



Fluid Thoughts



WRC CEO, Dhesigen Naidoo

Water and sanitation industrialisation – the promise of IPAP 2017

South Africa as a country, and southern Africa as a region, are emerging from the world's highest impact el Niño event in twenty years.

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At home, we have been through one of the worst droughts in recent history, and for the Western Cape, the worst since 1904. We will require three consecutive years of reasonable rainfall to effect a full recovery. In addition, South Africa's water balance continues to be at risk, with most models predicting a supply deficit of around 1 billion cubic metres by 2035 if our current high demand patterns continue unabated in spite of a supply increase of more than 16% on current and planned augmentation projects. This combined with the fact, that even in non-drought years, South Africa ranks 148 out of 180 countries with respect to water availability per capita, offers a very sobering picture.

Futureproofing South Africa's water security is a multidimensional task. This includes a sound demand management and water conservation strategy running concomitantly and interactively with a supply diversification strategy. The National Water and Sanitation Masterplan, currently in development, will provide the blueprint for these. But, a very important risk in the water and sanitation landscape is the absence at scale of a vibrant water private sector in South Africa. Because of this we are moving toward and increasingly negative technology balance of payments in this domain. This is not restricted to the commodities domain, where already, the market in sanitaryware, small-scale pipes, fittings and pumps relies quite heavily on imports. This extends further into provision of bulk services in water, wastewater and sanitation. A scaled-up private sector, beyond consulting services, will help to stimulate not only a move to domestic self-sufficiency. There is the huge promise of an export market for South African goods and services as the global demand rapidly increases worldwide.

An important stimulus in this direction has come in the form of the Industrial Policy and Action Plan (IPAP) 2017. The plan has, for the first time this year, a water and sanitation focus. Minister of Trade and Industry, Rob Davies, in his launch of the IPAP, pulled

out water and sanitation as a point of special focus, recognising not only the opportunity for adding to South Africa's industrial base an important sector, but since water security is in the top five of most global risk registers, the increased local water security on the back of new private sector development helps mitigate the water risk for the entire industrial landscape. The key action programmes will be the development and roll-out of the Water Industrial Development Plan, the acceleration of the Innovative Desalination and Water Manufacturing Programme, the Next Generation Sanitation Cluster Development Programme, and, the Modular and Advanced Wastewater Technologies Manufacturing and Capability Build Programme. All run in the 2017-2020 timeframe.

One of the big investment issues is expected to be that of scale. The South African market, while significant, may not be large enough to encourage investments in new manufacturing lines for non-consumable commodities. A quick glance at the African and further global opportunity shows the opportunity vividly. The 2013 UN figures indicates a global backlog of 780 million in clean water access and an incredible 2.5 billion without improved sanitation. This number increases every year as the world contemplates the strategies and investments required to meet the SDG targets of universal access to clean water and safe, improved sanitation by 2030. Further, the growth trends in Africa indicate that the water services needs will more than double in that same timeframe. The opportunities are vast. The IPAP prioritisation of water and sanitation industrialisation comes with industrial development support. It is time to unlock our individual and collective entrepreneurial spirit and build a vibrant and successful water, wastewater and sanitation private sector in South Africa.



Minister of Trade and Industry, Rob Davies, pulled out water and sanitation as a point of special focus in his launch of the IPAP earlier this

WRC SYMPOSIUM

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Water Diary

Catchment management

October 9-11

The International Water Association in association with WISA is hosting a specialist conference on watershed and river basin management at Skukuza camp, Kruger National Park.

Visit: www.rbm2017.com

Groundwater

October 14-18

The Groundwater Division of the Geological Society of South Africa will be hosting its Biennial Conference at Spier Hotel, outside Stellenbosch with the theme 'Change, challenge, opportunity'.

Contact: Deidre Cloete; Email: deidre@iafrica.com;

Visit: www.gwd.org.za

International water

November 13-14

The International Water Association (IWA) Development Congress & Exhibition will be held in Buenos Aires, Argentina.

Visit: <http://www.iwa-network.org/news/save-the-date-iwa-water-and-development-congress-exhibition-2017/> for more information.

Service delivery

November 26-29

The Water Research Commission, together with the Water Institute of Southern Africa is hosting the Second International Peri Urban conference, to be held at the Century City Conference Centre, in Cape Town. The theme of this conference is 'Shaping development and sustainability in peri-urban environments'.

