

FLUID THOUGHTS

Carpe Diem – Time to design a new water future



WRC CEO, Dhesigen Naidoo

I write this from the 2017 International Water Association (IWA) Water and Development Congress in Argentina, where 2 000 delegates from 30 countries have gathered. There is consensus that globally, water security is declining. This is backed up by barometers such as the Global Risk Register compiled annually by the World Economic Forum (WEF). Water crisis has consistently been one of the top five risks to the global economy in recent times.

This will come as no surprise to South Africans as we have belly-crawled under the barbed wire that was the worst *El Niño* event in more than twenty years. Our recovery has been at best sluggish, on the back of miserly post-drought rainfall patterns, so much so that at least one major metropolitan area – the City of Cape Town – has designated a Day Zero: the dreaded signal for extreme water rationing as the city reaches its highest level of water stress. While the City of Cape Town represents an extreme, many South African cities and towns are one poor rainfall season away from this scenario.

Is this the New Normal? There is a sufficiency of research, including an examination of the past hundred years of rainfall data, to support the theory that Southern Africa's foreseeable future will be characterised by lower than average precipitation with longer drought episodes. Even more worrying is the change in the rainfall modality to shorter more intense episodes prone to flooding events. This not only heralds the continued water availability conundrum, but is also a severe threat to the existing infrastructure platforms, like roads. Our transport infrastructure was designed for a very different rainfall pattern within a season. Potholes are not only a function of poor maintenance, but also of roads designed to manage and tolerate different, more moderate, rainfall episodes.

Two critical questions emerge: Firstly, are we trying to fix a 21st century problem with 20th century technology and 19th century operating rules? We continue to obsess about surface freshwater solutions when we have available to us some of the

best technologies to treat wastewater and saline waters (either seawater or brackish and polluted inland sources) as 'new' water sources – or, as the Singaporeans call them – 'new taps'. We have in South Africa remarkable science that enables safe, hygienic sanitation using less than half a litre of water per flush, less than a twentieth of the current standard. This enables up to a 30% water saving for every household in the country.

The second question beckons: when are we going to act decisively? This is the WeiJi moment. We are explicitly clear regarding the Wei, or danger associated with this New Normal. We need to spend more effort on the strategy to realise the Ji or opportunity associated with crisis. We have the possibility of a turning point in our water fortunes. We have a chance to completely redefine the water management paradigm, and in a manner that fundamentally and simultaneously improves energy and food security as well, as we engage the water–energy–food nexus.

We have the chance to radically improve our trade balance stimulated by a switch in our technology balance of payments. This can be achieved by the industrialisation of water and sanitation in South Africa as envisioned in the 2017 Industrial Policy Action Plan (IPAP). We are well positioned to develop a significant water private sector that has the potential to set up a manufacturing base and supply chain producing goods and services to empower water and sanitation services in the New Normal for the global market – solutions that can enable a 100% assurance of supply of quality water and universal dignified sanitation in a manner that creates wealth and sustainable livelihoods, and enhances inclusive economic growth.

WATER DIARY

Water business

April 15-17

Business meetings are at the heart of the Global Water Summit, happening in Paris, France. Every year, over 600 top executives come together to determine water's key role in sustainable economic growth and to meet with potential partners, suppliers and clients.

Visit: www.watermeetsmoney.com

Water loss

May 7-9

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>

Aquatic science

June 24-28

The Southern African Society of Aquatic Scientists will be holding its 2018 congress in Cape St Francis Bay resort, in the Eastern Cape. The theme for the congress is 'Aquatic ecology in the Anthropocene'. Enquiries: Petrie Vogel (conference organiser); Tel: (12) 346-0687; Email: admin@savetcon.co.za;

Visit: www.savetcon.co.za

Water resource management

June 24-27 2018

The Water Institute of Southern Africa (WISA) is hosting its biennial conference at the Cape Town International Convention Centre.

