CALL FOR WATER SECTOR LEADERS TO MAKE SPACE FOR THE YOUNG PROFESSIONALS

BY DI CAELERS

Significant barriers to entry into the water sector are an unfortunate reality for young professionals in South Africa, robbing the country of disruptive innovations that end up collecting dust in research and academic institutions rather than benefiting society.

Exhorting water sector decision makers and captains of industry to be intentional about opening the door to the younger generation in this "life and death" sector, keynote speaker Sivuyile Pezulu said at the Water Institute of Southern Africa's (WISA) 2020 online conference that it was time for "all hands on deck".

Pezulu, sales manager for sub-Saharan Africa at Milton Roy and co-founder of Indalo Water Solutions, cautioned that the high barriers in this very technical sector were preventing budding entrepreneurs from breaking into the business. Far from protecting the old guard, he suggested that the status quo would instead paralyse advancement and sustainability.

"While the maintenance of institutional memory and skills is important in organisations, the real test of good leadership is your commitment to the transfer of technical and soft skills to the young professionals if these businesses are to be sustainable and continue to improve," he said, inviting business leadership to ponder the alternative scenario.

"What legacy will you leave if you don't deliberately and intentionally focus on the advancement of young professionals in your organisation?"

South Africa is not short of innovation and resources in the water sector, Pezulu stressed, but seeing good ideas achieve little or no growth, or continue operating in survival mode only, wasn't optimal: "That's why I'm agitating for the advancement of young professionals, via the implementation of formal structures, combined with a process of measurement and evaluation in terms of efficacy, so improvements can continue being effected as necessary.

"Every one of us share a common opinion of the role that entrepreneurship has to play in business in South Africa, and that it is the answer to the country's staggering unemployment rates, especially among young people. We have a voice and a role to play in advancing innovation and building small business in the water sector."

Neither should such an approach negatively impact the bottom line of businesses, Pezulu remarked: "I am not saying forget shareholder value. I am not saying stop chasing the top or bottom lines. I am not saying we must be socialist or Communist. In fact, that is absolutely the opposite of what I'm saying.

"I am saying we can deliver shareholder value. We can chase top and bottom lines at the same time as we change, transform and build the sector we want to see - that advances young professionals, that builds businesses, and that offers opportunities for entrepreneurship to flourish," he said.

Suvritha Ramphal, of WISA Young Water Professionals South Africa who facilitated the panel discussion that followed Pezulu's keynote address, argued that the impact of COVID-19 on young professionals' lives and employment opportunities ramped up this need. Latest unemployment figures were sitting at an overall 30,8%, she said.

"COVID-19 provides us with a new lens through which we see the world. Not only has it affected all our lives, but has also influenced how we interact with our water and sanitation."

Panellist Inga Jacobs-Mata, South African country representative for the International Water Management Institute, concurred, adding that COVID-19 had had a debilitating effect on employment rates, impacting young people particularly. On the plus side, however, "innovation is embedded in the young professional space," said fellow panellist Janavi Jardine, of Green Matter. And while the pandemic necessitated a heightened response, the fundamental principles of "pivot and regroup" remained the same as for other challenges.

Lucky Litelu, founder and executive chairman of ICRD Group Holdings, agreed, saying that COVID-19 had accelerated digital transformation, and that stakeholders should join forces to unlock resources.

"We've achieved advances that might otherwise have taken five to six years because of the onset of the pandemic, and this has given us all a great opportunity to think and do things differently - and that includes having access to previously inaccessible markets," he said.

Concluding the discussion, Pezulu suggested it was time for decision makers to get excited about disruption and innovation, particularly South African-based innovations.

"My challenge to them, especially those in the private sector, is to look for small business opportunities in the communities in which they operate, giving those young entrepreneurs the opportunity to deliver. That will help to open up the sector, while expanding supplier and enterprise development," he said.