Visit: www.wisa.org.za

Young water professionals

December 10-13

The eight International Young Water Professionals conference will take place in Cape Town under the theme 'Building leaders and making impact'. The conference brings together 450 water, environment and related young

professionals from across the globe and showcases how the young water professionals are making impact across the sector as well as offering capacity development and training sessions to further skill our future water leaders to tackle the demands from the water sector.

Visit: <http://iwaywpcconference.org/>

Water loss

May 7-9, 2018

The IWA Water Loss Specialist Group, together with the City of Cape Town, will host the biennial Water Loss Conference and Exhibit at the Century City Conference Centre in Cape Town. The conference will be one of the world's largest water loss conferences and is expected to attract over 500 participants from more than 50 countries.

Visit: <https://www.eiseverywhere.com/ehome/251759&internal=1>



Departmental budget vote focuses on unserved communities



Water and Sanitation Minister, Nomvula Mokonyane, says government will go all out to ensure that previously unserved communities get access to water and decent sanitation, whilst ensuring water security for all South Africans.

The Minister said this during her department's Budget Vote Speech in Parliament in Cape Town in May. She added that to enhance water and service delivery to the nation, the empowerment of designated groups in society will be prioritised.

"The 2017 Budget Vote is, amongst others, about serving the unserved, creating new industries in the water sector, promoting the participation of women, youth and blacks within the sector, and providing water and sanitation services as catalysts to economic development and growth opportunities in our country."

The Department of Water and Sanitation's R15.1 billion budget for the 2017/18 financial year will, amongst others, ensure water security through building, maintaining and refurbishing water and sanitation infrastructure.

Some of the main infrastructure projects for this financial year include the Mzimvubu Water Scheme, Phase II of the Lesotho Highlands Water Project and the Vaal Gamagara Water Project. In order to increase water supply, the following augmentation schemes will be

undertaken: the continuation of raising the Clanwilliam Dam Wall, raising of Tzaneen Dam, Lower Thukela Regional Bulk Water Scheme and Hoxane Water Treatment Works, among others.

In addition to the bulk water-supply projects, the department plans to eradicate some 52 300 buckets in formal settlements. This will be undertaken in partnership with the Department of Cooperative Governance and Traditional Affairs (COGTA) and the Water Research Commission. "The restoration of the dignity of our people is a commitment by this government. We can now confirm that the following provinces no longer have buckets in the formal areas namely Mpumalanga, Gauteng, KwaZulu-Natal, Limpopo and the Northern Cape," noted Minister Mokonyane.

Source: SAnews.gov.za

Limpopo learners to represent South Africa at international youth and water competition

Three learners from the Lebeko School in Phalaborwa, Limpopo, will represent South Africa at the Stocholm, Junior Water Prize Competition to be held in Sweden in August.

The learners, Kutalo Mmola, Thma Mokgotho and Wayne Luka, all in Grade 11, beat the South African finalists with their project titled 'Water wastage – a thing of the past'.

Apart from the prestigious all-expenses-paid trip to Sweden, the learners also won laptops and bursaries from the Department of Water and Sanitation

(DWS) to study any water-related course at a university of their choice.

The South African Youth Water Prize competition is a DWS initiative aimed at encouraging development of new technologies that can be used to solve challenges in the water sector and to urge young people to consider careers in the water sector.

Each year, thousands of participants in over 30 countries from all around the globe join national competitions in hopes of earning the chance to represent their nation at the international final

held during the World Water Week in Stockholm.

The national and international competitions are open to young people between the ages of 15 and 20 who have conducted water-related projects of proven environmental, scientific, social or technological significance. The projects range from local or regional to national or global topics.

The winner of the Stockholm Junior Water Prize receives a USD \$15,000 award, a blue crystal prize sculpture, a diploma as well as the stay in Stockholm.

Scientists assess invasive alien plant control in Kruger



Along with urban and agricultural encroachment and pollution mitigation, managing invasive alien species is a key intervention needed to protect biodiversity.

In order to find out whether the historical measures undertaken at the Kruger National Park in South Africa have been effective and optimised, researchers led by Prof Brian Wilgen of Stellenbosch University assessed the invasive alien plant control operations in the protected area over several decades. Their findings and recommendations are published in the open access journal *Neobiota*.