Visit: www.wisa2018.org.za

World water week

August 26-31

World Water Week is the annual focal point for the globe's water issues. It is organised by the Stockholm International Water Institute. The theme is 'Water, ecosystems and human development'.

Visit: <http://www.worldwaterweek.org/>

Beverage firm wins supplier environmental awards



Coca-Cola Beverages South Africa was awarded top honours at the Massmart Supplier Environmental Awards.

Now in its fourth year, the awards honour Massmart's local suppliers for their commitment and exceptional performance in the implementation of environmentally-sustainable business practices. "As retailers our aim is for customers to be able to walk into our stores and trust that due consideration has gone into ensuring that the products on our shelves are produced sustainably

and responsibly-sourced," noted Group Sustainability Manager, Alex Haw.

At the awards ceremony the retailer's top performing suppliers were recognised for their commitment to sustainable supply-chain management.

Coca-Cola Beverages South Africa impressed by working with Mpact to construct Africa's first company approved food grade rPET (recycled polyethylene terephthalate) recycling plant. The plant has the capacity to recycle 21 000 t

of PET per annum. The company also implemented a schools plastics recycling programme, which has grown from 68 t per year in 2011 to more than 1 150 t in 2017.

For the first time, Woodlands Dairy and Samsung also received special recognition at the ceremony. Woodlands Dairy was honoured for being the first company in the dairy industry to implement an integrated wastewater treatment plant and biogas boiler. This has enabled them to reduce reliance on municipal water by 45%, and has contributed to a 78% drop in greenhouse gas emissions.

Samsung was recognised for their industry-leading contribution to e-waste recycling through their support of South Africa's largest and longest running post-consumer e-waste takeback programme.

Concluded Haw: "The suppliers recognised have been outstanding in their efforts to incorporate sustainable practices in the way that they run their businesses."

NEWS

Policy to guide provision of sanitary products

The question of how sanitary products will be funded will be guided by a recently-developed policy framework document. This is according to National Treasury.

Speaking in Parliament late last year, Yanga Mputa, Chief Director at the National Treasury's Tax Policy Unit, said this when briefing the Multi-party Women's Caucus. The National Treasury appeared before the caucus amid mounting calls to exempt sanitary towels from value-added tax (VAT). This is due to concerns that a tax on sanitary products is unfair, it impacts negatively on the cost, which makes them unaffordable to women, especially those from poor backgrounds. The policy framework, aimed at informing

government's response to the calls, was opened to public comment in October.

The National Treasury is part of an inter-departmental task team, led by the Department of Women, which is tasked with developing a policy response to the issue.

Contrary to public demand, National Treasury has indicated that it would rather support the provision of sanitary products through budget reprioritisation. Dr Kay Brow, Chief Director from the National Treasury's Budget Planning unit, said her department supported initiatives aimed at providing free sanitary products to school girls.

"There are already allocations specifically from provincial budgets that are going towards the provision of sanitary products."

It was reported at the same meeting that Gauteng has allocated R58 million towards sanitary and other hygiene products, while KwaZulu-Natal has allocated R20 million. The Free State, North West and Eastern Cape have contributed R6 million, R2.2 million and R1.2 million, respectively.

Source: SAnews

Programme invests in consulting engineering skills



A lack of investment in the development of skills for consulting engineering human resources over the years has resulted in a skewed and unbalanced scenario over the years. This is according to Consulting Engineers South Africa (CESA).

"The immediate challenge in the industry is the constraint faced by under-resourced

middle management engineers in providing adequate experiential training of upcoming young engineers," the organisation said in a statement. In answer to this challenge, the CESA Business Consulting Engineering (BCE) programme, an annual development programme, has been established. Presented by the organisation's School of

Consulting Engineering, the programme equips engineering staff in the consulting environment with the non-technical skills which form an integral part of the work of a consulting engineer, but which are not part of a normal tertiary engineering education programme.

Among others, students learn about the consulting engineering environment, business management, project finance, legal and contractual matters while getting exposure to aspects of interpersonal skills development, which enhance their ability to work in teams and become future leaders in the industry.