Keynote speaker Sivuyile Pezulu

VIRTUAL EXHIBITION TREASURE HUNT

Water Institute of Southern Africa

VIRTUAL EXHIBITION TREASURE HUNT

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Download the questions in the Resurce Centre

Treasure Hunt Questions

1. Which DuPont Technology can remove gas from the liquid streams?
2. Name the “model” of the Hach instrument that can perform colorimetric tests together with the option of using two probes in the same unit.
3. When was SBS established?
4. Who offers quality information to business communities through magazines and digital media?
5. Name two of the product solutions Jojo offers
6. What’s the worlds strongest ph Glass called
7. Name two of the industries Xylem offers solutions to
8. Name three of the infrastructure projects TCTA has initiated
9. Who designs and manufactures machines for solid-liquid separation?
10. Name 2 of the big 5 dams in South Africa
11. What is the name of AECI Plant Health's unique artificial intelligence system
12. Who is the custodian of the well-being of the consulting engineering industry?
13. When was Golder founded?
14. Which company produces instruments for chemical analysis?
15. Approximately how many people does Rand Water supply water to?
16. Who provides the country with applied knowledge and water-related innovation?
17. Name one of eThekwini Municipality's collaborative partners
18. Which company uses chemical treatment to turn wastewater to valuable solid and liquid resources?
19. Name two of Marsi Water's partners
20. What does the abbreviation SASTEP stand for?
21. What is AECI's Four Step Framework?
22. What is Veolia's all-in-one water digital service called?
23. What is the name of Aqualytics Alarm that monitors water quality in a clear water reservoir?
24. What is Biorocks compact All-in-One Sewage Treatment System called?
25. When was Sizabanthu established?
26. Who has a Path to Membrane System Optimisation virtual booth?

FLUSH TOILETS ARE UNSUSTAINABLE

BY MORGAN MORRIS

Consider that every toilet flush uses between four and 13 litres of clean water to move around 150-200gm of human waste.

If then, on average, any one individual flushes the toilet around six times a day, that amounts to around 200 litres of clean water per person per day that goes down the toilet. If that's not enough, also take into account the pricey downstream treatment processes that create further environmental headaches when that waste is finally disposed of, into oceans, for instance.

Now throw into the equation the challenges of poverty and inequality such as that in South Africa, explained Mr Jayant Bhagwan, director at the South African Water Research Commission in his presentation, 'Disrupting the Sanitation and Water Landscape: Reinventing the toilet'.

South Africa has made giant strides in expanding sanitation since 1994, with improvements in some 82.6% of households, pointed out Bhagwan. But inequalities continue.

For all its benefits – to public and environmental health – flush toilets may not be the way to address this challenge, he argued. For one thing, the costs are prohibitive. One study in eThekwini in KwaZulu-Natal estimated that it would cost the municipality around R6 billion per year for ten years if it wanted to offer full flush-toilet coverage.

But the environmental concerns are perhaps the most pressing, even if the idea of scrapping flush toilets seems unthinkable. "If we stop using water-borne sanitation as the gold standard, it doesn't mean that sanitation is going to go down the drain," said Bhagwan. "It's really madness to flush our human waste using fresh, treated, potable water that is very scarce."

A new sanitation paradigm is offering alternatives. This paradigm views human waste not as an offence that must flushed away, but rather as a resource, explained Bhagwan.

"We should stop seeing human excreta – faeces and urine – as a pollutant," he said. "It's a very valuable resource because it contains a lot of valuable products in the form of nutrients, chemicals, oils, fuels and carbon that we can use beneficially."

With this in mind, the WRC has adopted a new approach that it has dubbed 'The Sanitation Transformation Initiative', or SaniTI.

This approach will incorporate a swathe of new technologies, from low-flush and vacuum toilets to self-contained full recycle toilets. The WRC has, for instance, recently rolled out one such closed-loop sanitation system in schools in Krugersdorp.

"This space of reinventing the toilet is not a flush in the pan anymore; there is an impetus,' said Bhagwan.

LOW-FLUSH TOILETS MUST BE EMBRACED

BY MORGAN MORRIS

The current toilet-use paradigm whereby we use high volumes of water to flush our toilets may not be sustainable." So stated Dr Marlene van der Merwe-Botha of Water Group Holdings and independent consultant Gary Quilling as they argued for the widespread adoption of low-flush toilets in water-stressed South Africa in their presentation, 'Opportunities and hurdles that impact on the uptake of low-flush water efficient toilets in South Africa'.

But despite the glaring advantages of the technology and its ready availability, acceptance and uptake has been underwhelming in the country, hampered by several factors, Van der Merwe-Botha and Quilling pointed out.

These range from shortcomings of the technology itself (with some, multiple flushes are required; they can be noisy); a lack of regulatory guidance, awareness and incentives to both manufacturers and consumers; to policy gaps.

Working with the Water Research Commission, Van der Merwe-Botha and Quilling have developed a toolbox containing, among other things, a set of recommendations.