While the first invasive alien plants in the national park, which stretches over two million hectares, were recorded in 1937, it was not until the mid-1950s that attempts at controlling them began. By the end of the century, the invasive alien plant control programme had expanded

substantially.

However, the scientists found out that despite several invasive alien species having been effectively managed, the overall control effort was characterised by several shortcomings, including inadequate goal-setting and planning, the lack of a sound basis on which to apportion funds, and the absence of any monitoring of control effectiveness.

Furthermore, the researchers report that over a third (40%) of the funding has been spent on species of lower concern. Some of these funds have been allocated so that additional employment could be created on-site, or because of a lack of clear evidence about the impact of certain species.

As a result of their observations, the team recommends three major strategies when navigating invasive alien control

operations, as set out in their article.

Firstly, a thorough assessment of the impact of individual species needs to be carried out prior to allocating substantial funds. On the other hand, in case of a new invasion, management needs to be undertaken immediately before any further spread of the population and the subsequent rise in control costs.

Monitoring and assessments have to be performed regularly in order to identify any new threats that could potentially be in need of prioritisation over others.

Secondly, the scientists suggest that the criteria used to assign priorities to invasive alien species should be formally documented, so that management can focus on defensible priorities. They propose using a framework employing mechanisms of assessments used in the International Union for Conservation of Nature's Global Invasive Species Database.

The authors also point out that re-allocating current funds to species of greater concern is needed for species that cannot be managed via less expensive solutions, such as biological control. Taking care of alien plant populations living outside the park, but in close proximity, is also crucial for the prevention of re-invasions of already cleared areas.

To access the original article, Visit: <http://neobiota.pensoft.net/articles.php?id=12391>

Researchers test nifty way to save water in informal settlement

A partnership between the University of Cape Town, Stellenbosch Municipality and the Western Cape government is turning an abandoned water treatment facility in Franschoek into a centre for water reuse research and innovation.

The goal of the Water Hub, as the project has been named, is to demonstrate how effectively natural water systems can clean stormwater runoff.

"One of the things that we have done badly across all of Africa... is to deal with

the surface runoff," said Dr Kevin Winter of the University of Cape Town and Director of the Water Hub. In South Africa, in particular, these processes are especially lacking in informal settlements, according to Dr Winter. "While these settlements have basic services of public tap stands, communal toilets and laundry stations, the drainage infrastructure is limited, often dysfunctional."

At the Water Hub, Dr Winter plans to treat water runoff from Langrug informal settlement, making its way into the

Stiebeuel River, which runs through the site and into the Berg River system. Because of its positioning and Langrug's poor drainage infrastructure, Stiebeuel is laced with rubbish, greywater and sewage. "It is quite a significant river system, and we are now going to slowly start to rehabilitate," noted Dr Winter.

The project is viewed as a pilot for larger operations aimed at both conserving water and cleaning it naturally.

Source: www.groundup.org.za



Global

Study highlights benefits and costs of action and inaction on drought

Significant progress has been made over the past decade in improving understanding of droughts and their impacts. However, several questions remain, including the real costs to a country's economy, and whether the price of preparing for droughts is worth it. A new study released by the World Meteorological Organisation (WMO) and Global Water Partnership seeks to answer these questions.

The working paper reviewed an extensive range of literature on the benefits of action and costs of inaction of drought mitigation and preparedness. It was prepared for the Integrated Drought Management Programme as part of efforts to support the development of more proactive drought policies and better predictive mechanisms.

"Unlike floods and tropical cyclones, drought is a slow onset disaster. But its impact is just as devastating in terms of human suffering and loss of

livelihoods. We need to move away from the traditional piecemeal, crisis-driven response and adopt modern tools, in the form of integrated drought management policies, to increase climate resilience," noted Robert Stefanski, WMO's Head of the Integrated Drought Management Programme Technical Support Unit.

The paper reviews economic drought impact assessments and describes the main obstacles and opportunities facing the transition from crisis management to risk management. Presently, many available estimates of drought costs are partial and difficult to compare. Too little is known about the costs of indirect and longer-term drought impacts because of lack of data.

