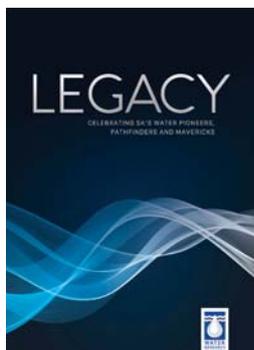


NEWS

New publication celebrates SA water's pioneers, pathfinders and mavericks



South Africa's complex water situation has called on the local water and sanitation community to continuously explore innovative and creative solutions in the country's pursuit of water security for its entire citizenship.

Over time, some of these specialists have risen to become world renowned and award-winning pioneers – doyens who have dedicated their careers to new discoveries, trailblazing a new path towards South Africa's sustainable development. In the process, these thought leaders and innovators have not only steered the South African water

sector in their respective fields but have inspired whole new generations of young water professionals to follow their example. In recent years, their generous mentor contributions have also aided the transformation of the sector.

Now the Water Research Commission (WRC) has profiled 34 of these trailblazers in a new publication, *Legacy – Celebrating SA's water pioneers, pathfinders and mavericks*. The profiles include among others, hydrological modelling and climate change doyen, Prof Roland Schulze; Stockholm water prize winner, Dr Jackie King; indigenous crop torchbearer, Prof Albert Modi; Africa Water Leadership award winners, Prof Alison Lewis; winner of the Presidential Order of Mapungubwe, Prof George Ekama and Dr Thokozani Majozi; and sanitation guru, Prof Chris Buckley, to name a few.

"Many of those featured in this publication started their careers as students on WRC-funded projects. Their tales are truly remarkable, and speak of passion, dedication and hard work," notes WRC CEO, Dr Jennifer Molwantwa, in the foreword of the book. "While all their life

stories might be unique, their goal has been the same – to make South Africa a better place for all who live in it through practical application of water security research, development, innovation and technology."

Not only does the publication capture the profile and career histories of these water and sanitation experts, it also serves as inspiration for younger people interested in pursuing a career in the sector. General learnings from those profiled are captured at the back of the book. "For those students that want to take up the baton and run with it, these stories can serve as a roadmap to follow. Though each one is different, there are similarities that can act as markers along the way for the next generation's journey ahead," notes author Petro Kotzé.

Legacy – Celebrating SA's water pioneers, pathfinders and mavericks (WRC Report no. SP 147/21), is available online at <https://bit.ly/3Qm4FtL> or in free hard copy from orders@wrc.org.za

UP academic wins water prize at SA science 'Oscars'

University of Pretoria (UP) academic, Prof Evans Chirwa, walked away with the NSTF-Water Research Commission (WRC) award during the 24th National Science and Technology Forum in partnership with South32 (NSTF-South32) Awards in July.

Prof Chirwa, a professor and the Rand Water Research Chair: Water Utilisation in the Department of Chemical Engineering, was awarded for his work on 'the introduction into South Africa of the use of biological analogues in advanced water treatment and water recovery with applications in metal-halide heterogeneous photocatalysis'.

Reacting to his win, Prof Chirwa said just being nominated for the award alone had been an honour. "Being nominated for this award by UP was the greatest recognition I'd received since I joined the university. My research group and I are overjoyed by this achievement. My postgraduate students work very hard every day; they are the true winners of this honour. My family supported and encouraged me through the process, and I thank them from the bottom of my heart for the love and support," Prof Chirwa said.

According to Deputy Minister of Higher Education, Science and Innovation,

Buti Manamela, platforms such as the NSTF-South32 Awards are important in recognising the impact of members of the science community. "It does not require a science degree to appreciate the danger of having a scientific community that believes that science much not actively concern itself with the well-being of, or sustainability of human life. We need more socially conscious scientists and innovators. I believe that platforms such as [these awards] are useful in helping us identify and support such scientists and innovators."

Kalahari site points to water-rich periods that attracted early humans

Research on the tufa rock formations on Ga-Mohana Hill in the southern Kalahari has shown that waterfalls, flowing streams and pools once attracted early humans to this dry plateau.

Until recently, most evidence for early human development in southern Africa has stemmed from the country's southern coast.

