



## INDUSTRY INSIGHT

Groundwater management  
and the community

**Dr Kornelius Riemann**  
Managing Director, Umvoto Africa

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# Groundwater management and the community

Each mural in progress celebrates the participation of the community in cleaning up and preserving their environment

Murals: Painted by artist collaborator Seth

As a scientific and environmental consulting firm, Umvoto Africa's expertise as a groundwater specialist is undisputed since its foundation in 1992. As with all successful businesses, that didn't happen by chance, says managing director Dr Kornelius Riemann.

Umvoto's growth is the result of a sustained investment in emerging talent, which has seen more than 100 undergraduates, graduates and postgraduates pass through a caring and supportive internship programme.

This vision prepared the way for the succession of a new leadership structure following the tragic passing of Umvoto's founder and managing director, Rowena Hay, along with her husband and company director, Dr Chris Hartnady, due to Covid-19 complications in July 2021. Today, the company is led by Riemann and three technical directors, namely David McGibbon, Dylan Blake and Luke Towers.

Rowena's legacy will live on through a non-profit organisation, The Umvoto Foundation, that she established in late 2020, and the present senior team, which she mentored from the day they joined the company as interns and fresh graduates straight out of university. The directors are supported by Umvoto's specialists and project managers, some of whom have stepped up into new leadership roles.

"Covid-19 has been devastating, but the upside is that through a supportive and engaging framework, we're maintaining a vibrant team dynamic, exceptional morale and staff well-being, and we're now stronger and even more committed," says Riemann.

## UN Global Compact

A locally and globally interconnected company, Umvoto is a member of the UN Global Compact, which supports the implementation of the Sustainable Development Goals (SDGs). "This is a philosophy that we embrace internally as a core company value, and externally with all our stakeholders to ensure access to quality potable water for all communities," says Riemann.

There are 17 SDGs. These include SDG 1: No Poverty; SDG 6: Clean Water and Sanitation; SDG 10: Reduced Inequalities; and SDG 11: Sustainable Cities and Communities. The development of water resources plays an essential role in meeting almost all the SDGs, but specifically SDGs 6 and 11 in a South African context.

South Africa faces the triple challenges of poverty, unemployment and inequality. The purpose of the SDGs – and South African government initiatives like the UN-aligned National Development Plan 2030 – is to close the inequality gap. The reality is that millions of South Africans live in informal settlements, which continue to grow in number and size nationally, posing a major challenge for urban planners.

Dr Kornelius Riemann, managing director, Umvoto Africa



## Urbanisation and population growth

"Groundwater is an inevitable part of water demand management and water security in many parts of the world, especially in more arid regions like South Africa that face intensive urbanisation and population growth," says Riemann.

"Additionally, as the standard of living increases – in line with achieving the SDGs – so too will demand. This requires specialist risk reduction strategies that combine the modelling, planning and execution of surface water and groundwater as an integrated solution," he continues.

Factoring in the impact of climate change is an equally important consideration, which is why Umvoto has a team of climatologists focused on analysing current and future weather patterns. Allied to this is the company's recent diversification into air quality monitoring and its seasonal impacts, which ties in well with Umvoto's holistic environmental services.

## Understanding groundwater

Many municipalities and water utilities see groundwater as an immediate solution to supplement surface water storage, especially during drought conditions. However, without an integrated plan, which includes phased groundwater replenishment, these resources are in danger of being overexploited.

"It's definitely not a 'one size fits all' solution, and any groundwater strategy must be part of a holistic masterplan that integrates with surface water resource planning," Riemann explains. "A combined system approach results in the optimisation of water use as part of a longer-term and successful water cycle model."

## Landmark projects

Over the years, Umvoto Africa has been involved in various landmark groundwater projects, which include ongoing work for the City of Cape Town, before and after the potential 'Day Zero' event in 2018, when there was a real



The Umvoto Foundation's first mural taking shape next to the Lotus River Canal prior to clean-up operations

possibility of the metro running dry. Another long-term project in the Western Cape includes the wellfield development and groundwater management solutions provided for Overstrand Municipality, based in Hermanus.

