still need to look at a treatment option for the liner,” explains Anderson.

This is reiterated by Getahun, who explains that the liner is classified medical grade waste because it is contaminated by human waste and has to be managed by a specially accredited company. “The classification from a regulatory perspective is a problem as it increases the handling cost of the liner.”

The polymer film is separated from the organic waste. The separated polymer material can be used for recycling once there are sufficient quantities.

On a positive note, because the organics stream is not contaminated



with chemicals, cover material or heavily diluted with water, it can be fed directly into wastewater treatment works or anaerobically digested for production of biogas and fertilizer.

WASH R&D Centre UKZN have appointed a master's student to work on the project. "We have a dedicated faecal sludge laboratory, and everyone who works in the laboratory must complete a rigorous safety programme as well as a laboratory induction and training on sampling and analysis procedures. Monthly samples of faecal sludge have been collected from the Kaloola toilets," adds Getahun.

Turning faecal sludge into a resource

There is some resistance from the public over using faecal waste for fertilisers, especially for growing fruit and vegetables. "We are hoping that from our engagement with the Department of Water and Sanitation as well as the Crop Sciences Department from the WASH R&D Centre UKZN, treated faecal waste can be used in a safe way. It is all about capacitation and education. Continuous engagement with the public as well as showcasing the advantages of turning faecal sludge into a resource is really important," states Anderson.

BORDA has been involved in faecal sludge treatment and re-use in other countries. "Zambia have Faecal Sludge Treatment Plants (FSTPs) where the

end product is mostly used as fertilizer. The demand for this product is higher than the output that these plants can produce. In Mali, bricks have been created from the faecal waste. In Madagascar, faecal waste from the Loowatt toilets is converted into liquid fertiliser for farmers. But this has not yet been commercialised. There are so many opportunities," he adds.

Another challenge is that the off-grid sanitation systems are often located in geographically challenging areas. This adds a transport cost should the faecal sludge be treated off site. Another problem lies in the costly technologies required to actually turn faecal sludge into an economically valuable product. "It is expensive to do this on a small scale," notes Getahun.

Despite this, Getahun adds that the WASH R&D Centre UKZN has done a lot of work on faecal sludge from various sanitation systems and is searching for a financially viable solution. "I am excited about this project as the research will provide valuable insights into faecal sludge resource recovery processes. These findings have the potential to assist municipalities and waste management companies in optimising faecal sludge management and resource recovery. This can then be expanded to other locations in

Africa and around the world."

Faecal sludge is not glamorous and can battle to attract funding, so the much-needed funding from P4G has accelerated the investment journey of the Kaloola – BORDA partnership. Typically, institutional investors and venture capitalists want to see scalability and clear business proofs before they invest businesses. McGuckin adds that P4G's objective is to identify climate startups with growth and impact potential and support them with grants and technical assistance to become investment ready.

McGuckin believes that the startups of today will grow into titans of tomorrow and that this partnership is well on track towards creating a climate smart future. "The project will hopefully expand the availability of low-cost technologies to treat faecal sludge. There is a huge customer base around the world that has a need for the services that are coming out of the Kaloola-BORDA partnership." ●

HALF A CENTURY OF INNOVATION IN SANITATION AND HYGIENE SOLUTIONS



From portable toilet hire to septic tank servicing and packaged wastewater treatments plants, Sanitech is South Africa's largest sanitation company and operates across the entire sanitation value chain

Sanitech – South Africa's largest integrated hygiene and sanitation solution company and first portable toilet hire company – recently celebrated its 50th anniversary.

Kirsten Kelly interviews the company's managing director, Robert Erasmus about Sanitech's growth.

How did Sanitech start?

Robert: The Sanitech name was registered in 1974 by Grant Murray in KwaZulu-Natal. Initially, it was a small plumbing business, but Murray quickly identified a market for portable sanitation services. Over the years, Sanitech expanded, albeit on a limited scale, by partnering with various agents. In the 1990s and early 2000s, private equity ownership drove further growth. Then in 2007, Sanitech became part of the Waco International Group.

Why did Waco buy Sanitech?

At the time of the acquisition, Sanitech was a construction-centric business, so there was an overlap of the customer base of Sanitech and other Waco businesses like Formscuff and SGB Cape. Sanitech also had a rental-type business model, similar to the likes of Formscuff.

Robert Erasmus,
managing director,
Sanitech



As Sanitech was initially mostly a Kwa-Zulu Natal business, the Waco International Group gave the company a wider footprint through leveraging off Formscuff and SGB's existing branch network around the country where we expanded from eight locations to 24. Today, Sanitech even have branches in Namibia and Mozambique.

How has Sanitech changed?

We have undergone significant changes since the acquisition. Over the years, while Sanitech has continued to service the construction sector, we also work within the mining, industrial, municipal, agriculture and event industries. We have expanded our service offering to wastewater treatment plants, hygiene and cleaning solutions, septic tank servicing and pest management. Today, Sanitech employs over 3 000 people, which is a substantial increase from 350 people in 2008. I joined Sanitech in 2008 and my role was to transform

Sanitech into a corporate entity aligned with WACO International's standards in health, safety, policies and procedures. This marked the beginning of Sanitech's efforts to attain our various ISO accreditations.

We first achieved ISO 45001: Occupational health and safety, followed by ISO 14001 Environmental; and then 9001: Quality. Most recently, we have achieved ISO 22000: Food safety for Gauteng and we intend to extend this accreditation nationally.

This is a long journey, especially for a company that has branches throughout the country. But it is incredibly important for us to have these certifications.

Why are ISO certifications important?

Waco International has always had an exceptionally strong health and safety culture, so this was embraced by Sanitech after the acquisition.

ISO accreditation is a strategic investment that empowers businesses to enhance their competitiveness, mitigate risks, and seize new market opportunities. By adhering to globally recognised standards, organisations can build trust, streamline operations, and achieve sustainable growth. While the initial outlay may seem substantial, the long-term returns in terms of efficiency, customer satisfaction, and regulatory compliance far exceed the costs.

Our ISO accreditations are important to our customers, particularly those in the mining and industrial sectors. Using companies like Sanitech that are ISO accredited mitigates risk.

What inspired the wastewater treatment side of the business?

This does tie into the environmental accreditation. We are a compliant company and committed to discharging all the waste from our portable toilets according to local regulation. In certain areas, we had to travel long distances to dispose of the waste, making it a costly undertaking. Furthermore, the discharge rates from the municipalities can be extremely high.