Evidence of a wetter Kalahari has been published in the journal *PLOS ONE* by University of Cape Town (UCT) PhD candidate Jessica von der Meden of the Department of Geological Sciences and UCT's Human Evolution Research Institute.

Tufa deposits are soft, porous sedimentary rocks composed of calcium carbonate. They are formed by the evaporation of fresh groundwaters that emerge as

springs. The striking tufa formations at the Ga-Mohana Hill archaeological site, 12 km from Kuruman in the Northern Cape, are evidence that water was once abundantly available in the region.

Dating sequences of samples extracted from the tufas show that these rocks were formed during five distinct episodes over the last 110 000 years. Three of these episodes coincide with evidence for human occupation at the rock shelter.

Von der Meden's investigation shows that there are links between human occupation and water availability in the southern Kalahari before 71 000 years ago. Around 20 000 years ago, during the Last Glacial Maximum, this link seems to break down as there are no tufas that date to this time (indicating drier conditions) although human occupation persisted.

The findings are significant because this evidence challenges the thinking that humans occupied these arid regions only during wetter periods, and it may suggest arid-adapted behaviours. "Tufas are not actively forming today. That is really a clue that the environment was different in the past," notes Von der Meden. "We've shown a record of water in the tufas that not only matches the archaeological record but also provides evidence of a crucial resource for the people living at Ga-Mohana. These findings shed light on climate change and the impact of this on human evolution."

* To read the full article, Visit: <https://www.news.uct.ac.za/article/-2022-08-15-kalahari-site-points-to-water-rich-periods-that-attracted-early-humans>

WATER DIARY

Global water sector

11 – 15 September 2022

The International Water Association's World Water Congress and Exhibition will be held in Copenhagen, Denmark.

Visit: www.worldwatercongress.org

Land use and water quality

12-15 September 2022

The fifth International Conference on Land Use and Water Quality (LuWQ2022) with the theme 'Agriculture and the environment' will be held in Maastricht, the Netherlands. LuWQ2022 is an interdisciplinary conference on the cutting edge of science, management and policy to minimise effects of agriculture and land use changes on the quality of groundwater and surface waters.

Visit: <https://www.luwq2022.nl/>

Groundwater

18 – 23 September 2022

The 49th International Association of Hydrogeologists (IAH) Congress on 'Groundwater sustainability and poverty reduction' will be held virtually and in Wuhan, China.

Visit: <http://iah2022.com>

SA water sector

28 – 30 September 2022

The biennial conference of the Water Institute of Southern Africa is taking place virtually and at Sandton Convention Centre under the theme 'Navigating the course'.

Visit: <https://wisa2022.co.za/>

African water sector

19 – 21 October 2022

North-West University is the lead host of the 23rd WaterNet/WARFSA/GWP-SA Symposium. These symposia have been held annually in eastern and southern Africa for the past 22 years to promote interaction among policymakers, academics and practitioners from water and water-related sectors. The event will be held at Sun City.

Visit: <https://www.nwu.ac.za/date/23rd-waternetwarfsagwp-sa-symposium>

Wetlands

25 – 28 October 2022

The National Wetlands Indaba will be hosted by the Free State Wetland Forum (FSWF) and supported by the SA Wetland Society with the theme 'Wetlands action for people and nature'.

Visit: <https://indaba.org.za/>

Municipal engineering

2 – 4 November 2022

The 85th conference of the Institute of Municipal Engineering in Southern Africa will be held at Birchwood Hotel and Conference Centre in Gauteng.

Visit: www.wisa.org.za

Water storage and hydropower

29 November – 1 December 2022

The 4th International Conference and Exhibition on Water Storage and Hydropower will be held in Lake Victoria, Uganda.

Visit: <https://hydropower-dams.com/africa-2022/>

Resource recovery

15 – 18 January 2023

The 8th International Water Association Water Resource Recovery Modelling Seminar will be held in Stellenbosch. Topics will include activated sludge and biofilm processes, advances in sludge treatment and management of solids, resource recovery, separation processes, and aquatic chemistry (including micropollutants of concern), among others.

Visit: www.iwawrrmod2022.co.za

GLOBAL

Healthy environment declared a universal human right



The United Nations (UN) General Assembly has adopted a historic resolution, declaring access to a clean, healthy and sustainable environment a universal human right.