This includes the standardisation of terminology; the adoption of a Water Efficiency Labelling System, or WELS, similar to that used in Australia and New Zealand; the establishment of a professional body that can manage practices in the sector; as well as a system of incentives, in the form of green certification and tax rebates, to manufacturers and consumers. But the necessity for such technologies in South Africa must be underlined and accepted at all levels, said Quilling.

"What is required going forward is to have a mindset reset."

NATIONAL WATER & SANITATION MASTER PLAN (NW&SMP)

NW&SMP PHILOSOPHY

INSTRUMENTS
National Water & Sanitation Master Plan
Water Security Framework
Municipal Finance Management Act
Public Finance Management Act
National Environmental Management: Protected Areas Act

2030 NDP

Affordable and reliable access to sufficient and safe water and hygienic sanitation for socio-economic well-being with due regards to the environment

Without improved revenue generation from transfers and tariffs and reduction in costs, the sector will be unsustainable

DRIVERS
- Sustainable Development Goals
- National Development Plan
- National Water Resource Strategy
- National Water & Sanitation Resources and Services Strategy
- Natioanl Water & Sanitation Bill
- Climate Change
- African Union Agenda 2063
- United Nations High Level Panel on Water

KEY OBJECTIVES - NEW NORMAL
- Resilient and fit-for-use water supply
- Universal water & sanitation provision
- Equitable sharing and allocation of water resources
- Effective infrastructure management, operation and maintenance and waste water treatment
- Reduction in future water demand

Water & Sanitation Management
- Protecting and restoring ecological infrastructure
- Reducing demand and increasing supply
- Redistribution for transformation
- Improving raw water quality
- Managing effective water & sanitation services
- Regulating water & sanitation

Enabling Environment
- Enhancing research, development & innovation
- Creating effective institutions
- Managing data & information
- Amending legislation
- Building capacity for action
- Ensuring financial sustainability

Ready for the future, ahead of the curve

Consolidate and Prioritise Schedule of Actions

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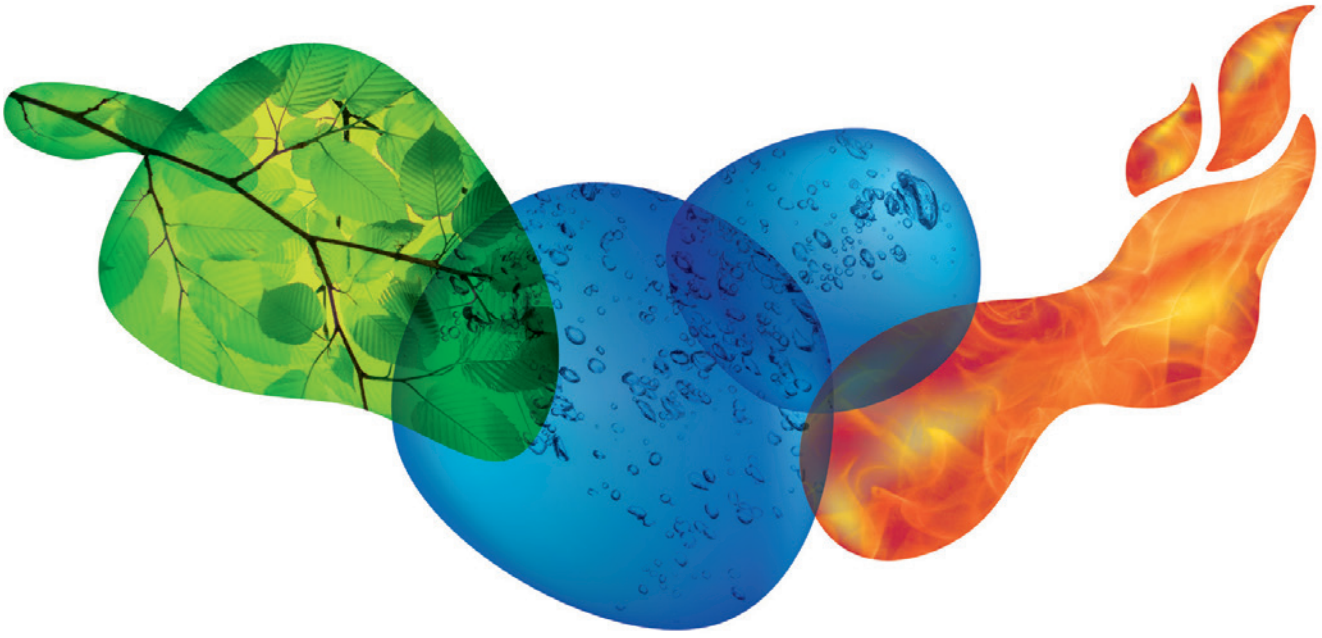