The 2018 course will run from February to December, and a maximum of 25 students are accommodated. Visit: www.cesa.co.za/node/142 to find out more.

Experts meet over SA's strategic surface and groundwater source areas



Protection of South Africa's most importance water source areas is critical for a water-safe future, and the reason why the CSIR and partners have embarked on a research project supported by the Water Research Commission (WRC).

Towards the end of last year, CSIR experts met with their private sector counterparts, as well as senior planners and policy-

makers to finalise the delineation of South Africa's national strategic surface and groundwater source areas.

Strategic water source areas supply a disproportionately high amount of the country's water in relation to their size. In the first phase of the research, scientists used rainfall data to map the areas that produced most of the country's surface water – the water in streams, rivers and wetlands.

"The surface-water strategic water source areas occupy just 8% of South Africa's land area, yet provide 50% of our water. This water supports at least 50% of the population, 64% of the economy and about 70% of the irrigated agriculture," noted Dr David le Maitre, an ecologist and hydrologist at the CSIR.

"In the second phase of the project, we looked at mapping groundwater sources such as aquifers and boreholes. These data sets will now be included in an integrated and updated report that is being finalised."

Threats to these catchments include contamination and damage through mining, agriculture and urban development. Researchers discussed the importance of including all South Africans in their management and protection. Therefore the project will produce recommendations for water and land management for government officials, industries and land owners located in these areas.

The final technical report, guidelines and information will be published in 2018.

Finance industry joins mission to close SA's water infrastructure gap



Leading water, infrastructure and financial sector stakeholders met in Johannesburg towards the end of last year for in-depth talks on funding models to improve South Africa's water security.

The third Annual Water Stewardship summit kicked off with calls for the financial sector to look introspectively

at ways to support efforts to close the water services infrastructure funding gap amounting to around R30-billion per annum; in support of the coming National Water and Sanitation Master Plan.

The Department of Water and Sanitation (DWS) is currently in the process of drafting the country's new National Water

and Sanitation Master Plan, which is expected to be completed later this year. Outlining the goals of the plan, Trevor Balzer, DWS Deputy Director-General: Strategic and Emergency Projects, echoed sentiments which called on big businesses to assist in funding sustainable development projects. "This... is a critical time in South Africa's water and sanitation planning. We expect to incorporate the feedback from the financial community and other stakeholders to create a plan that effectively addresses the country's needs."

The summit, organised by the Strategic Water Partners Network, the National Business Initiative and the Royal Danish Embassy, provided an often-neglected opportunity for public and private financiers to become involved in the initial planning and project conceptualisation stage of the new masterplan. By involving such financiers early in the process, it is hoped that the masterplan can be designed in such a way that it is attractive to investors.

GLOBAL

Not-so-sweet artificial sweeteners a sign of contamination



The presence of artificial sweeteners in rural groundwater shows evidence of contamination by local septic system wastewater, according to researchers from the University of Waterloo, Canada.

The study, which appeared in the *Journal of Environmental Quality*, describes how the researchers tested private, rural groundwater wells in the Nottawasaga River Watershed, in central Ontario, for four artificial sweeteners as a way to detect groundwater impacted by human wastewater being released by septic systems in the area.

Artificial sweeteners are ideal human wastewater tracers as they exit the human body essentially unchanged, and are not completely removed by most wastewater treatment processes. Human wastewater contains relatively high concentrations of artificial sweeteners.

"Although the four artificial sweeteners we measured are all approved for human consumption, it is the other septic contaminants that might also be present in the water that could pose a health risk," said John Spoelstra, first author on the study and an adjunct professor in earth and environmental sciences at Waterloo. "As for groundwater entering rivers and lakes, the effect of artificial sweeteners on most aquatic organisms is unknown."

Among other contaminants, septic effluent can contain bacteria such as *E.coli*, viruses, pharmaceuticals, personal care products, and elevated levels of nitrate and ammonium.