Within the City of Cape Town, the key groundwater projects encompass the Table Mountain Group Aquifer (initially focusing on the Steenbras Wellfield), the Cape Flats Aquifer (CFA), and the Atlantis Aquifer – the latter serviced via two wellfields operated by the city since the 1980s and now undergoing refurbishment. Collectively, these aquifers are planned to form part of the Western Cape Water Supply System.

The ongoing development of the Steenbras Wellfield is geared towards large-scale augmentation (approximately 20 million litres per day), feeding abstracted groundwater into the Upper Steenbras Dam to supplement Cape Town's surface water supply infrastructure. With drought conditions thankfully absent at present, the current city strategy is to draw on the wellfield, when required, during the drier summer season and/or during higher demand periods. Umvoto is currently undertaking ongoing modelling to perfect an optimal supply and demand balance.

So far, six Nardouw Aquifer production boreholes have been commissioned and are currently operational, with three more completed holes to be commissioned (two Nardouw and one Peninsula Aquifer), and a further three Peninsula Aquifer holes still to be completed. As an indication of the depth, the boreholes targeting the Peninsula Aquifer are deeper than 1 000 m.

"The commissioned boreholes have been pumping for more than a year now as part of an extended commissioning period, abstracting between 10 Mℓ/day and 15 Mℓ/day, which provides us with invaluable data on future performance," says Riemann.

### CFA: art and science come together

Another long-term project running in parallel over the past four years or so is the CFA,

which underlies a major portion of Cape Town, including Mitchells Plain and the township of Khayelitsha.

The city's plan caters for a scheme that includes six abstraction wellfields, interspersed by approximately 60 injection boreholes returning high-quality, advanced-treated effluent for managed aquifer recharge (MAR). The first wellfield is scheduled for commissioning during early 2022.

The CFA serves as an excellent example of how community outreach projects are essential for the sustainability of groundwater systems, especially when it comes to protecting the ecosystem. Currently, due to underserved informal settlements and the dumping of untreated industrial effluent, pollutants like raw sewage, oils, chemicals and rubbish enter stormwater systems – with the city's Lotus River Canal being one of the worst affected. Subsequently, this toxic mix drains into the surrounding wetlands, underlying aquifer and, finally, into False Bay.

"Working with the city and various stakeholders, Rowena identified the opportunity to involve the community via a series of interventions. This included litter clean-up operations and environmental education. But more significant has been the positive emotive buy-in through The Umvoto Foundation's support for a transformational art campaign," says Riemann.

For every section cleaned up along the Lotus River Canal, The Umvoto Foundation's collaborative artists painted strikingly beautiful murals. In addition to their aesthetic appeal,

Riemann says the messages have been very well received by communities, who now have a far greater appreciation of the value of water, plus their responsibility for environmental conservation.

In pursuit of these themes, The Umvoto Foundation is currently developing a series of geoheritage booklets and associated hikes/walks, to educate the public about the important geological and hydrogeological features they see every day but may take for granted. This will include the publication of booklets on the history and geology of Table Mountain's dams, as well as the history of Hermanus' water resources (specifically the TMG Aquifers). The first booklet is due for release in 2022 and includes an app and walking trail guide to make the reader experience as interactive as possible.

"From inception, Umvoto's strength has been based on its added-value approach. What Covid-19 has taught us is the importance of resilience. However, we want to do more than just weather the storm. In other words, our goal is to move beyond resilience and to ensure that our proactive interventions make a difference in managing and mitigating climate change. Rowena wanted us to 'Build Back Better' and that's what we're going to do," Riemann concludes. **35**



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Construction in progress on the H1A3b Nardouw Aquifer production borehole pumphouse at the Steenbras Wellfield. The pumphouse was designed to blend into the environment  
  
*Pumphouse: Designed by Zutari (Pty) Ltd*