The resolution, based on a similar text adopted last year by the Human Rights Council, calls upon states, international organisations, and business enterprises to scale up efforts to ensure a healthy

environment for all. UN Secretary-General, António Guterres, welcomed the 'historic' decision saying that the landmark development demonstrates that member states can come together in the collective fight against the triple planetary crisis of climate change, biodiversity loss and pollution.

"The resolution will help reduce environmental injustices, close protection

gaps and empower people, especially those that are in vulnerable situations, including environmental human rights defenders, children, youth, women and indigenous peoples", he said in a statement.

The text notes that the right to a healthy environment is related to existing international law and affirms that its promotion requires the full implementation of multilateral environmental agreements. It also recognises that the impact of climate change, the unsustainable management and use of natural resources, the pollution of air, land and water, the unsound management of chemicals and waste, and the resulting loss in biodiversity interferes with the enjoyment of this right – and that environmental damage has negative implications, both direct and indirect, for the effective enjoyment of all human rights.

Millions more children to benefit from world's first malaria vaccine

Julien Harneis



The pharmaceutical company GSK has been awarded a contract by the United Nations Children's Fund (UNICEF) to produce the world's first malaria vaccine so that millions more children will be protected against the killer disease.

The award, valued at up to US\$170 million, will lead to 18 million doses of the vaccine being available over the next three years, potentially saving thousands of young lives annually. Malaria remains one of the biggest killers of children under five. In 2020, nearly half a million boys and girls died from the disease in Africa alone.

Etleva Kadilli, Director of UNICEF's Supply Division, said the rollout sends a clear message to malaria vaccine developers to continue their work. "We hope this is just the beginning. Continued innovation is needed to develop new and next-generation vaccines to increase available supply, and enable a healthier vaccine market," she noted.

"This is a giant step forward in our collective efforts to save children's lives and reduce the burden of malaria as part of wider malaria prevention and control programmes."

Monsoon 'pulls' climate-changing chemicals into atmosphere



While the Asian monsoon brings rain that is vital for the agricultural economy of the vast region, it is also known to suck up into the upper atmosphere chemical pollutants that accelerate climate change.

Scientists are eagerly awaiting the results of a US-led international project that seeks to confirm earlier findings that pollutants generated by human activity get transported upwards by the monsoon system and impact atmospheric chemistry and, in turn, change climate.

Atmospheric chemistry is the study of the components of planetary atmospheres, which includes the troposphere, the stratosphere and other upper atmosphere layers.

Laura Pan is a principal investigator on the project and a scientist at the US National Centre for Atmospheric Research, which is leading the Asian Summer Monsoon Chemical and Climate Impact Project (ACCLIP) along with the National Aeronautics and Space Administration

(NASA). "In recent decades, satellites have revealed that the monsoon creates a distinct layer of chemicals about 16 km above the Earth, but we know very little about its composition and evolution," Pan said. "ACCLIP will give us an opportunity to sample what's there, but we know that whatever its composition, it connects to the climate.

The monitoring programme involves scientists from Korea, Japan, Italy and Germany, who will focus on the powerful circulation of the monsoon and sample the chemical pollutants that are pulled upwards into the higher atmosphere where they affect rainfall over Asia in different ways – leading to both droughts and floods.

- To learn more, Visit: <https://espo.nasa.gov/acclip/content/ACCLIP>

Global conservation organisation calls on states to join fight against plastic pollution

International conservation organisation, WWF has commended the move of 20 states to form The High Ambition Coalition to End Plastic Pollution, which will work to ensure the world's first ever plastic pollution treaty includes global rules and regulations for the production, design and disposal of plastic rather than a patchwork of national standards.

This, the Coalition hopes, will be key in securing the elimination of plastic pollution by 2040, just 16 years after the world is set to finalise the treaty in 2024.

WWF calls on remaining UN member states to join the Coalition as it has set ambitious performance indicators of success that can increase the world's chances of swiftly ending plastic pollution. These indicators include global measures such as developing global bans, restrictions and standards for plastics as well as setting global baselines and targets for sustainability throughout the lifecycle of plastics. The Coalition is calling

for a global ban on problematic plastics, which the WWF understands includes unnecessary single-use products.