We have therefore set up three wastewater treatment plants in Steelpoort, Secunda and Witbank to counteract this cost. These plants have been so successful that we have decided to add mobile and modular wastewater treatment plants to



Sanitech's decentralised wastewater treatment plants play a pivotal role in supporting its customers in achieving the environmental objectives of their Environmental, Social, and Governance (ESG) goals

our sanitation service offering and have some clients in the industrial, mining and food processing sectors.

Part of this success lies in the fact that while the technology is sourced from a global company, we make sure that most of the mechanical items of the plant – like pumps and pipes – are sourced locally. This makes maintenance and any repair requirements less costly and reduces downtime.

These decentralised wastewater treatment plants play a pivotal role in supporting our customers in achieving the environmental objectives of their Environmental, Social, and Governance (ESG) goals. The plants minimise a company's environmental impact associated with waste transportation and presents opportunities for water reuse that reduces water demand and effluent discharge – creating a dual benefit for businesses through cost reduction and compliance.

Can you talk about some of the challenges that Sanitech experiences?

It is difficult to achieve organic growth when South Africa is experiencing a prolonged period of slow or stagnant growth. In order to win new business, many service providers are lowering their margins, which has a negative impact on service levels or even a risk of failing to fulfil a contract.

While Sanitech endeavours to lower its operating costs and pass on these savings to its customers, we are not willing to compromise on our service levels as well as our health, safety and environmental commitments. We will therefore not always be the cheapest supplier.

What has remained the same in Sanitech?

We have always been an innovative company and are willing to challenge the status quo or try something new to help our clients.

A product is only a tiny part of an innovation, there many types of innovation, from quoting and invoicing methods to the ability for customers to login to their own account via the customer portal.

Some of our other

innovations include electric vehicles, the Khusela Dry Sanitation Unit, toilets for the mining industry and an automated scrubber drier. Our vision is to use innovation to improve compliance, convenience and peace of mind for our customers. Our innovative offering is one of our key differentiators in the market.

What excites you about Sanitech?

The growing emphasis on ESG, our new service offerings around supporting the ESG goals of our clients and the positive feedback we have received from our customers, reflecting a shared commitment to sustainability and social responsibility. Our customers want to reduce their water usage, have chemicals that are not harmful to the environment and prioritise the health and wellbeing of people. By aligning our services with these priorities, we not only support our clients in meeting their ESG commitments but also contribute to creating a more sustainable and responsible future. ●



With a fleet of more 330 vehicles, Sanitech can supply and service locations throughout the country, speedily and efficiently



Why getting the toilet right is crucial for South Africa



The constitution says, 'sanitation is dignity' yet 35% of South Africa's population have limited or no access to safe sanitation. This lack of access negatively impacts health, socio-economic development, and education, which are crucial to the future of the country.

In South Africa 19% of the population have access to ventilated or improved pit latrines, while 13% have pit toilets with no ventilation pipes, and 1% practice open defecation. The dire need to improve South Africa's sanitation is further reflected in the ongoing water crisis across the country where even those who have access to flush toilets are experiencing intermittent to no water supply.

Birger Lundgren, CEO of Sanitation Ambassadors NPC, says, "Many people in South Africa still see the flushing toilet as the gold standard, or aspirational even. The truth is that is excessive and having them as a goal gets in the way of progress in the sanitation space." The Department of Water and Sanitation sees decentralised systems as a means to provide sanitation to all, and this is backed up by research from the Water Research Commission and other scientific bodies which state that non-sewered sanitation is both a tangible and realistic project to undertake.

Non-Sewered sanitation

Simply expanding the network of flushing toilets is unfeasible, thus non-sewered

sanitation (NSS) is sanitation that does not rely on flushing but rather technologies collect and fully treat the faecal material on-site. "When we speak of NSS, we make the discussion between safe and unsafe, dignified, and undignified. Pit toilets are unsafe and undignified, whereas NSS seeks to collect and treat waste properly, and safely," adds Lundgren. The difference between NSS and pit toilets or the dreaded bucket system is the systemic management of waste, often treated and used as a byproduct with economic potential.

The social impact of sanitation

At a special WASH event at the University of Johannesburg coinciding with World Toilet Day, Professor Michael Rudolph, director of the Centre for Ecological Intelligence (CEI), gave numerous examples of where projects run through the CEI calling for urban agriculture at schools were met with problems revolving around toilets and water. "It is simply heartbreaking to witness school children wishing to better their lives using unsafe pit latrines, with no water for hygiene onsite. Water and sanitation

underpin so much of what we value in society, and these undignified structures have an immense impact on schooling," adds Prof Rudolph.

Speaking at the event, Håkan Juholt – the Ambassador of Sweden to South Africa – notes that in South Africa 43% of hygiene related deaths under 5 years old are due to improper sanitation. He goes to say, "When South Africa became a democracy in 1994, I was astonished at the progressive nature of your constitution. Now 30 years later, South Africa must still realise these progressive ideals, and it starts with water and sanitation. This issue impacts the entire country, from schooling to work to general health and safety. We must deal with 'shit' for the lack of a better word, and deal with it effectively and humanely."

The sanitation issue is also a gendered issue as schoolgirls miss on average 90 days a year because they either lack access to sanitary pads or tampons or feel that the school bathrooms do not provide adequate privacy.

Sanitation Ambassadors

Lundgren says that more than 12 000

The WASH Centre at the University of Johannesburg Bunting Road Campus exemplifies the potential of non-sewered sanitation and Sanitation Ambassador's innovative solutions

schools in South Africa use pit latrines which negatively affect the lives of 5 to 6 million children and teachers. Using his business knowledge and experience in the WASH sector, Sanitation Ambassadors have come up with a solution to aid in safe, effective, and hygienic sanitation.

"We used the Swedish approach, which is to say that our solutions must be simple and effective. They are modelled on the Ikea idea where we use prefabrication to make things as easy to assemble as possible. This also means that these WASH centres are very easy to maintain, says Lundgren, "They are also designed to have standard cleaning procedures integrated into them, making longevity and cleanliness a priority."

The WASH centres are designed to separate urine and faeces at the source making them both easier to treat and use for economic gain.

The process for the toilets in these centres is:

- Separate urine either for containing or directly soaking into the ground.
- The flush system uses 100 ml of water and can be integrated with a grey water system.
- The faeces drop through a chute and are stored underneath the flooring.
- The box is accessed outside the toilet building, and there is a subscription service where the Sanitation Ambassadors collect and clean the box. Each box has basic AI technology that monitors when to collect or clean.
- Sanitation Ambassadors take the waste to a Resource Treatment Centre plant where it is converted into other products such as fertiliser.

