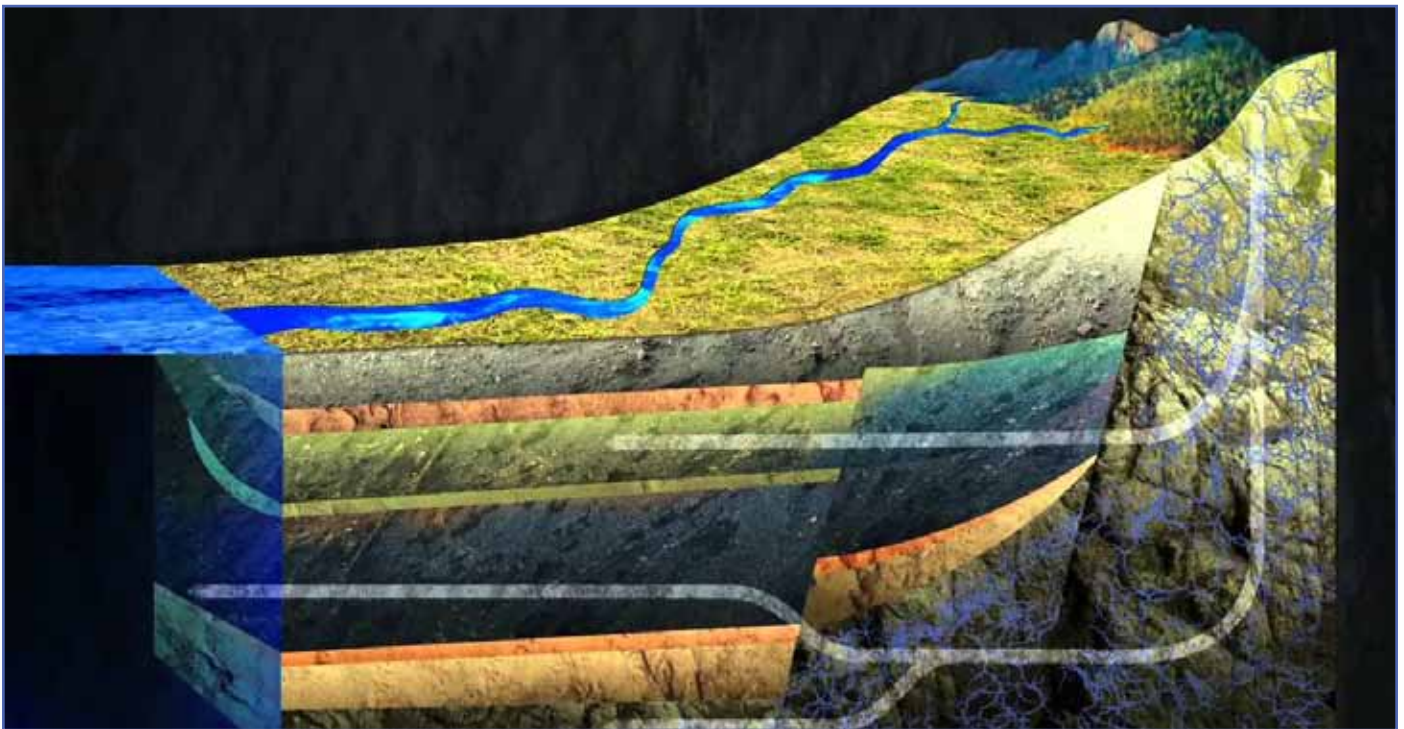




IS GROUNDWATER THE ANSWER TO DRYER SEASONS?



Climate change could result in Cape Town's temperature rising by 0.25 degrees Celsius in the next 10 years, which in turn could increase drought likelihood by up to seven times, according to water consultant Ayesha Laher.

But Cape Town is not the only African city that could be affected, as seven out of the world's top 10 countries most at risk from drought are in Africa, Laher said during a workshop on the final day of the biennial conference of the Water Institute of Southern Africa.

"The effects of climate change on water resources in Africa will be flooding, drought, change in distribution of rainfall, drying up of rivers and lakes.

By Sue Segar

"The east coast (of Africa) is going to get wetter and the west coast is going to get drier," she said.

She said that while Cape Town received over 98 percent of its potable water from surface sources like rivers and dams, ground water had huge potential to serve the city's thirst for water for private and commercial use.