Such rules and regulations will have an undeniable impact on companies that make virgin (rather than recycled) plastic, as well as those that market products that use disposable packaging. However, the widespread environmental damage that plastic pollution has caused and will continue to wreak globally requires a joint legally binding effort by all nations, common standards for plastic products and increased transparency for how plastic is made and used.

"Ending plastic pollution starts with global leaders acknowledging the destructive lifecycle of plastics. That's why the world agreed earlier this year that we need a global treaty to end plastic pollution. The next step is to get serious about banning problematic plastics such as unnecessary single-use plastics, establishing common standards for plastic production and

regulating greater transparency of the plastics value chain," said Marco Lambertini, Director General, WWF International.

"The High Ambition Coalition is yet again a demonstration of the determination across the world to seriously tackle the plague of plastic pollution. Now we need more states to join!"

WWF envisions a global plastic pollution treaty that, when finalised, would be comparable to or exceeds the accomplishments of the Montreal Protocol, an international treaty finalised in 1989 that successfully phased out the production of harmful substances responsible for ozone depletion. Hailed as the "single most successful international agreement", the Protocol succeeded due to the unprecedented level of cooperation and commitment shown by the international community.

NEW WRC REPORTS

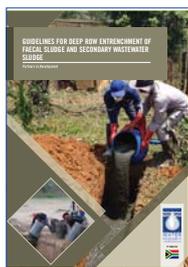


Water conservation / water demand management in the South African mining industry: A compendium of best practices and case studies

Water is a valuable resource and should be treated as such by the mining industry, especially in light of it being a shared resource within a catchment and security of supply will in the future be an important consideration. As a shared resource water can be a key part of providing support for the regional and community growth and development. This can only be done by the efficient use of water and consideration of water conservation / water demand management (WC/WDM) considerations. The Water Research Commission (WRC) commissioned a project to compile a compendium of best practices and technological innovations in the mining industry with regards to WC/WDM. Among others, the compendium presents some case studies of best practices and innovations in the mining industry.

WRC report no. TT 846/20

Web link: <https://bit.ly/3RbW79I>



Guidelines for deep row entrenchment of faecal sludge and secondary wastewater sludge

Deep row entrenchment of sludge can be used to safely dispose of untreated or partially treated faecal material while achieving several benefits, including improved soil fertility and increased agricultural productivity: enhanced growth of timber or other non-edible commercial crops; Food security: improved nutrient value of fruit grown by households and environmental rehabilitation: restoration or enhancement of ecosystems through remediation of poor or disrupted soils and stabilisation of carbon in the soil, thus reducing greenhouse gas emissions. These guidelines are intended to provide a practical framework for entrenchment of both biosolids (i.e. sludge from wastewater treatment works) and faecal sludge (i.e. sludge from on-site sanitation systems) which adequately protects the environment and public health while avoiding excessive measures which could prove prohibitive to the implementation of this method both in terms of costs and time.

WRC report no. TT 880/22 (Guidelines), 2899/1/22 (Main research report)

Web link for Guideline: <https://bit.ly/3KnIhQc>

Web link for Main report: <https://bit.ly/3Ct6cdR>

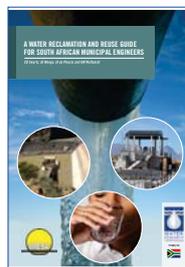
New models for the sustainable operation and maintenance of school sanitation facilities

The lack of functioning school sanitation infrastructure at thousands of South African schools can be attributed to twin causes, first, the backlog of new/replacement school toilets waiting to be built and, second, existing toilets are, in many

cases, not cleaned or maintained adequately and quickly fall into a state of disrepair and become completely unusable. A destructive cycle exists of investment in infrastructure delivery, followed by unsuccessful management of that infrastructure, leading quickly to failed sanitation, which then requires further investment to replace that same infrastructure (in many cases only recently built). Five different models for raising external revenue for sanitation operations and maintenance (O&M) were developed under this study and reviewed with stakeholders working in the sector, including the Department of Basic Education and representatives of private sector entities. The models were based on schools offering a product or service (for example advertising space and access to consumer data) in return for fees. The most promising model is based on a school hosting a free public Wi-Fi hotspot, with Wi-Fi access exposing the user to advertising and/or requiring them to complete a market research survey. A company would own the hotspot and pay for a capped free monthly data package. Additional data could be sold to the public with a small Page mark-up to raise revenue for O&M activities. Companies benefit from advertising with guaranteed views and from collecting consumer data from hard-to-reach markets. Schools benefit from a free WiFi allowance for their own use and from increase funding for O&M.