These Resource Treatment Centres are strategically placed in communities using hybrid toilet systems, or any other container-based toilet. They aim to be more efficient in serving the needs of the communities than traditional wastewater treatment plants in these areas.



The WASH centres are also made of plastic that usually ends up on landfill sites and cannot be recycled. Each unit represents 1.3 tonnes of plastic that has been diverted from landfills.

Gama Cuba, from the Sanitation Ambassadors, says that this project is "important in and of itself" and it provides dignity to communities that sorely need it. "I come from the communities that this project seeks to help. This is not abstract; I used unsafe pit latrines, and I know the harm of them. These WASH centres provide vital infrastructure to people who genuinely need it, and our cost is 30-40% less than other solutions which means that funding, be it private or public, offers more return."

The waste is especially useful in agriculture where urine and faeces can be used as fertilizer, something that is already being done. "By having toilets that meet the needs of the people using them and ensuring the byproducts are economically useful, we are truly seeing a circular economy in practice," adds Lundgren.

The Launch of the University of Johannesburg WASH centre

The University of Johannesburg's Bunting Road Campus had a Sanitation Ambassador WASH centre installed at a site dedicated to urban farming.

This WASH centre represents a significant step in adopting and using this technology, even in highly populated urban environments.

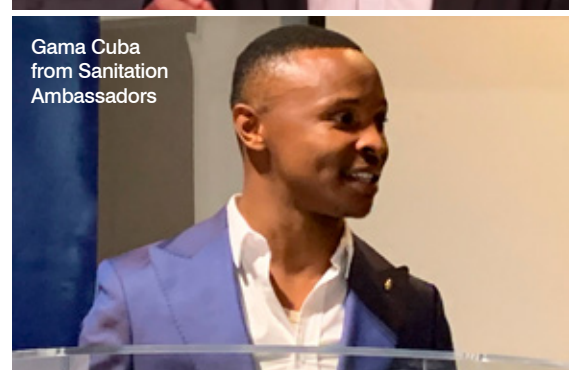
Prof Rudolph, Lundgren, Cuba, and Swedish Ambassador Juholt all extend their pride over the work done at the university, and more generally by the Sanitation Ambassadors, who are working tirelessly to improve sanitation in South Africa. ●



Birger Lundgren,
CEO of Sanitation
Ambassadors
NPC



Professor Michael Rudolph,
director of the Centre for
Ecological Intelligence,
University of
Johannesburg

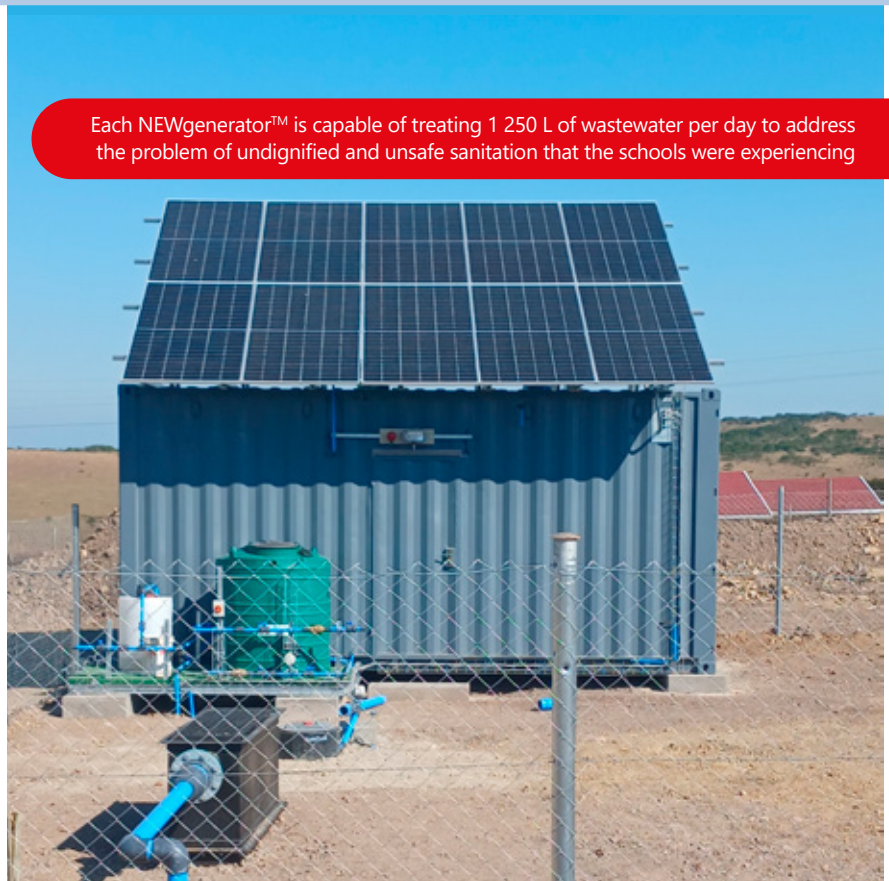


Gama Cuba
from Sanitation
Ambassadors



Håkan Juholt,
Ambassador of
Sweden to
South Africa

Schools across the Eastern Cape are suffering from undignified and unsafe sanitation conditions. In a recent project WEC Water, a provider of comprehensive water treatment solutions, supplied and installed 15 NEWgenerator™ off-grid sanitation systems to help address this issue.



Each NEWgenerator™ is capable of treating 1 250 L of wastewater per day to address the problem of undignified and unsafe sanitation that the schools were experiencing

Transforming sanitation in Eastern Cape schools

WEC Water has successfully supplied and installed 15 NEWgenerator™ off-grid sanitation systems to remote schools in the Eastern Cape



Ntwanano Mandlazi, a project engineer at WEC Water, says “Historically, many of the schools involved in the project

have relied on pit latrines which have proven to be unhygienic and unsafe. In addition, the schools are located in areas where water is scarce, and the electricity supply is erratic. The NEWgenerator™ addresses these challenges in a few unique ways.”

NEWgenerator™ benefits

The NEWgenerator™ treats the blackwater from the toilets and basin water through biological, physical and chemical processes to a quality suitable for reuse as flushing water in a virtually closed loop system. Each NEWgenerator™ is built into a 6 m refurbished shipping container and consists of an anaerobic baffled reactor (ABR), membrane filtration, a nutrient capture system (NCS) and disinfection. The systems also allow for remote monitoring by the WEC Water team. Each unit is powered by 10 solar panels, making it a truly off-grid solution.