The total estimated volume of available, renewable ground water in South Africa is 10, 343 million cubic meters, which is reduced to 7, 500 million under drought conditions," according to Dr Shafick Adams, of South Africa's Water Research Commission.

"Cape Town is blessed to have large amounts of



Ayesha Laher. – Picture by Wempic Photography

water below it that can be exploited. Groundwater ... feeds the springs around the city with three major aquifers,” said Laher.

Groundwater could also be a viable alternative source of water for the city’s commercial sector, she said. Demand on the city’s ground water from private boreholes tapping into below ground water; by January 2018 there were 22 000, mostly private boreholes, registered in Cape Town, as well as an unknown number of unregistered ones.

“Ground water has a huge potential for Cape Town, but its use needs to be carefully monitored,” Laher cautioned.

There are three types of rights that apply to the use of ground water in South Africa in terms of the National Water Act:

- Schedule 1 rights, which allowed for reasonable domestic household, which did not require a licence;
- General Authorisation, with limits reviewed every five year. This allowed for a maximum of 1,000 litres a day in Cape Town, and favoured farmers with large properties; and
- Use above the General Authorisation limits requires a licence.



WASTEWATER PLANTS HIDDEN IN PLAIN SIGHT

No one wants to live next door to a wastewater treatment plant, even if it's the best sustainable source of pre-used water to tackle the escalating global drought threat.

Now two South African companies are working hard to counter those negative perceptions, installing and testing groundbreaking international wastewater treatment technology that is producing excellent results.

There's unlikely to be a "not in my backyard" response to Organica Water plants, introduced to delegates at WISA 2018, and that's exactly the response they're looking for, says Jaco Jansen, process engineer at Murray & Roberts Water's demonstration plant in Verulam, KwaZulu-Natal.

"Water scarcity is a reality for us, and we need to look at future potential water sources. Dams aren't the solution because they still need rain, as is the case for groundwater solutions. Desalination is expensive, and can only be applied in coastal areas.

"The only real alternative is to recover previously-used water, and that's why we're concentrating on ensuring that wastewater treatment plants become psychologically more acceptable within city boundaries," Jansen explained.

Murray & Roberts Water

By Di Caelters

brought the nature-inspired technology, which uses natural root systems as well as root-mimicking infrastructure to process wastewater, to South Africa in 2016. It partnered with Hungarian developers Organica Water.

Photographs of their installations in China, and right here in Durban, offer no clue to the real business of wastewater treatment. They are completely odour-free and look

more like botanical gardens, either enclosed in glass houses or under shade structures, depending on the local climate.

Jansen cited a host of benefits, including better treatment characteristics, a smaller physical footprint, lower operating costs, and positive aesthetics.

"Perhaps most importantly, this is a way to ensure higher water quality while minimising the footprint, leaving more available land to sell for development in rapidly-



urbanising environments,” he added.

Cost-saving is another important priority, and Jansen explained that this was significant. Because the plants were suitable for urban areas, they negated the need for expensive pipe infrastructure to take sewage long distances out of cities.

“The Organica system also uses 35% less energy when compared to typical Conventional Activated Sludge (CAS) systems, due to increased efficiencies,” Jansen said.

Nereda, the other system, was brought to South Africa by WEC Projects, a Diepsloot company that provides engineered solutions in the wastewater treatment industry. They signed an agreement with Netherlands-based Royal HaskoningDHV in 2016.

WEC Projects process engineer

Tim Fisher told delegates the system, first installed at Gansbaai in 2009, purifies wastewater via an aerobic granular biomass programme. The process consistently delivers high-quality effluent in return for benefits including better treatment characteristics, a smaller physical footprint, lower operating costs – and they look better.

“The Nereda model is typically 25% of the size of existing conventional wastewater treatment models,” he said.