In conducting the study the researchers found that more than 30% of samples analysed from 59 private wells show detectable levels of at least one of four artificial sweeteners, indicating the presence of human wastewater. Estimates

reveal between 3% and 13% of wells could contain at least 1% septic effluent.

The team also tested groundwater seeping out of the banks of the Nottawasaga River and found 32% of their samples tested positive for sweeteners. Again, this indicates that some of the groundwater entering the Nottawasaga River has been affected by septic system effluent.

"We were not really surprised by the most recent results given what we've found in past studies," noted Spoelstra. "Septic systems are designed to discharge effluent to groundwater as part of the wastewater treatment process."

Therefore, contamination of the shallow groundwater is a common problem when it comes to septic systems."

Online course focuses attention on environmental impact of conflict



UN Environment and partners have launched a massive open online course on environmental security and sustaining peace.

Conflicts over natural resources are among the greatest challenges in 21st century geopolitics, and present serious threats to human security. At least 40% of all internal armed conflicts over the past 65 years have had an important natural resource dimension.

Since 1989, more than 35 major armed conflicts have been financed by revenues from conflict resources. In the coming years, extreme climate stresses are

expected to double the risk of violent conflict.

Despite the risks that war and armed conflict pose for the environment and the role that natural resources may play in fuelling or amplifying armed conflicts, there are also significant opportunities linking the environment and peacebuilding.

UN Environment Executive Director Erik Solheim said: "Let's not forget the power of environmental cooperation to drive peace and prosperity."

Indeed, knowledge and experience regarding the important role of natural resources and the environment in post-conflict peacebuilding has grown immensely over the past two decades.

Building on these experiences, UN Environment has teamed up with the Environmental Law Institute, the Earth Institute at Columbia University, Duke University, and the University of California

at Irvine to develop a new online course on Environmental Security and Sustaining Peace.

The course synthesises 100 000 pages of material and 225 case studies from over 60 post-conflict countries into seven hours of dynamic video lectures. The course is based on the experiences and lessons learned of over 1 000 experts and 10 UN agencies.

"The goal is to build a new community of 10 000 practitioners that can make natural resources a reason for cooperation rather than conflict," said Solheim.

The course covers a range of natural resources, from extractives to land and water, as well as a range of tools and approaches from conflict and gender sensitivity to assessments, mediation and spatial planning.

Visit <http://bit.ly/2znYH7o> for more information.

Report sheds spotlight on corruption impact on women



Identifying ways to recognise and address corruption in the water sector isn't new. However, little research has been done into how corruption impacts women and men differently.

The latest report by UNDP-SIWI Water Governance Facility (WGF) draws on experiences from Colombia and South Africa to identify these differences and understand their underlying causes.

Corruption within the water sector is

widespread, ranging from petty bribes to the manipulation of large-scale infrastructure and public water services. It compromises access to safe drinking water and sanitation, posing a significant threat to billions of lives. Globally, women bear the main responsibility for household water access, and are therefore at greater risk of exposure to corruption.

The report brings to light topics such as sextortion, where services are only offered in exchange for sexual favours. It also confirms existing research, specifically, that women tend to be less corrupt than men, or are less likely to engage in corruption because they stand to lose more if caught.

"Corruption impacts women differently than men," says Pilar Avello, Programme Officer at WGF. "The fact that water is a vital resource for survival makes women in need of it likely to engage, even offer, sex in exchange for water. We need to

talk about this at a higher-level, bring the discussion to the table and collectively find ways to fight it."

The report is a key output from the WGF's research project **Water, integrity and gender** and draws on interviews carried out in Bogotá, Colombia and Johannesburg, South Africa. It aims to identify the types of corruption that exist and better understand the motivations behind them, to work towards instituting 'good' governance through more transparent, accountable and effective institutions and procedures.

"Raising the issue of gender in water sector corruption is only the first step," says Dr Jenny Grönwall, Programme Manager at WGF. "Developing gender equalising strategies needs to be next one."