Each NEWgenerator™ can treat 1 250 ℓ of wastewater per day. Nutrients can be recovered from the NCS and converted into nutrient-rich fertiliser. In addition, the biogas

produced from the treatment process can be captured safely and used for cooking. The NEWgenerator™’s compact and modular design makes it easy to transport, install, and commission on-site.

The systems have been deployed to 15 schools in Stutterheim, Qonce, Zwelitsha, Mthatha, Peddie, Ngqeleni, Port St Johns and Sterkspruit.

Longevity and maintenance

Mandlazi says, “Once the WEC team has built, installed and commissioned the units, we also have a 5-year Operations and Maintenance (O&M) contract. This highlights our dedication to supporting these schools with the ongoing operation and upkeep of these units. We are particularly proud of our association with the NEWgenerator™ technology as it enables Africa to overcome the major challenges of access to safe flushing water and sanitation, ultimately restoring a greater sense of dignity to its people. The technology benefits schools as well as informal settlements and small businesses.” ●

BOOSTING FARM PRODUCTIVITY WITH BETTER WATER MANAGEMENT



Precision irrigation with pressure sensors

In the farming sector, efficiency is essential to maintain profitability and sustainability. With the growing demands for food production and increasing pressures on resources, modern agriculture must leverage technology to improve yield, minimise waste, and optimise processes.

VEGA, a leader in sensor technology, offers a suite of pressure and level measurement solutions that can significantly enhance productivity on the farm, from monitoring fertiliser levels to optimising irrigation systems.

Water management is one of the most crucial aspects of successful farming, especially in regions prone to drought. Farmers are increasingly adopting precision irrigation methods to ensure that crops receive just the right amount of water at the right time. VEGA's pressure sensors, such as the VEGABAR series, are ideal for use in irrigation systems. These sensors accurately monitor the water pressure within pipes, ensuring consistent water flow to all areas of the farm. For instance, in drip irrigation systems,

uneven water pressure can lead to over-watering in some areas and under-watering in others, wasting resources and potentially harming crops. By installing VEGA's pressure sensors along irrigation lines, farmers can detect pressure drops or fluctuations early on, allowing for immediate adjustments to maintain consistent water delivery. This not only preserves water but also supports healthier, more resilient crops, ultimately improving yields and resource efficiency.

Enhancing fertilizer management with level sensors

Fertiliser is another critical input that must be carefully managed to ensure optimal crop growth without overuse. Precise monitoring of fertiliser levels is essential, especially when using automated dispensing systems. VEGA's

level measurement solutions, such as the VEGAPULS radar sensors, offer accurate and reliable level readings of bulk fertiliser tanks and silos.

An application example is a grain farm that stores liquid fertiliser in large tanks. Keeping an accurate track of fertiliser levels helps the farmer plan for timely restocking, prevent running out mid-season, and avoid over-purchasing. With a VEGAPULS level sensor installed on the tank, the farmer gains real-time data on fertiliser levels. The sensor's non-contact radar technology remains unaffected by changing environmental conditions and does not require maintenance, making it highly suited for agricultural applications. This solution ensures that fertiliser stock levels are managed more efficiently, reducing waste, costs, and downtime.

VEGA's pressure and level sensors offer robust, precise, and maintenance-free solutions that help farmers optimise resource use, reduce waste, and increase overall productivity. By enabling better control over irrigation and fertiliser management, VEGA's sensors support the farming sector's ongoing transformation towards smart, sustainable agriculture. As farmers adopt these technologies, they can look forward to improved yields, more efficient resource usage, and a stronger position in today's challenging agricultural landscape. ●

Data backed decision making and planning could help reduce carbon use in the water sector

CAN WATER HELP AFRICA REACH NET ZERO?

Human activity has drastically increased our planet's carbon level. NASA's regular Carbon Dioxide measurements show an alarmingly upward trajectory with an increase in atmospheric carbon of 50% increasing the average global temperature. The effects have been disastrous with more forest fires, prolonged droughts, excessive rainfall, and aggressive heatwaves.

By Chetan Mistry, Strategy and Marketing Manager at Xylem Africa

The rising carbon levels create tumultuous ripples in Earth's complex weather ecosystem, hurting communities across the globe, especially in Africa. Africa contributes only 4% to global carbon levels yet climate change disproportionately affects the continent. According to the African Development Bank, Africa is home to seven of the ten countries most vulnerable to climate change, and 95% of the globe's rain-fed agriculture is in sub-Saharan Africa, making local crops very vulnerable to shifting rainfall.

The problem has many aspects, such as Africa's massive reliance on combustible fuels and oil economies, or reluctance to fund African



decarbonisation. But one area deserves more attention: water.

The situation in Africa is influenced by many factors, such as Africa's reliance on combustible fuels and oil economies, as well as the reluctance to help fund African decarbonisation. One area that is often overlooked is water.

Canary in the coal mine

Water is climate change's canary. Excessive rainfall and prolonged droughts relate to changes in water systems. Civilisations primarily spring up around water, so changing water behaviour is a bellwether for sustaining the modern world.

Water also offers opportunities to tackle carbon generation and usher nations closer to Net Zero status, negating the greenhouse gases they produce. Xylem consulted international experts to design a strategy that will help public water utilities and large water consumers adapt their systems to reduce carbon generation. The strategy, *Net Zero: The Race We All Win*, is a four-step approach:

- 1) Set realistic targets
- 2) Optimise existing assets
- 3) Prioritise capital planning
- 4) Plan for the future.

Public utilities often have stockpiles of data—modern data analytics tools are helping them use that information for future planning. We can set realistic data-backed targets to incrementally make appropriate adjustments for a given site. For

example, Chile's Aguas Andinas is using data-backed planning to significantly reduce its carbon output by 2030 through renewable energy.

Assets and technology

Asset optimisation is also crucial. Utility sites must last for decades, and sweat their pumps, pipes, mixers, bioreactors, and oxidisers. However, strategically modernising those systems delivers dramatic energy efficiency and carbon reduction improvements. Numerous utilities are using net zero plans to cut energy and maintenance costs. For example, variable-frequency pumps require less energy and maintenance, and many models work on solar energy. Scottish Water used this approach to reduce energy usage by 40% and maintenance costs by 99%.