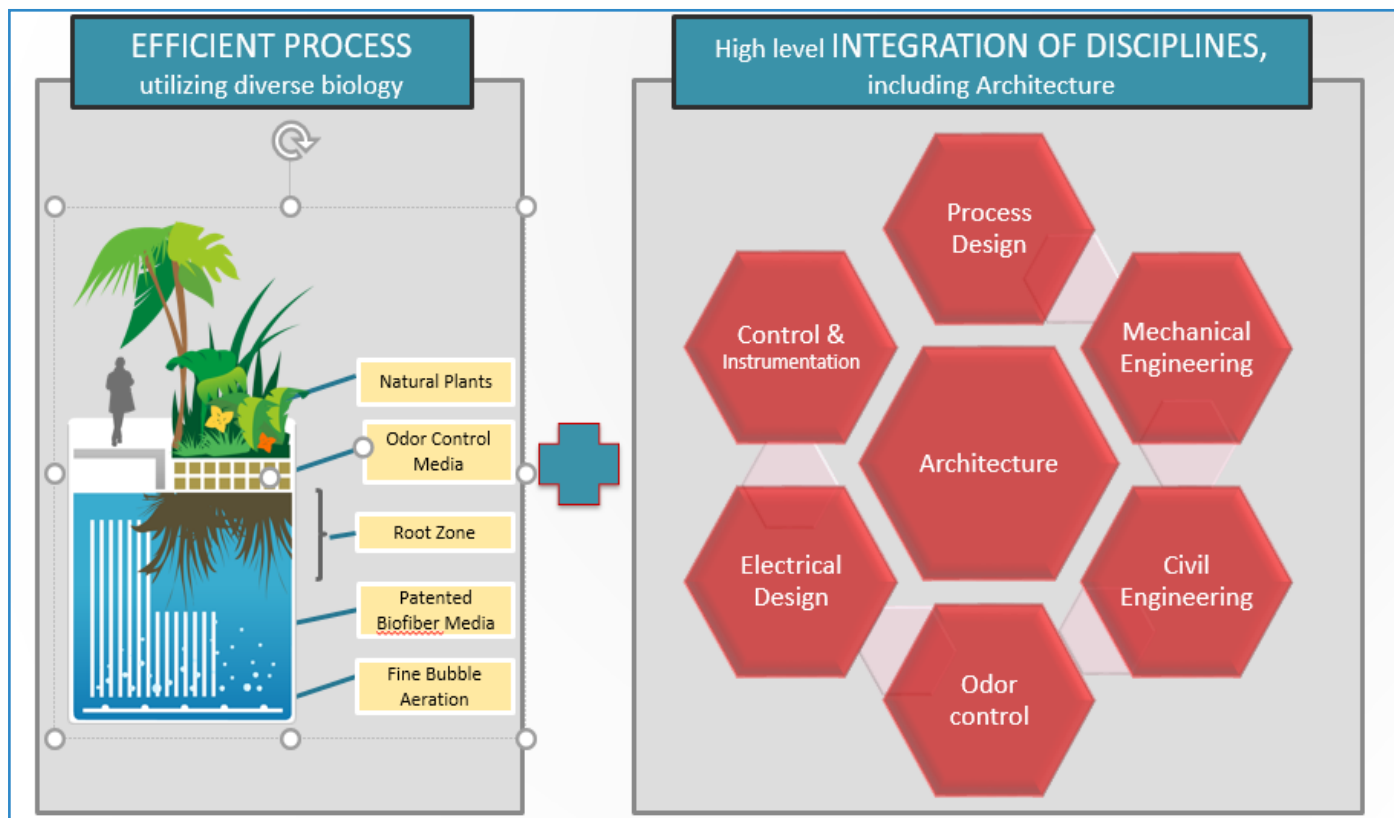
The Gansbaai Wastewater Treatment Works was the world’s first full-scale domestic sewage treatment works to use the Nereda technology, which was later replicated at the Wemmershoek Waster Water Treatment Works, also in the Western Cape, in 2015.

Last year WEC Projects was appointed to design,

manufacture, install and commission a new 5ML treatment facility at the Hartebeesfontein Wastewater Treatment Works in Gauteng.

Fiona Griffith, managing director of UK-based consultancy Isle Utilities, which investigates novel tech solutions and pairs developers with funders to help bring these to market, said her company had been involved with both companies during their start-up phases. With Nereda, they initiated demonstrations to water utilities in the UK, and facilitated introductions to a range of water utilities and supported some of the initial trials for Organica Water.

“What we work to do is to find tech companies with good ideas in the early development stages, then collaborate with them to move it from an idea to a commercial reality,” she said.