The countries that are most vulnerable to gross domestic product losses due to droughts are in eastern and southern Africa, South America, and South and Southeast Asia, according to one study cited in the working paper. It features

a case study on Brazil, where droughts, especially in the northeast, are expected to increase in frequency and intensity as a result of global climate change.

Drought preparedness and risk mitigation helps lower the eventual drought relief costs. For example, the US Federal Emergency Management Agency estimated that the US would save at least two dollars on future disaster costs from every dollar spent on drought risk mitigation, the study shows.

"Given the scale of the issue and the likely drought trends under climate change, it is essential to have a well-defined strategy for mitigating the impacts of drought and enhancing drought preparedness, conclude the paper's authors, Nicolai Gerber and Alisher Mirzabaev.

To access the working paper, Visit: http://www.droughtmanagement.info/literature/IDMP_BACI_WP.PDF

Soil pollution comes under scrutiny

Soil pollution, due mostly to human activities that leave excess chemicals in soils used to grow food, took centre stage at the 5th Global Soil Partnership (GSP) Plenary Assembly held at FAO headquarters in June.

Excess nitrogen and trace metals such as arsenic, cadmium, lead and mercury can impair plant metabolism and cut crop productivity, ultimately putting pressure on arable land. When they enter the food chain, such pollutants also pose risks to food security, water resources, rural livelihoods and human health. It is estimated that around one third of the world's soils are degraded, due mostly to unsustainable soil management practices. Tens of billions of tonnes of soil are lost

to farming each year. One cause is soil pollution, which in some countries affects as much as a fifth of all croplands.

"Soil pollution is an emerging problem, but, because it comes in so many forms, the only way we can reduce knowledge gaps and promote sustainable soil management is to intensify global collaboration and build reliable scientific evidence," said Ronald Vargas, a FAO soils officer.

"Combating soil pollution and pursuing sustainable soil management is essential for addressing climate change," added Rattan Lal, President of the International Union of Soil Sciences, in his keynote address to the Plenary Assembly. "Tackling

human caused problems through sustainable practices will mean more change will happen between now and 2050 than during the 12 millennia since the onset of agriculture."

The Plenary Assembly endorsed three new initiatives aimed at facilitating information exchange: the Global Soil Information System; the Global Network of Soil Laboratories; set up to coordinate and standardise measurement across countries; and the International Network of Black Soils, launched to increase knowledge about the world's most fertile agricultural soils, which are also known for their high carbon content.

Biodegradable microbeads aimed at reducing water pollution



Scientists and engineers from the University of Bath have developed biodegradable cellulose microbeads from a sustainable source that could potentially replace harmful plastic ones that contribute to pollution.

Microbeads are little spheres of plastic less than 0.5 mm in size that are added to personal care and cleaning products, including cosmetics, sunscreens and fillers to give them a smooth texture. However, they are too small to be removed by sewage filtration systems and so end up in rivers and oceans, where they are

ingested by birds, fish and other marine life.

It is estimated that a single shower can result in 100 000 plastic particles entering the ocean, contributing to the eight million tonnes of plastic that enter the ocean every year. It is feared that the particles could enter the food chain, harming wildlife but also potentially ending up in our food.

Now a research team from the Bath University's Centre for Sustainable Chemical Technologie, has developed a way of producing a biodegradable renewable alternative to plastic microbeads in a scalable, continuous manufacturing process.

The beads are made from cellulose, which is the material that forms the tough fibres found in wood and plants. In this process the scientists dissolve the cellulose to reform it into tiny beads by forming droplets that are then 'set'. These microbeads are robust enough

to remain stable in a bodywash, but can be broken down by organisms at the sewage treatment works, or even in the environment in a short period of time. The researchers anticipate that they could use cellulose from a range of 'waste' sources, including from the paper-making industry, as a renewable source of raw material.

Dr Janet Scott of the centre said: "Microbeads used in the cosmetics industry are often made of polyethylene or polypropylene, which are cheap and easy to make. However, these polymers are derived from oil and they take hundreds of years to break down in the environment.

"We have developed a way of making microbeads from cellulose, which is not only from a renewable source, but also biodegrades into harmless sugars. We hope in the future these could be used as a direct replacement for plastic microbeads."