As utilities stabilise their energy and maintenance requirements, they can prioritise capital planning. This step urges us to both focus on urgent requirements and maintain long-term carbon reduction. According to Belgium's De Water Groep, this approach helps protect sites from continually making radical adaptations in response to extreme environmental shifts. Part of its process is to vet future projects on their energy-neutral and climate-neutral aspects, a space it can explore while it achieves greater asset optimisation.

All three of these steps feed into the fourth step: planning for the future. Ultimately, aiming for Net Zero is an

opportunity to revisit how we run our water systems. Some strategies include buying renewable grid energy and generating on-site renewable energy. New Zealand's Watercare is helping lead the way. It has launched several solar sites, including the country's first floating solar farm, and integrated its capital and operational strategies for better performance.

How can African utilities benefit from these steps? Our water management sites can start with specific and incremental upgrades rather than attempt massive overhauls. Some solutions are faster to deploy, such as UV and ozone disinfection that complement chlorine systems while reducing the latter's storage and pollution risks.

Smart meters and in-line leak detection improve monitoring and data collection and reduce costly non-revenue water waste. Modern aeration systems are more energy-efficient than their predecessors, and new sludge-management systems substantially reduce carbon release.

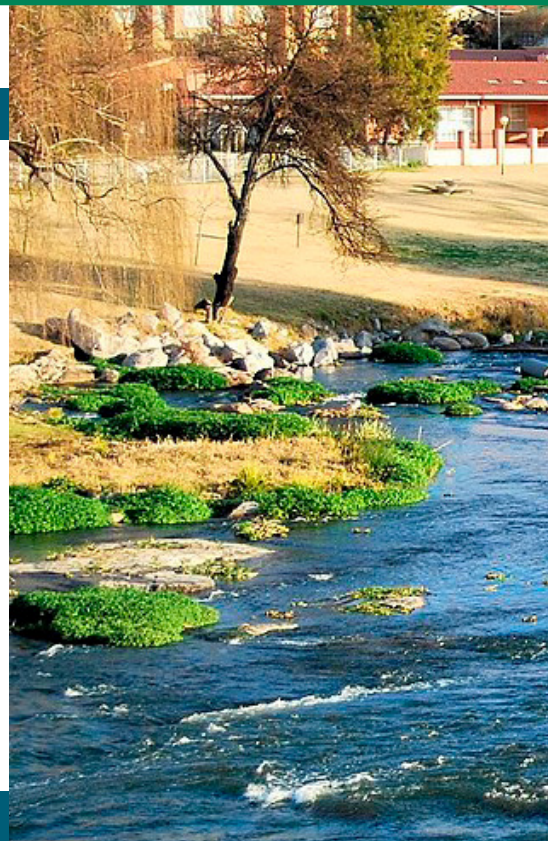
These examples apply to public utilities and industrial water systems at mines, factories, and farms. They help enterprises manage their Environmental, Social and Governance (ESG) requirements, lower costs, and improve energy resilience. They also reduce carbon output and extend control over carbon and environmental risks.

A focus on water helps Africa reach Net Zero. With both short-term and long-term victories that help guarantee a future for our planet. ●

Water is a significant opportunity for Africa's climate goals



The Department of Water and Sanitation has appointed Rand Water as their implementation agent for the integrated control and management of invasive alien plants on the Vaal River Barrage Reservoir (VRBR). Rand Water has also partnered with the Centre for Biological Control (CBC) to assist them with biocontrol.



Rand Water and the Centre for Biological Control tackle invasive species

Pontederia crassipes, commonly called water hyacinth, and Pistia stratiotes, or water lettuce, are extremely invasive and damaging. Water hyacinth is more resilient and aggressive than water lettuce and will receive the most attention.

In early 2024 an “explosion” of growth of these two species took place on

the VRBR fueled by the “perfect storm”, namely spills of effluent-filled water rich in nutrients, hot summer conditions, and reduced water flows in the system. At the spread's peak, water surface cover reached about 397 of 940 hectares monitored under the contract.

Cleanup efforts

At the time, due to huge public and

local community involvement with physical removal, and pro-bono assistance from the Rhodes University - Centre for Biological Control (CBC), the mass was reduced to less than 100 hectares. Further work was undertaken by Rand Water under the contract from DWS to physically remove further plants over the winter months when the plants are dormant. The cover is now sitting at less than 1 hectare at the beginning of spring.

Since the project's inception, it was identified as a “long-term” project due to the invasive nature of these plants as well as the already existing seed bank within the waters. The project adopted an integrated approach that utilised physical removal, chemical spraying, curtaining in the water and biological agents.

The CBC and Rand Water

The CBC is the only institution in South Africa equipped with specialist qualified staff, biocontrol agent-rearing facilities, and a network of teams



Hyacinth spreads quickly when not attended to, what happened in the Vaal has to be addressed in a long-term project



available to provide on-the-ground assistance in the form of advice, implementation support, and long-term monitoring techniques.

As a result, Rand Water has appointed the CBC as a sole service provider for the upcoming season to assist in all aspects relating to biocontrol and provide support for the project. The CBC team is being led by Prof. Julie Coetzee and Dr Kelby English with additional support from Prof. Martin Hill.

Through the approval of the Department of Forestry Fisheries and Environment (DFFE), four permits have been granted to rear biocontrol agents at the RW Nursery as well as three community sites (the funding for community rearing sites has come directly from the community

themselves). All rearing sites are already in full swing with agents being reared for both water lettuce and water hyacinth.

Biocontrol agents

The aim, where possible, is to use biocontrol agents for as much of the control of these two invasive alien plants integrated with physical removal, and only where other methods are not working fast enough will approved herbicide application be used. All biocontrol agents released have been rigorously tested and confirmed to be host-specific before they were approved for release in South Africa. This means the agents solely feed and complete their life cycles on their target host plants.

The Vaal River is an important source of water for South Africa and must be protected to ensure water security

Four biocontrol agents will be the focus of the rearing facilities, the water lettuce weevil *Neohydronomus affinis*, the water hyacinth hopper *Megamelus scutellaris*, and the water hyacinth weevils *Neochetina bruchi* and *N. eichhorniae*.

In South Africa, the water lettuce weevil was first released in 1985, and the first water hyacinth agents were released in the 1970s and the most recent in 2013. There are a few other water hyacinth agents namely a moth *Niphograpta albiguttalis*, a mirid *Eccritotarsus catarinensis*, and a mite *Orthogalumna terebrantis* which are not actively reared and released but may find their way into the system naturally as they move to new or different water hyacinth populations across the country. The moth has been found in the Vaal Barrage system and is steadily increasing in abundance.