TIME TO CHANGE WATER MANAGEMENT PARADIGM

By Sue Segar

Cape Town – as a city that has endured a bad drought – is not alone in the world. There are cities throughout the world which are running out of water and facing crippling water situations. But does this have to happen? What if there was a change in the paradigm of water and waste management?

This was the powerful question posed by Indian environmentalist and political activist Sunita Narain during the final plenary at the Water Institute of SA conference.

Narain, who is director-general of the India-based research institute, the Centre for Science and Environment as well as director of the Society for Environmental Communications, highlighted the need to cut the costs of water supply by making water supplies more local. “Affordability should underpin any process,” she stressed.

In an address entitled Water Wisdom for a Climate-risked Fast-urbanising and Still Inequitable World, she called for a new system of water economics which give the true cost of supplying and also recycling “every drop” of water.

She said there is currently a “gross inequality” in the supply of water in cities around the world which can largely be ascribed to the adoption of technologies “that are so expensive that we can supply water to the rich, but not to all.”

She also stressed the importance of a common approach to water and waste management.

Narain, who, in 2016, was named as one of Time Magazine’s 100 Most Influential People, said the developing world, whose cities are built on models in which water comes from “further and further away” needs to start building cities that are more equitable and focused on supplying water to rich and poor alike.

Narain said water utilities are spending all their money on supplying water, resulting in



Sunita Narain. – Picture by Wempic Photography

them being left with no money to “take back the waste” and to treat, recycle and reuse it.

A key problem facing most water systems in the world is that they are divorced from the waste systems. Many states do not have the money to recycle the waste and reuse it.

Additionally, she said most cities are built on the concept of doing underground sewerage

which is costly to maintain.

Narain said populations around the world are suffering the “double whammy” of climate change coupled with the mismanagement of natural resources.

“The changing nature of rain requires us to change the way we do water management. We have to plan deliberately to hold water when and where it falls; plan for excess and scarcity.”

Cities – and the industries operating inside them – will need more and more water for growth. “But, cities and industries, if we do not plan today and differently, use clean water and discharge untreated waste water. Pollution will increase and water scarcity will increase.”

She said water sourced from further and further away leads to increasing costs of supply and to high distribution losses. Distribution loss means less water to supply at the end of the pipeline. Less water means more costly water. This means a water utility cannot supply to all people or take back the waste of all. “This leads to inequity,” she said.

A key solution, Narain said, is to focus on making water supplies more local. Instead of only having one catchment area of water, it is critical to have many catchments, to hold and recharge the rain water. “The more local your water system, the cheaper it will be,” Narain said.

CITY FIRMS LAUDED FOR WATER SAVING ACTION

By Raymond Joseph

Retail giant Woolworths’ head office in Cape Town has cut back its dependency on potable municipal water use by using water seeping into the basement of its buildings from an underground river.

Previously the water went to waste as it was pumped into the municipal drainage system to be channeled out to sea.

But now this water is used for car washing, to run air conditioners and to flush toilets in five interlinked Woolworths buildings, saving 18, 000 kilolitres of potable water each year. The system was installed at a cost of R1.2-million in 2010.

This was one of the successful water saving systems installed by businesses in Cape Town, which were highlighted by Claire Pengelly, Water Programme Manager of non-profit organisation GreenCape, during a workshop on the final day of the Water Institute of Southern Africa’s biennial conference in Cape Town this week.

The Peninsula All-Suite Hotel in Sea Point has cut back the use of potable water by 10 percent by using a well point, to supply water to flush toilets. Installed at a cost of just R100, 000 in 2016, it has resulted in a saving of 225 kilolitres a month of potable water.

And K-Way manufacturers in Ottery are saving 125 kilolitres a month using groundwater from a well point for toilet flushing. The well cost just R30 000 to sink.

These are just three examples of how Cape Town companies have cut back their water use, while making significant financial savings, in response to the drought in Cape Town.

But switching to ground water comes at an initial cost, and carries some risks, said Pengelly.

“The regulatory processes are complex and lengthy and require engagement with multiple government entities,” she said. For example, water quality can be variable with salinity present in water in some areas, which raises issues involving the disposal of brine. Some companies that had put in water extraction systems were not running them because of the high cost and other issues related to the disposal of brine extracted from ground water in some parts of Cape Town.

The system also was rainfall dependent, which raises supply issues in times of drought.