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SA NEEDS ITS OWN WATER RECLAMATION GUIDELINES

BY SUE SEGAR

With water reuse becoming a "new normal" in Southern Africa, a project, funded by the Water Research Commission and the Institute of Municipal Engineers of SA (IMISA), has been launched with a view to developing comprehensive guidelines on water reuse for the region's water sector.

The project, done in cooperation with the University of Stellenbosch, also aims to provide the three tiers of government in South Africa - local provincial and national - as well as consulting engineers and funding organisations with knowledge on state-of-the-art practises of all aspects of water reclamation and reuse systems.

"The guidelines will support sound decision-making and implementation," said Chris Swartz, from the company Chris Swartz Water Utilization Engineers.

Speaking in the session entitled Towards a Water Reuse Normal, Swartz said water reuse projects are being implemented on an ever-increasing scale globally and in South Africa.

Swartz quoted one of the pioneers of water reclamation in Southern Africa, Dr Lucas van Vuuren, who said: "Water should not be judged by its history, but by its quality," adding that, with an increasing trend towards water reuse projects, the guidelines are well timed.

"There is a need for guidance on planning, design, operation and management of water reclamation and reuse schemes.

"A number of excellent reuse guidance documents are available internationally, but they are not specific to Southern Africa – and the region needs its own guideline document with local guidelines and best practises," Swartz said.

One of the aims of the project is to solicit input from stakeholders on specific needs and topics to be included in the guide.

"Then we need to do case studies – to look in more depth at other plants. For instance, we are fortunate to have the Windhoek treatment plant with more than 50 yeasrs of experience and we draw heavily on that reclamation plant.," Swartz said, in reference to the world's first potable reuse plant in the world – which was built in Namibia in 1968, and which has exposed the country to more than 50 years of experience in direct potable water reuse.

Once the water reclamation and reuse guide is compiled, a number of workshops and knowledge dissemination events will be held where the information can be shared with the water sector in South Africa, Swartz said.

The guide will address all the key factors associated with water reuse, including water quality, water treatment technologies, costs, social and cultural perceptions and environmental considerations.

A key factor to take into account is the health aspect. "You should never compromise health to reduce costs. Health should always be foremost when looking at reused water," said Swartz.

when looking at reused water.

"You get chemicals and pathogens in waste water, and you don't want that in drinking water, so you need to look at ways to reduce that. Specifically pharmaceuticals end up in waste water and ultimately in the drinking water if dont remove them and have long term health effects.Our water treatment plants are not designed to remove these very low-concentration micro pollutants like pharmaceuticals. We need to understand the fate and transport of these contaminants to be able to remove them."

Swartz said the Water Research Commission have done excellent work in the last decade, and has, among other things, looked at the health aspects of water reuse.

In their last project, they identified 20 priority pollutants for South Africa which include industrial chemicals, pesticides, biocides and herbicides as well as pharmaceuticals and metabolites and natural chemicals. "We will further study these towards regulating them, he said.

He said the barriers and challenges facing the water reuse sector include the lack of national standards, analytical capabilities, the risks associated with operation and management and a general lack of public knowledge and acceptance of water reuse.

Workshop focuses spotlight on pelagic fishing processing sector

The pelagic fishing processing industry will be one of the sectors under discussion during a workshop hosted by the Water Research Commission on 10 December as part of the WISA Online Conference. The conference, which is titled 'National Surveys of Water and Effluent Management in the Pelagic Fishing, Fruit and Vegetable Processing and Power Generating Industries' will focus on the latest reports completed under the National Survey (NATSURV) of water and wastewater practices in prominent South African industries.

The NATSURV series of publications were originally developed by the WRC in association with the then Department of Water Affairs from the mid-1980s onwards. The intention of the publications was to document water and wastewater management and best practice within different important industrial sectors in the South African economy.

The original investigation into the pelagic fishing processing industry was completed in 1987. Subsequently to this document, many changes have occurred in the sector, which necessitated an update of the document. The aim of the latest project was to assess the South African Pelagic Fishing and Fish Processing Industry to obtain an overview of the operations, water use, effluent production, energy use, best practice implementation and legislative environment in which this industry is regulated.