You don't need hot water to wash your hands



Water temperature doesn't make any difference when it comes to removing harmful bacteria from your hands, a new study suggests.

"People need to feel comfortable when they are washing their hands, but as far as effectiveness, this study shows that the temperature of the water used doesn't matter," says Prof Donald Schaffner, extension specialist in food science at Rutgers University-New Brunswick.

For the study, published in the *Journal of Food Protection*, high levels of harmless bacteria were put on the hands of 21 participants multiple times over a six-month period before they were asked to wash their hands in water of varying degrees and various volumes of soap.

"This study may have significant implications towards water energy, since using cold water saves more energy than

warm or hot water," Prof Schaffner explains. "Also, we learned that even washing for 10 seconds significantly removed bacteria from the hands."

While the study indicates that there is no difference between the amount of soap used, more work needs to be done to understand exactly how much and what type of soap is needed to remove harmful microbes from hands, says co-author Jim Arbogast, Vice-President of Hygiene Sciences and Public Health Advancements for GOJO.

"This is important because the biggest public health need is to increase hand washing or hand sanitising by the public before eating, preparing food, and after using the restroom."

To access the original study, Visit: <https://www.ncbi.nlm.nih.gov/pubmed/28504614>

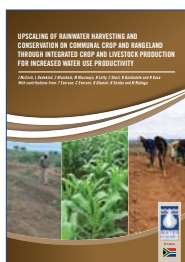


New WRC reports

Evaluation of the risks associated with the use of rooftop rainwater harvesting and groundwater for domestic use and livestock watering

South Africa has a mixture of developed and developing regions, with at least 9.7 million (20%) of the people that do not have access to adequate quality water supplies. Rooftop rainwater harvesting (RRWH) has recently been considered to be one of the most promising alternatives for supplying freshwater in the face of increasing water scarcity and escalating demand. Although rainwater harvesting is being practised in a number of areas, the technology is not fully utilised in rural communities. Although the general public perception is that RRWH is safe to drink, the presence of potential pathogens, such as E.coli, Salmonella, Legionella, and Giardia among others, have been reported in these water sources. The overall aim of this project was to evaluate the risks associated with the use of RRWH for domestic use and in homestead food gardens, and groundwater for potable use and livestock watering. The final product has been published as two volumes. Volume 1 deals with microbial quality of rooftop rainwater while Volume 2 considers the chemical quality of groundwater for potable use and livestock watering.

Report No. 2175/1/16 and 2175/2/16

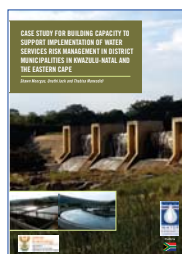


Upscaling of rainwater harvesting and conservation on communal crop and rangeland through integrated crop and livestock production for increased water use productivity

Rainfed agriculture dominates world food production and thus rainwater harvesting and conservation (RWH&C) has the potential to provide significant

social, economic and environmental benefits. This is particularly relevant in sub-Saharan Africa where 93% of farmed land is rainfed. Micro-catchment RWH&C is a subset of rainwater harvesting techniques and includes the systems and practices which concentrate rainwater from a larger area to a smaller area within a specific field and stores this runoff in the soil profile. Water conservation systems that enhance the productive use of harvested rainwater are considered important complementary practices that should be applied when in-field RWH&C systems are established. It is in this context that this research project was conducted. The overall objective of this project was to review and demonstrate rainwater harvesting and conservation methods for integrated crop and livestock production at field scale for increased crop and livestock water use productivity at selected sites in communal areas of South Africa.

Report No. TT 712/16

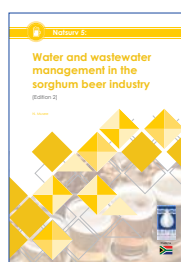


Case study for building capacity to support implementation of water services risk management in district municipalities in KwaZulu-Natal and the Eastern Cape

The most effective means of consistently ensuring functional and effective water/wastewater system infrastructure is through the use of a comprehensive risk assessment and management approach that

encompasses all components of the water/wastewater system. Fundamental to successful execution of such activities is proper planning. Water safety planning and wastewater risk abatement plans form integral parts of the Department of Water and Sanitation's Blue Drop and Green Drop programmes respectively. In previous projects, the Water Research Commission (WRC) and its research partners developed guidelines and Web-based tools for both these aspects of water services provision. In this follow-up project, the WRC, in collaboration with the Department of Science and Technology, assisted municipalities in the Eastern Cape and KwaZulu-Natal to build capacity around and implement water safety planning and wastewater risk abatement plans.