WRC report no. 3025/1/22

Web link: <https://bit.ly/3cn8TTx>



A water reclamation and reuse guide for South African municipal engineers

With South Africa being a water-scarce country, alternate sources of water supply and optimisation are critical. The reuse of water is one of the best solutions in optimising limited water resources. The reuse of water is widely practiced in both developed and underdeveloped countries. Utilising reclaimed water for urban uses like irrigation of parks, golf courses, sport fields, etc. is becoming increasingly critical. Even for certain industrial use, potable drinking water is not necessary for many industries, especially wet industries. To become a more water sustainable country, wastewater reuse is the way to go. The main aim of this project was to develop and compile a guide for municipal engineers, and disseminate knowledge on the planning and implementation of water reclamation and reuse schemes. The project to develop and compile the Guide was jointly funded by the WRC and the Institute of Municipal Engineering of Southern Africa (IMESA). This guide provides knowledge on state-of-the-art practices of all aspects of water reclamation and reuse systems, including process selection, decision-support, planning, design, implementation, and operation, maintenance and management of reuse projects and schemes. These guidelines should support sound decision-making and implementation.

WRC report no. TT 882/22

Web link: <https://bit.ly/3PQbza3>



Repurposing of sludge generated from the treatment of acid mine drainage

Acid mine drainage (AMD) continues to pose a threat to water quality in active and abandoned mining areas globally. Stages of mining development (e.g. active and abandoned) result in the exposure of sulphide minerals (pyrite, chalcopyrite, galena, etc.) to atmospheric oxygen and moisture, resulting in the oxidation of these

minerals (mainly pyrite) and subsequent release of sulphuric acid and potentially toxic trace elements, e.g. Pb, Cu, Zn, Ni and As among others. Chemical precipitation (neutralisation) is the commonly used technique in large-scale AMD treatment plants such as the high-density sludge (HDS) treatment plants where polymeric components are added for flocculation and to densify the sludge. While the treated water, which is usually discharged into streams, contains elevated SO_4^{2-} concentrations, most of the potentially toxic trace are removed through precipitation onto the sludge. The HDS process results in the generation of large volumes of sludge, which poses an environmental challenge in its disposal as it tends to act as a secondary source of pollution. The main aim of the project was to explore the possibility of repurposing sludge produced from AMD treatment.

WRC report no. TT 886/22

Web link: <https://bit.ly/3RdTO5H>



The detection of antibiotic resistance organisms and the development of a qPCR Protocol for the enumeration of ARGs in domestic greywater systems: A case study conducted in Cape Town

The use of greywater is often encouraged, especially during periods of drought. Greywater is highly variable in composition and often contains significant microbial contamination, including pathogenic

and resistant organisms. The risk of infection from pathogens and dissemination of resistant genes present in greywater is considered to be the most significant human health risk associated with greywater use. This project was aimed at detecting and enumerating antibiotic resistant genes (ARGs) in domestic greywater systems, and to assess whether these systems can support the growth and proliferation of resistant organisms. The specific objectives included determining whether domestic greywater is a source of antibiotic resistance genes and pathogenic organisms; enumeration of ARGs in various greywater sources using qPCR; water analysis to measure the levels of antibiotics present in greywater; and the development of novel FACS assays to screen for ARGs from environmental samples.