Also, many people and companies were tapping into ground water sources, without the necessary, extensive network in place to monitor it.

“A lot of it is illegal drilling and extract on is going on all over Cape Town but the system is not being sufficiently monitored,” Pengelly said.

CELEBRATING WISA EXCELLENCE

WISA2018 ended on a high note, with special honours for youth participants and a collection of conference bags to be donated for use as schoolbags for children in the Langerug informal settlement near Franschoek.

The settlement was one of the areas visited by WISA2018 delegates during the Thursday fieldtrips because of the green infrastructure solutions which have been implemented there.

In the first of a series of three categories of awards, conference technical chair Jason Mingo said they had made a decision to focus the awards process on students this year.

Mingo, a task manager in the Western Cape Environmental Affairs and Development Planning Directorate of Pollution and Chemicals Management, announced the following winners:

- Best Poster: Rinaldo Kritzinger, North West University, for his work in respect of antibiotic-resistant bacteria and the associated genes in the drinking water in the North West province.
- Best Student Presentation: Talitha Beyl, Stellenbosch University, for her examination of the significant opportunity for the integration of wastes from anaerobic digestion (AD) effluent into the production of microalgae.
- Most Promising Research: Boipelo Madonsela, University of Cape Town, for her work on the use of a diagnostic indicator assessment to understand sustainability transitions towards Waster Sensitive Design in the City of Cape Town,

Handing out the awards for Best Water and Wastewater Treatment Plants, Achim Wurster, director and vice chairman of the board of the Water Institute of Southern Africa (WISA), said WISA's Water Science Division had evaluated the nominations, and decided on the 2018 winners in line with a focus on acknowledgement of competence and initiative of plant personnel to constantly improve operations.

The Wilson Award for Wastewater Treatment Plant and Design Capacity went to the Fraser

By Di Caelters

Wastewater Treatment Works in the iLembe District Municipality, in KwaZulu-Natal.

The Amanzi Award for a Water Treatment Plant in a Metropolitan Area or City stayed in KwaZulu-Natal, going to Durban Heights Wastewater Works, under plant manager Sibonelo Hadebe.

The final award, the Young Water Professionals (YWP) Development Award, was handed out by YWP chair Nora Hanke-Louw.

"The award goes to an organisation which has best supported the development of young professionals in the sector between 2016 and 2018, and is particularly special this year as YWP ZA marks its 10-year anniversary," she told delegates at the final session.

Hanke-Louw stressed the importance for her organisation of partnerships with water sector employers dedicated to the development of their young professionals.

The winner was Rand Water, which she said had a long history of driving YWP development in the sector.

"The selection committee was particularly impressed by the manner in which YWP development has been incorporated into Rand Water's 'way of doing things'," Hanke-Louw said.



Boipelo Madonsela.



UMGENI WATER PLUGS ENGINEERS GAP

Municipalities in South Africa are at the forefront of service delivery for water treatment and sanitation, but lack of engineering skills is hampering local authorities to provide service to the people.

“One of the major challenges of the municipalities is the shortage of skilled engineers and scientists, said Naheen Toolsee, skills training representative for Umgeni Water, state-owned company involved in water management.

In 2005 there were 405 professionally-registered staff, averaging 46 years of age, and in 2015 this had decreased to 204 workers, averaging 38 years old.

“A shortage of engineers can result in the failure to implement and operate capital projects as well as failure was to maintain water infrastructure,” he said.

This leads to poor water quality, poor maintenance and increased expenditure, he added.

“Such a scenario can lead to widespread service delivery protests, especially considering that water and sanitation is a human right,” he said.

By Munyaradzi Makoni

Umgeni, the largest supplier of bulk potable water in KwaZulu-Natal, programme to train engineers showed good results, so in 2010 the entity received an invitation from the National Treasury to partner in the training of students.

The idea was to increase the pool of engineers and scientists so as to help municipalities deliver on their mandate. This was in line with Umgeni’s strategic water capacity building programme.

“We had an engineering programme of our own but it needs to be fast-tracked so that students are ready for professional registration in three to five years so that the objective of increasing the pool of experts would be met,” he said.

The programme trained the students, gradually increasing their exposure and responsibilities over the five year period. Supervision and mentorship was the crucial part of the programme.

“Municipalities should plan for the intake of professionally registered graduates,” he recommended.