Biological control is considered the most sustainable method of control, but this method does require continuous monitoring and technical support. Due to the very nature of these invasive alien plants, the Vaal Barrage system will need to carefully be managed for many years to ensure the population is reduced and controlled. ●

Using weevils as a biological control agent is sustainable and environmentally friendly
Photo credit: Ton Rulkens





GLOBAL PUMPING GIANT READY TO SUPPORT HYDROGEN ECONOMY

As the world shifts to cleaner energy sources Namibia and South Africa provide the ideal conditions, such as sunny weather and being well situated upon established world trade routes, to become a global powerhouse within the green hydrogen sector.

South Africa is investing heavily in bringing the right skills to the region. This type of specialised planning is essential to ensure the success of the hydrogen economy as the process of creating green hydrogen is complex as is the generation of renewable electricity to split water molecules into oxygen and hydrogen through electrolysis.

Not surprisingly, two key projects are already in advanced stages of development in Namibia with the Hyphen Hydrogen Energy and Daures projects well underway

and gearing to transform southern Africa into a vital supplier of hydrogen to meet the energy demands of developed nations.

Global pumping solutions provider KSB has identified the vast potential of these types of projects in southern Africa and through its KSB Pumps and Valves subsidiaries in Namibia and

The technologies needed to enable the hydrogen economy

According to KSB business strategist, Ulrich Stahl, the important enabler function of hydrogen is that it makes the transport of renewable energy over long distances possible. Furthermore, transporting Hydrogen as a gas or in liquid condition is challenging. Being a light gas it is difficult to contain and requires compressing and cryogenic freezing to convert it to liquid form. This is prohibitively difficult and has led to techniques where it is converted to ammonia which is a compound of nitrogen and hydrogen. The addition of nitrogen to create ammonia makes it easier to store and transport than pure hydrogen. Once shipped to its destination, it can be converted back into hydrogen, making it a practical and scalable solution for fulfilling global energy needs.

In Namibia, the Hyphen Hydrogen Project aims to build



KSB MegaCPK pump

a massive 3 GW electrolyser facility near Lüderitz with production of green hydrogen set to begin by 2026. At full capacity, it will produce 3 million tonnes of green hydrogen annually. This ambitious project will draw on 6 GW of renewable energy generated from wind and solar power ensuring that the hydrogen it produces is entirely green and emissions-free. The hydrogen will be exported primarily to Europe with Rotterdam allocated as a key destination for energy integration.

The Daures Project follows a similar path focusing on leveraging Namibia's climate and space to develop large-scale hydrogen infrastructure. These projects will also require the expansion of towns to accommodate thousands of new jobs and the building of residential, industrial and port infrastructure. This is expected to create substantial economic growth and job opportunities in the region.

How KSB Pumps fits in

KSB Pumps and Valves Namibia managing director, DeWet Van Wyk, adds that with its local manufacturing ability and access to global supply chains, KSB is well poised to support the scale of the hydrogen economy where entire regions need to be transformed. "From residential housing to essential services, we need to ensure that the infrastructure is in place to sustain the thousands of people who will be working on these projects."

As a result, KSB is planning for the full cycles of equipment and services needed as the scale of these hydrogen projects requires extensive infrastructure, both for the hydrogen production process and for supporting the influx of workers and services needed to sustain the operations.



KSB Magnochem pump

For hydrogen production, advanced electrolyser plants need to be built to separate hydrogen from water using renewable energy. Our technology will play a crucial role in supplying the specialised pumps needed to handle ultra-pure water in electrolysers, as well as those needed for pressurising hydrogen and converting it to ammonia to facilitate transport.

"Our pumps ensure the ultra-pure water used in electrolysis remains contaminant-free, which is crucial for maintaining the integrity of the electrolysers. Additionally, we pressurise the hydrogen, making it easier and cheaper to transport it as ammonia. Beyond the technical infrastructure, these projects will require significant investment in population amenities. The remote location of the hydrogen projects, particularly in sparsely populated areas like Lüderitz and the Northern Cape, necessitates the development of entire



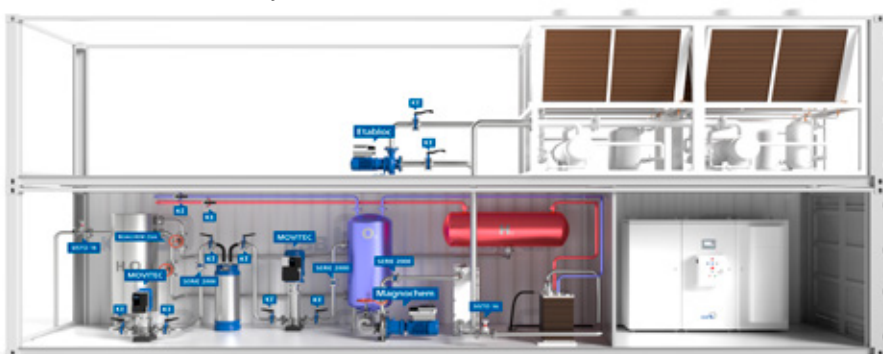
KSB Sicca 900-3600 GTC gate valve

support ecosystems. Housing for thousands of workers will need to be built along with critical services such as wastewater treatment, food supply chains, schools and healthcare facilities among others. Small towns like Lüderitz, currently home to just a few hundred residents, are expected to grow significantly to accommodate the workforce required for these projects."

KSB Pumps and Valves market area manager, Dylan Mitchell, further explains that the conversion of hydrogen into ammonia presents an efficient solution to the logistical challenge of transporting energy across vast distances. Ammonia can be shipped using existing infrastructure allowing southern Africa to export energy to areas like Europe and Japan where clean energy demand is on the rise. Once at its destination, ammonia can be split back into hydrogen and fed into industries such as steel manufacturing, petrochemicals and power generation.

Ulrich concludes by saying, "We believe that with international collaboration, government support and private-sector investment the green hydrogen projects in Namibia and South Africa hold enormous promise. Southern Africa's ability to produce and export clean green hydrogen positions the region as a strategic destination for global investment. The infrastructure needed to support these projects will also provide much-needed economic growth." ●

PEM electrolyser





BLENDING INNOVATION WITH INDIGENOUS WISDOM for a water-wise future

Amid South Africa's water crisis, innovative science is converging with indigenous wisdom. The Department of Water and Sanitation (DWS) and the Energy & Water Sector Education Training Authority (EWSETA) are exploring traditional knowledge to complement modern solutions, fostering sustainable strategies to address water scarcity challenges in the nation.