WRC report no. TT 891/22

Web link: <https://bit.ly/3Ao3CD3>

Water use and yield of selected indigenous fruit tree species in South Africa

Indigenous fruit tree (IFT) species are trees that grow in the wild, bear edible fruit, and they have their origin in South Africa. More than 20 types of IFTs have been identified in South Africa and these grow under a range of bio-climatic conditions across the country. So far, no detailed studies have determined the water use by indigenous fruit tree species in South Africa. This

information is essential for maintaining the country's biological diversity, meeting environmental flow requirements for sensitive riparian species, as stipulated in Section 36 of the country's Water Act (1998), and supporting efforts to identify alternative crops through IFT domestication and agroforestry programmes. The Water Research Commission therefore initiated and funded this five-year project to close these important information gaps. The goal was to provide critical information relating to the ecophysiology of various IFT species that have the potential for domestication and commercialisation. To ensure that data were collected on priority species, the project commenced with a stakeholder engagement involving participants from various sectors, e.g. NGOs, universities, nurseries, etc. The aim of this engagement was to identify at most five IFT species that have a high domestication and commercialisation potential out of the more than 20 species found in South Africa.

WRC report no. 2720/1/22

Web link: <https://bit.ly/3CALJnz>

Willingness to pay for re-engineered sanitation systems for households: A market trend analysis

Several re-engineered toilet facilities have been investigated and research has shown that these toilets or toilet systems such as urine diversion/separation or composting toilets can contribute immensely towards reducing water consumption. However, despite the extensive research and development and great exploration by government, private sector and civil society, the adoption rate by households remains minimal, with only 0.3% of households having adopted these re-engineered water-saving toilet systems while domestic water usage remains high. This study's aim was to solicit households' willingness to pay to change to using water saving sanitation technologies.

WRC report no. 3014/1/22

Web link: <https://bit.ly/3pM6HYV>

Nanotechnology innovations and commercial opportunities for water and sanitation management: A South African perspective

In this report, the current state-of-art of commercialisation of nanotechnology products, systems and processes for use in water and sanitation are evaluated and a clear viewpoint on further research and development (R&D), innovation and commercial opportunities is established. Each type of the nanotechnology-based product, system and process is evaluated to provide a clear viewpoint and future perspective on its commercial potential in South Africa. This report therefore offers an overview of nanotechnology applications in water and sanitation in South Africa. The report provides useful information for government policy makers, industry, funders, R&D and innovation centres and researchers who have interest in nanotechnology. The document further examines how nanotechnology developments, and the solutions they enable, can help address some of the problems related to water and sanitation. It consequently identifies nanotechnologies and their potential contribution to solve some of societies' most challenging problems including water scarcity and pollution, energy-related challenges, poor sanitation, and many others.

WRC report no. TT 888/22

Web link: <https://bit.ly/3TiryQU>

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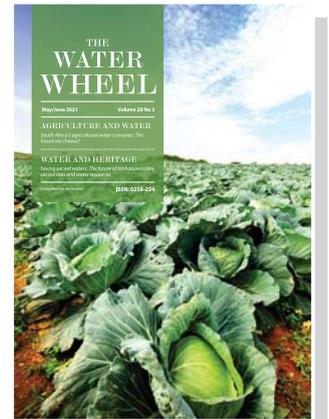
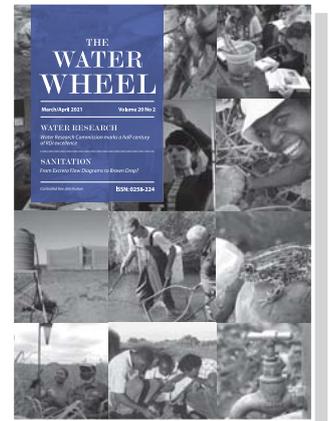
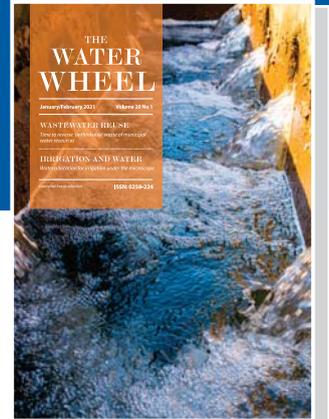
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An RDI Value Framework: A framework toward empowering research institutions to deliver demonstratable value to their stakeholders

Globally, water research organisations grapple with the same challenge, namely, that in some cases, research and innovation are conducted to produce new knowledge and innovations that are poorly, or not taken up by the water and sanitation sector or industries. The research team was tasked to address this challenge with the WRC as a case study. The study forms part of an initiative of the Global Water Coalition (GWRC), of which the WRC is a member. Among others, this study developed a water and sanitation RDI framework for the WRC based on core values and the insights from a literature review and stakeholder research.