To read the report visit: <http://bit.ly/2mwFU4Q>

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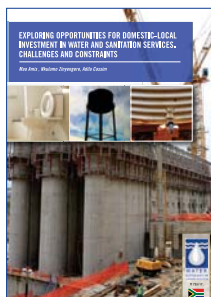
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NEW WRC REPORTS



Exploring opportunities for domestic-local investment in water and sanitation services

The Department of Water and Sanitation is the custodian of water resources and responsible for coordinating investments in water infrastructure. There are about 250 government-owned water schemes in South Africa. It's estimated that South Africa requires at least R1.4 billion in investments per annum to maintain

the current water infrastructure. This funding challenge has exacerbated the water management situation in the country. This study sought to develop understanding on the perceived challenges and constraints faced by the private sector, which prevents them from harnessing the opportunities of investing in the water and sanitation sector in South Africa. This was based on the premise that by unpacking these perceived challenges, a clear picture of the investment opportunities in the sector might be unveiled to make a business case for investments in the sector.

Report No. TT 725/17

Developing innovative approaches to national allocations and transfers to local government and its use

The design of a system of transfers is of critical importance to the efficiency and equity of local service provision and fiscal health of sub-national government. South Africa's fiscal framework has evolved progressively over the years with an example of recent work being a review by National Treasury, the South African Local Government Association (SALGA), the Department of Cooperative Governance and Traditional Affairs (CoGTA) and the Finance and Fiscal Commission (FFC) of the system of local government infrastructure grants. Innovations also continue to emerge internationally, particularly relating to performance based grants. In this context, the WRC commissioned this research study aiming to build on work previously undertaken; review current processes related to transfers and allocations; and undertake an international scan of innovative approaches and relevant experience with a view towards identifying challenges and constraints and presenting future requirements and solutions for further evolution in the system of transfers and allocations for water services in South Africa.

Report No. 2487/1/17

The validation of the variables (evaporation and soil water) in hydrometeorological models: Phase II

For many field and modelling applications, accurate estimates of soil water (SW) are required, but are often lacking. Modelled

estimates of SW are often used without proper validation and the verification of the results is questionable. In addition, remotely sensed (RS) products are becoming more widely used in hydrological modelling. However, RS SW measurement is faced with the difficulty of "seeing" below the soil surface and penetrating the aerial plant canopy layer. This project was initiated to provide a spatially explicit validation procedure for the 1 km grid of SW and total evaporation produced.

Report No. 2323/1/17

Towards wastewater biorefineries: Integrated bioreactor and process design for combined water treatment and resource productivity

This project investigated the wastewater biorefinery (WWBR) concept: the integrated processing of a wastewater stream or streams to generate products of value, including "clean" water, and remediate the effluent simultaneously. In this approach, products of variable value are produced concomitantly with clean water as a product, typically through multiple unit operations. The preference is to generate products of sufficient value to make the biorefinery economically viable. The focus of this research project was on developing and testing this concept, as well as evaluating its applicability to and potential in the South African context.

Report No. 2380/1/17



Risk Based, Site-Specific, Irrigation Water Quality Guidelines: Volume 1 Description of Decision Support System

The 1996 South African Water Quality Guidelines comprise one of the most widely-used tools in water quality management. However, they are now viewed as significantly out of date. A Phase 1 Department of Water Affairs and Forestry (now Department of Water and Sanitation) project was completed by a

panel of experts in 2008. They performed a needs assessment, developed a general philosophy and described the general specifications of a decision support system (DSS) for revised water quality guidelines for South Africa. The general aim of this project was to develop a software-based decision support system (DSS) able to provide both generic and site-specific risk-based irrigation water quality guidelines for South Africa. The DSS assesses fitness-for-use and establishes water quality requirements for the effect irrigation water constituents have on soil quality, crop yield and quality, as well as irrigation equipment.

Report No. TT 727/17

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