“**O**ne of colonialism's lasting legacies is the erasure of indigenous knowledge as a valid source of information,” says Prof Bongani Ncube, SARChI Chair in Governance and Economics of Water and Sanitation Sector institutions. Rhulani Shingwenyana, a senior researcher in water for the CSIR adds, “There is a real need to look into all avenues to help solve our water woes, and the reality is that indigenous people have been

looking after their water for a long time, so why not learn from them?”

What and why indigenous knowledge

Indigenous knowledge is best described as the plurality of thought that pre-colonial South Africa held with regard to how to manage a society. This encompasses politics, ecology, as well as cultural practices. “It is best to think of indigenous knowledge as site-based, as knowledge can differ from similar groups due to their specific geographic

needs,” says Prof Ncube. Indigenous peoples have been practising an ecology for a long time, and in some remote communities, this is still the way water is managed. Rhulani adds that “while not strictly legal in some rural communities they have ‘water councils’ that are used to manage water within the community. This includes water rationing and sustainable usage, which is exactly what Johannesburg is practising now with their water restrictions.”

Sylvain Usher, advisor to the African Water and Sanitation Association, says “Africa has a wealth of historical knowledge and the continent's ongoing battle with water has illuminated the fact that there is no ‘one size fits all’ solution, which is why indigenous knowledge can be useful to the water sector.”

Water in South Africa

Africa is experiencing growth in economy, population, and urbanisation. By 2050 it is expected that the population will

daily safe water, but that percentage is still 3 million people.

Water usage in South Africa is 218 litres per person per day, well above the international average, which is 173 litres per person per day. This is more disturbing when coupled with the fact that it is a water-scarce country.

In 2024, Johannesburg is currently undergoing water restrictions due to supply worries. Both Rand Water and Johannesburg Water are taking action against non-revenue water as well as systemic threats like non-payment, illegal connections, and vandalism.

It is in this context that organisations are looking to all spheres to get as much information as possible, indigenous knowledge included.

How does Indigenous knowledge help

Both DWS and the EWSETA have noted that community engagement is a key area that predicts a successful water project. "It can't be overstated that actively engaging and involving a community in projects that directly impact them has aided in many project successes," says Petunia Ramunenyiwa, chief director of IGR sector

Pollution of our water sources has a big impact on rural communities that access them for water in the absence of potable water

transformation and provincial governance for DWS.

"Who better than the community themselves to know their struggles and how they have managed," says Prof Ncube, a sentiment shared by Usher. In areas where the community is involved, solutions come up quicker than those without. The iSimangaliso Wetland Park is a good case study where DWS, along with the community who live near or even on the site are involved in its protection. This shared knowledge and collaborative approach is indicative of the principles found in the Protection of Indigenous Knowledge Act of 2019, which underpins how historical and cultural knowledge can aid in South Africa's missions, be it water or ecological.

This is where the SETA for the water and energy sector offers insight into how this can be translated into skills needed for the sector. Mpho Mookapele, CEO of the EWSETA, says that "our goal as the SETA is to equip those in the sector with the necessary tools for the sector to thrive, and by acknowledging that community engagement is a key component of the field we can efficiently incorporate that into our training." Usher adds that "At every level, from vocational to academic, cultural knowledge can play a vital part in shaping the professionals of the future."

The big 'why?'

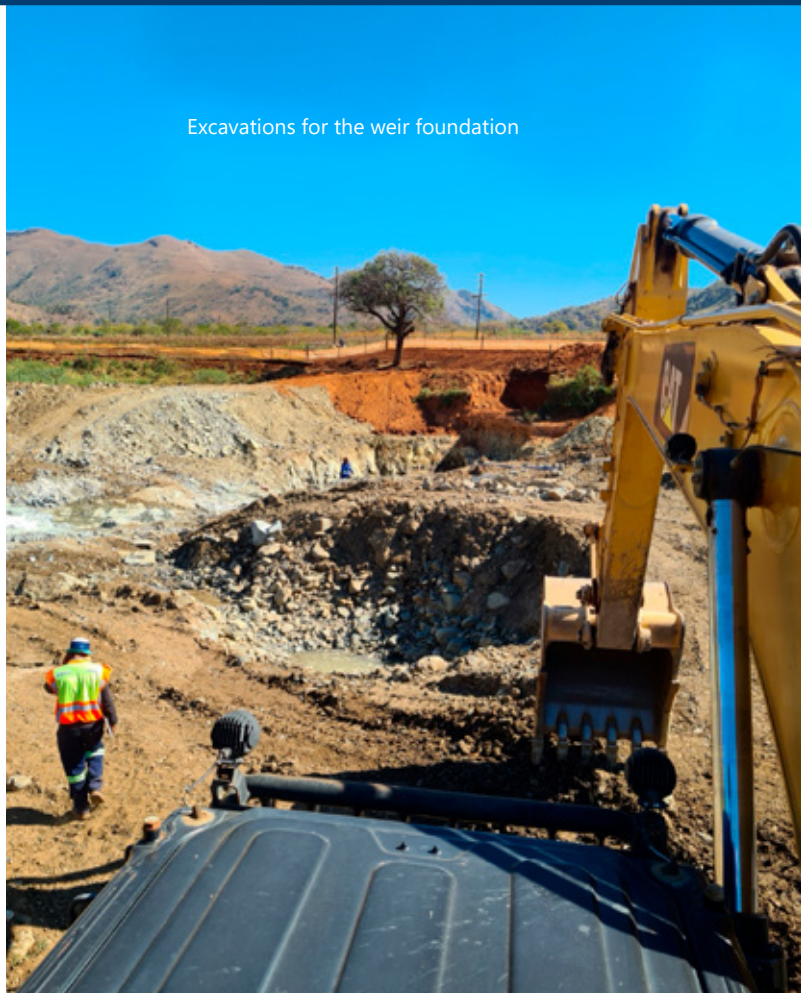
If modern science is the de facto leader in this sector, offering the most promising solutions, why include cultural knowledge? If science is to remain objective it must evaluate all the information, Indigenous knowledge included, and discounting it wholesale is unscientific. Indigenous knowledge is also a very human-centric concept, and water, while a science-driven sector, is a very human need. The current water woes are indicative that as a country South Africa did not treat water with the respect it deserved. There are countless water professionals working tirelessly, who are passionate about water and perhaps a perspective shift that centres water around humanity is exactly the approach that is needed to win a water-secure future for South Africa. ●

The iSimangaliso Wetland Park is a good case study where DWS, along with the community who live near or even on the site are involved in its protection

double, and as it does, the demand for water increases. In Sub-Saharan Africa, only 24% of the population has access to clean water daily. South Africa scores high here as the country has 5% of the population who don't have access to



Cleaning the sludge from the clarifiers



Excavations for the weir foundation

EKULINDENI TO BENEFIT FROM MAJOR WATER TREATMENT WORKS REFURBISHMENT PROJECT

The refurbishment of the Ekulindeni Water Treatment Works, done by Lubisi Consulting Engineers, will address critical water supply issues, as well as improve access to clean drinking water. **By Duncan Nortier**

“**T**he project will bring some much-needed relief to the community,” says Mathew Mazhawidza, an engineer at Lubisi.