Pelagic fish make up about 25% of the total South African catch value. The pelagic fishery is a limited-access, rights-based fishery, based on three species: sardine, anchovy and round herring. The research approach included a literature review, engagement with national environmental managers, site specific surveys and site visits, and processing of data and information.

The study found, in summary that the assessed South African sites use less water than expected to achieve their production rates when compared with international benchmarks, but they use significantly more electricity and fuel than expected, mostly for heating purposes.

IMPROVING IRRIGATION EFFICIENCY

BY SUE SEGAR

Irrigation practises in agriculture are, in general, predetermined activities where irrigation is applied at constant intervals, such as twice a week. But what would happen if irrigation activities took place based on a plant's actual water needs and in real time, according to soil and weather conditions?

This was the question posed by Dr Adolfo Gabriel Levin during the session entitled Growth Based Irrigation (GBI) Technology Improves Water Use Efficiency in Agriculture.

Dr Levin, whose presentation was co-authored by J.H. Willemse and N. Shatzkin, focused, in his presentation, on the need to maximise water use efficiency in the context of global water shortages and the ever decreasing amount of fresh water available for agricultural use.

With a growing international food demand, there is a need to grow agricultural development but to also seek more sustainable production systems and to improve water efficiency, he said.

Improving water use efficiency can be done in a number of ways – including by improving crops genetically, through agricultural practises or by improving irrigation strategies, by moving from pre-determined irrigation activities to modern irrigation technology.

Dr Levin cited the SupPlant technology which AECI Plant Health is bringing to South African and African farmers.

Highlighting some aspects of this plant technology, he said one of its features is a sensing system that determines irrigation needs in real time "or at least at high frequent intervals".

"SupPlant LTD has developed a revolutionary irrigation decision support system based on data generated by plant, soil and climatic sensors (every ten minutes).

"Such data is analysed and interpreted by tailor-made mathematical algorithms (every half an hour) for each crop in the cloud."

He said the revolutionary technology is called Growth Based Irrigation (GBI) which allows irrigation to take place according to the plants' water needs in real time without any intervention of the grower.

"The GBI system may significantly reduce water consumption and increase or maintain yields and may significantly increase water use efficiency ...mainly due to fact the system uses the data of the plant under real conditions," he said.

Dr Levin demonstrated the Supplant technology in different crops and under diffferent growing conditions mainly in South Africa. His team's research also compared the Supplant technology results with the actual growers' irrigation strategies.

His team's research concluded that the GBI system proved to be a water-wise user, adapting and adopting the irrigation strategy according to the environmental conditions and plant water needs in real time,

"SupPlant GBI systems assists farmers to answer two main questions in the world of irrigation: when and how much to irrigate?

"Therefore, GBI provides not just precision in the irrigation strategy (how much to irrigate) but also accuracy (when to irrigate).

"The GBI system provides water to the plant on demand in real time (irrigation timing) – and therefore more yield can be achieved with less water," Dr Levin said.

WORKSHOP

Water Resource Management in the Limpopo River Basin (LRB)

Although a lot of research work and data are generated within the LRB, there is need for more effective coordination and management of water resources in this transboundary basin due to the number of people that depends on it for sustainable livelihood. Also, there is an urgent need to know the amount of work that has been done in the LRB so as to prevent duplication of effort. To this end, this workshop seeks to bring together major stakeholders, researchers and scholars who are interested and working in the Limpopo River Basin for possible networking and collaboration.

When:

Thursday, 10 December
13:00 - 14:00

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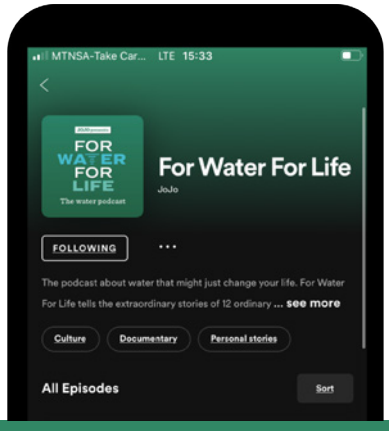

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FOR WATER FOR LIFE

SCIENTISTS SOUND THE ALARM OVER ANTIBIOTIC-RESISTANT BACTERIA BEING RELEASED INTO RIVERS FROM WASTEWATER TREATMENT PLANTS

BY DI CAELERS

Wastewater discharged from treatment plans must be methodically scrutinised to halt the release of antibiotic-resistant pathogens into surrounding streams and rivers, posing a severe risk of environmental contamination.