Report No. TT 693/16



Natsurv 5 – Water and wastewater management in the sorghum beer industry (Edition 2)

This guideline is aimed at updating the first edition of National Survey 5 of 1989 on aspects related to resources management in the traditional sorghum beer industry. The guideline outlines industrial operations, degree to which various resources

have been managed based on a set of indicators per unit of production (e.g. specific water intake, specific effluent, etc.), best practices adopted or currently under implementation and, finally, an outline of recommendations on probable improvements that can further enhance resources utilisation in the sorghum beer industry. A key changes observed in this industry is its significant decline both in size and volume of beer produced annually since the first Natsurv was published.

Report No. TT 692/16

To order any of these reports contact Publications at Tel: (012) 761 9300; email: orders@wrc.org.za or visit www.wrc.org.za to download a free copy.

Specialist watershed conference coming to South Africa



Skukuza, in the Kruger National Park, is gearing up to host the 14th International Water Association (IWA) Specialist Conference on Watershed and River Basin Management, to be held on 9 to 11 October.

The specialist conference is intended to present and discuss the latest developments, strategies, techniques and applications of international best practices in integrated watershed and basin management. This conference aims to be a 'think tank' and discussion platform that provides a step forward in terms of awareness, innovative models, and best practices in water sustainability and the allocation of a severely limited resource. Technical sessions will provide a forum for presentations on the challenges of sustainable water management on all scales, from local to global, in the face of drought, flood, changing climate, and the changing human landscape. Conference panels, poster sessions, lunches and technical events will allow for the exchange of ideas between nations, cultures and disciplines.

“these conferences attract a wide range of international scholars, which offers South African delegates the opportunity learn from global best practice”

The theme of the conference, 'Living Catchments', emphasises not only the human element of watershed and river basin management but also the dynamism and complexity as a melting pot of various anthropogenic interests (industry, residential, environmental, institutional, recreational etc.) and their interdependencies with the interests of the natural world. From mountains to prairies, from floodplains to oceans coasts, from cities to towns, villages, ranches, and farms, everyone lives in and benefits from a catchment and, in turn, impacts and is impacted by its water quality and water quantity.

The conference boasts world-renowned keynote speakers, such as Prof Aaron Wolf (transboundary water conflict and cooperation specialist and professor of geography at Oregon State University), as well as Dr Brian D'Arcy (biologist and catchment planning specialist).

The conference covers a wide range of themes related to watershed and river basin management, within the ambit of a catchment lens (holistic, transdisciplinary, multi-sector, multi-partner, multiple scales, integrated etc.). Conference topics include climate change, achieving the Sustainable Development Goals (SDGs), water governance, improving water resource management (with a focus on water quality, eutrophication, hydrological assessments, groundwater, and floodplain management, advancing participatory interaction in these processes. Furthermore, these themes should consider the latest trends in negotiating tensions in basin management, including mining, underground gas extraction, the urban/rural interface, as well as the water-energy-food nexus.

The international conference offers various opportunities to South African scientists, noted Dr Inga Jacobs-Mata, conference organiser and Research Group Leader: Integrated Water Solutions at the CSIR – Natural Resources and the Environment. “IWA Specialist Group conferences offers an opportunity to profile South African scientists and practitioners globally and within the IWA network. In addition, these conferences attract a wide range of international scholars, which offers South African delegates the opportunity learn from global best practice as well as to teach others about what we are doing well in South Africa.”

As such, delegates can expect to:

- Learn about the latest developments in integrated watershed and river basin management
- Explore the different approaches for water resource management under accentuated climate variability from various international and multi-jurisdictional perspectives
- Develop feasible solutions for river basin management of transboundary river basins
- Learn and share experiences with international case studies
- Identify international collaborative research opportunities and technical applied projects in watershed and river basin management

“We hope to provide a platform for international collaborative partnerships on watershed and river basin management to be developed and strengthened,” noted Dr Jacobs-Mata.

To find out more about the conference, Visit: www.rbm2017.com