Before refurbishing

The state of the water treatment plant was one of disrepair and the water supplied to the area was erratic, with residents never sure of when they were with or without water.

The water treatment works have a capacity of 4 Mℓ/day, which Mazhawidza says, “should cater to the demand of the 4531 people population it supplies, but the constant breakdowns of the plant necessitated a refurbishment.”

Concern for clean, reliable water supply to the villagers is at the heart of this project and it also informed Lubisi Consulting’s design approach. “We did the usual, go out and collect technical data, but we also spent time consulting the community – which really brought the villagers’ frustration into perspective. It helped us focus on doing this properly,” says Mazhawidza.

The refurbishment

The project had the complication of needing to supply water, while the refurbishment was taking place. This task was managed through extensive planning. “We had to cut off water supply while certain tasks were being

performed. Ensuring everything that was needed was on site, and communicating our activities to the community was critical,” says Mazhawidza.

When the supply needed to be stopped, the community would be informed of exactly how long and when. This also meant that we had to stick to a planned timetable and rigorous time management was essential for these tasks.

“After informing the community of a break in water supply due to works on site, we always made sure that we restored water supplies on time as communicated in our notices to the community. This was very important for us. Periodic breaks in the water supply were unavoidable,” Mazhawidza explains.

“Excessive sludge had accumulated in the clarifiers, which led to poor efficiency in the overall water treatment process. Some components in the plant could only be assessed accurately during the times when we shut the plant down completely,” says Mazhawidza.

Working on the filters




The weir

The water treatment works extract water from the Komati River, which has widely differing flows during the wet and dry seasons. Construction of the weir was necessary to ensure that during times of low flow, the raw water pumps would still be able to extract water from the river. The weir stands at an average height of 1.5 m and guarantees at least a 1.5 m of water depth throughout the year at the raw water pump station. "I was excited to work on the weir, as it is not common on projects in the area. We had to divide the river into two parts while working, essentially constructing the weir one half at a time. This allowed us to divert the river to one side whilst we worked on the other side," adds Mazhawidza.

The project began on November 1st, 2023, and is set to be completed before the end of the year. While

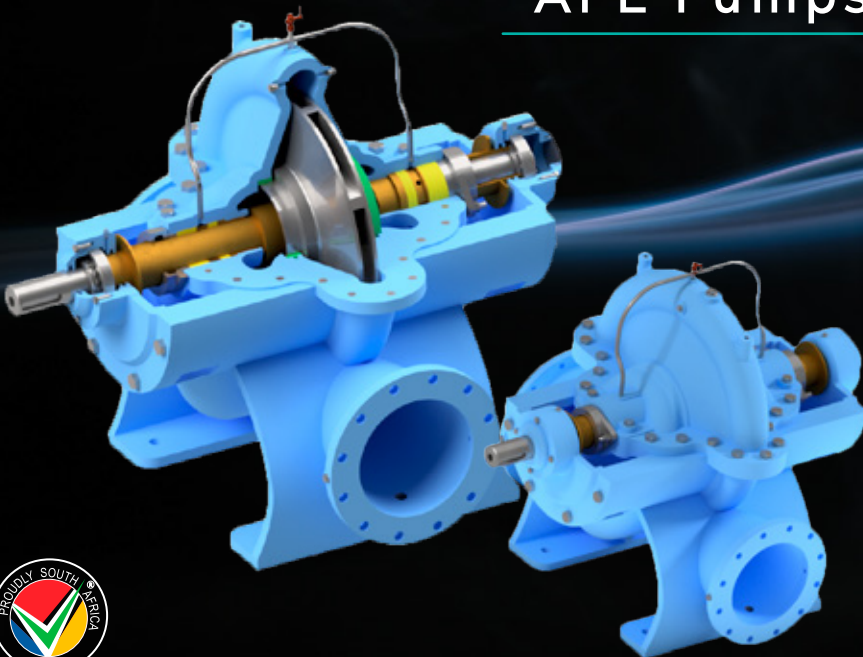
working on the project, Lubisi Consulting Engineers was in constant contact with the Chief Albert Luthuli Municipality to ensure that once the project was handed over, the municipality would be able to take care of the infrastructure. This includes the training of operators, creation of operation and maintenance manuals as well as proposed budgets for the operation of the plant going forward.

This refurbishment means that the community will no longer have to depend on alternative water sources, which are often contaminated or unreliable. "The project is really fulfilling from a technical aspect and a human aspect. Being able to work on interesting engineering projects that bring immense benefit to people is very rewarding," says Mazhawidza. 



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WORLD' HIGHEST PIANO KEY WEIR DAM COMMISSIONED



The Department of Water and Sanitation's (DWS) Minister – Pemmy Majodina – has commissioned Hazelmere Dam, located in the Mdloti River in KwaZulu- Natal.


Hazelmere Dam's wall was raised by seven metres (from 86 m to 93 m) to increase capacity of storage and to augment the water supply to areas such as Verulam, Groutville, Blythedale and Ballito.

The project scope of the work included the construction of retrofitting a Piano Key Weir (PKW)

onto an existing dam spillway structure, the installation of 83 rock anchors as well as foundation grouting and other minor related works.

"The Hazelmere Dam can now be measured against world class standards due the type of spillway selection, technology and innovation used in implementing the project," said Minister Majodina.

The dam has an uncontrolled PKW spillway, this was done to ensure that the dam wall withstands extreme concentration of floods of between six and eight hours for the dam catchment area.

Some of the employed technologies undertaken to upgrade the dam wall included the world's highest Piano Key Weir, world's largest anchors were installed to improve stability of the concrete gravity dam wall structure, and the largest capacity post-tensioning stressing jacks were deployed during construction. Some of the technologies also employed included the use of innovative data management software for real-time monitoring of anchor performance and 3D digital crack metres. 

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