WRC report no. 3028/1/22 (Volume 1: Review of theory and situational analysis) and 3028/1/22 (Volume 2: The Development of the Framework and Practical Tools)

Web link Volume 1: <https://bit.ly/3TfAzuc>

Web link Volume 2: <https://bit.ly/3R6OZef>

Rapid, efficient Ag-Au NPs interdigitated nano biosensor arrays for water quality analysis

Escherichia coli (*E. coli*) and *Salmonella typhimurium* are commonly known bacterial contaminants in water and food. The presence of these bacteria in consumables remains a public health concern due to their high virulence and pathogenicity; causing common infectious gastrointestinal tract diseases in humans with symptoms such as diarrhoea. Nanoparticles (NPs) have been shown as promising alternative chemicals for pathogen detection in biological samples. Thus, the project was aimed at combining the qualities of electro-analytical techniques and NPs in developing a sensor that is able to detect and quantify these bacteria in minutes. Electro-analytical techniques are preferred because they have unique advantages, such as high sensitivity, selectivity, low cost and are usually rapid.

WRC report no. 2889/1/22

Web link: <https://bit.ly/3TlBt8k>

Inactivation of waterborne pathogens using medicinal plants

Worldwide, pathogenic organisms are a serious public health concern because of their prevalence in the environment. They are shed in high numbers through the faeces of infected individuals and are transmitted via the faecal-oral route. This study investigates the prevalence of SARS-CoV-2 RNA and Noroviruses (I and II) in raw and treated wastewater from four wastewater treatment plants as well as four rivers within eThekweni, Durban, KwaZulu-Natal, South Africa. The study is a wastewater-based epidemiology investigation, an emerging area in the environmental field that aids in providing an early warning signs of waterborne enteric viruses within the environment. Their identification is critical for preventing infection and responding to an outbreak. The study further evaluates the phytochemical composition, antimicrobial and antioxidant activities of aqueous, methanolic and ethanolic extracts of *Ocimum gratissimum*, *Moringa oleifera*, *Azadirachta indica* (Neem) and sesame plants.

WRC report no. 3027/1/22

Web link: <https://bit.ly/3Ra35vp>



The role of emerging innovative wastewater sludge to energy technologies in transitioning to a circular economy in the water sector: A South African case study

Similar to other sectors, the benefits of transitioning to a circular economy (CE) in the water and wastewater (collectively water) sector have been demonstrated through both theoretical models and

practical experience in those areas where partial circularity has been achieved. However, full transition still faces significant challenges and barriers. As in most countries, the current water and wastewater business cycle in South Africa is predominantly based on the linear economy approach. To address current and future water security challenges in a sustainable manner, there is a need to rethink the South African water and sanitation value chain and accelerate transitioning to a CE. This project was funded by the WRC as part of the research into innovative water and wastewater management solutions that can assist WSAs successfully transition to a CE. The project evaluated the role of sludge to energy technologies in accelerating the adoption of CE principles by converting wastewater treatment plants (WWTPs) into resource recovery facilities at the centre of that transition.

WRC report no. TT 883/22

Web link: <https://bit.ly/3e0cHur>

Essential considerations for the implementation of membrane distillation crystallisation in the treatment of hypersaline brines

The generation of brine waste streams emanating from water treatment processes such as reverse osmosis (RO), multi-stage flash (MSF) and multi-effect distillation (MED) are a major concern for the environment. Brine waste-handling and disposal methodologies are largely contingent on the geography in the vicinity of the plant generating the brine and include discharge into oceans, inland water bodies such as rivers, surface dams and sewers, as well as deep-well injection and brine storage in waste evaporation ponds. Membrane Distillation Crystallisation (MDC) offers a sustainable wastewater treatment option for saline and hypersaline effluent streams. The objectives of this study were to identify quintessential considerations, mainly related to key membrane characteristics and performance criteria, when assessing the viability of implementing and selecting MDC over alternative technologies.

WRC report no. 2763/1/22

Web link: <https://bit.ly/3pMNSok>

To download any of these reports click on the web link provided, Visit: www.wrc.org.za or Email: orders@wrc.org.za