That was the call from scientists during two different presentations at the Water Institute of Southern Africa's (WISA) 2020 online annual conference. Each featured the results of studies analysing wastewater for evidence of the presence of antibiotic-resistant pathogens in separate parts of KwaZulu-Natal, turning up evidence of tuberculosis (TB), E.Coli and Klebsiella.

Acknowledging the concomitant risk to human health, presenter Hlengiwe Mtetwa, a scientist in the Department of Community Health Studies at the Durban University of Technology (DUT), told delegates that although TB transmission is usually between an infected and a healthy person, there were studies detailing indirect transmission from other sources, including the environment.

Her study, which examined wastewater at three different treatment plants in Durban, was concerned with the presence of the human and animal pathogen Mycobacterium Tuberculosis Complex (MTBC) – specifically antibiotic-resistant genes - that survived the disinfection process and ended up being discharged into the surrounding environment.

Microbial resistance is a major cause of TB deaths among people living with HIV in Africa, and Mtetwa said it was "alarming" that the study detected the presence of these resistant genes in most, if not all the wastewater treatment plants surveyed. The resistance was to first- and second-line drug treatments, but the former were more common, she explained.

"This detection of genes coding for resistance to first- and second-line TB drugs from the environment may be used as an indicator for community prevalence of drug-resistant TB infections," Mtetwa cautioned, adding that a detailed health risk assessment in respect of wastewater contamination related to TB and drug-resistant TB was warranted.

Similarly, speaker Siyabonga Thwala, a molecular biologist at Umgeni Water in Pietermaritzburg, presented study findings identifying the presence of antibiotic-resistant genes in wastewater from the Edendale Hospital sewer as well as from the Darvill Wastewater Treatment Works.

He told the conference that hospitals were known hotspots for antibiotic-resistant bacteria, including E.Coli and Klebsiella, which were being discharged into sewers via the urine, faeces and blood of infected patients.

Despite processes aimed at ensuring the final effluent was free of pathogens, his study found this was not the case and that pathogens were indeed being released from the treatment plant into the surrounding environment.

"Multi drug-resistant E.Coli and Klebsiella were highest in the hospital sewer, and reduced to lower numbers in the final effluent from the wastewater treatment plant. But these were not totally eliminated and were being discharged into the Msunduzi River," Thwala revealed.

His recommendations included a dedicated wastewater treatment plant for the Edendale Hospital, with the Darvill plant acting as a second layer of decontamination defence in order to ensure the total removal of all pathogens before final effluent was released into the environment. He also called for the enactment of applicable legislation around acceptable levels of these antibiotic-resistant pathogens in effluent.

"The discharge of multi drug-resistant bacteria into receiving rivers is concerning as it might pose a risk to surrounding communities, and further studies are needed to detect and quantify this risk across the entire spectrum," Thwala urged.

TCTA
A new word for water

TCTA is a state-owned entity responsible for financing and developing bulk raw water infrastructure.

The Trans-Caledon Tunnel Authority (TCTA) is proud to contribute towards government's mandate to ensure a sustainable water supply across Southern Africa. Since 1986, our specialist skills, from sourcing project finance to planning, design and construction, place TCTA in the ideal position to facilitate the development of bulk raw water infrastructure.

Having successfully completed the first phase of the Lesotho Highlands Water Project (LHWP), which to this day, remains as one of TCTAs flagship projects, the organisation along with the strong support from the Department of Water and Sanitation have continued in its endeavour to be the leader in the implementation and sustainability of bulk raw water infrastructure development.

Phase II of the LHWP is currently underway. TCTA is solely responsible for the funding of this bi-national infrastructure project between Lesotho and South Africa. The project involves the construction of an intricate network of tunnels and dams to divert water from the mountains of Lesotho to South Africa. It will provide water for South Africa and hydroelectricity for Lesotho.

Other projects that the organisation has taken pride in fulfilling include: the Berg River Project, the Vaal River Eastern Subsystem Augmentation Project; the Mooi Mgeni Transfer Scheme; the Komati Water Scheme Augmentation Project, Olifants River Water Resources Development Project; Acid Mine Drainage.

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