

# FLUID THOUGHTS

## Planning for future water security in a nexus paradigm

From a water perspective, we live in a 'world of Cape Towns'. That was the banner of the 2018 Water Week edition of *Down to Earth*, the signature publication of the Centre for Science and the Environment (CSE), India.

The publication had its global launch when the water practitioner community gathered in Cape Town at the biennial Water Institute of Southern Africa congress in June. The special edition magazine was explicit on a few pivotal issues. Firstly, it offered an external analysis of the severity of the extended drought episode we have gone through on the back of the 2014 El Niño event. Secondly, it illustrated once again the class diversity of the water scarcity experience in South Africa; in particular the middle-class inconvenience dominated the media coverage, masking the real threat of socio-economic stagnation on the one hand, and a missed opportunity to highlight the dire need to bring servicing to the poor and vulnerable in South Africa on the other.

The third is the worldwide nature of the challenge. Ten metropolitan cities of the Global South are on the very edge of water crisis. These are São Paulo, Buenos Aires, Mexico City, Sanaa, Karachi, Kabul, Beijing, Bengaluru, Istanbul, and on our own continent, Nairobi. In addition to these, there are 200 cities in the world that are considered water stressed.

When one looks to the predictions of the future, as illustrated in figure 1, we see a spiral with a 2050 end point of one in five developing countries experiencing water shortages. The convergence of the predictions shows that a combination a much larger population with increased longevity, further economic growth as the developing world catches up with the developed world, increasing consumption patterns partnered with the impacts of climate change and increasing pollution levels; will see a global water stressed future. Importantly and in addition, there will be a concomitant stress in both sustainable power access as well as food security. We have the added challenge of these sectors working very separately in response to these joint challenges. Silos as we know are only good for temporary storage.

The Water Research Commission has through its Water-Energy-Nexus Lighthouse programme, and together with its partners, built an important repository of new knowledge in this domain. It has also developed the beginnings of a scientific community of practice to engage both the challenge and the possibility of a future that is characterized by water, energy and food security



WRC CEO, Dhesigen Naidoo

driven by a Nexus approach. The W-E-F nexus approach means a joint consideration of water, energy and food security contexts and objectives in developing solutions and interventions that are designed purposefully to have collective and individual positive outcomes across the three sectors. This is geared toward creating a critical mass of capacity and resources to achieve higher levels of both security and delivery of water and water services, sustainable energy and food access and security throughout the system.

We, the water science community, have over the years, with a water lens, piloted and demonstrated many nexus solutions like new sanitation, energy-generating wastewater treatment processes with added benefits in the form of chemicals and fertilizer beneficiation for agricultural production. The additional benefit is that these solutions are strongly in line with the sustainable development paradigm with the deliberate goal of a lower carbon budget compared to traditional processes as a stated objective for each of these interventions.

The new climate change legislation seeks to achieve a new industrialisation paradigm as a pivotal contribution to the New Dawn project. The scale-up and roll-out of the suite of Water-Energy-Food Nexus solutions has to be a keystone to this strategy. In the words of Dr Sunita Narain, the Director-General of the CSE, "Cape Town, Bengaluru and Chennai, all have a common present. The question is if they can create a new future that is water secure because it is water wise". The optimised path to this prosperous future can only be one of joint water, energy and food security through a coordinated and synergised approach.



WRC CEO, Dhesigen Naidoo, and Dr Sunita Narain, DG of the CSE at the WISA conference earlier this year.



Figure 1. Different scenario and forecasting exercises, using the assumption of the continuation of current practices is a business-as-usual paradigm converge on concomitant and increased pressure on our resources. This in turn compromises water, energy and food security with knock on effects on health, security and stability.

## WATER DIARY

### Land rehabilitation

**August 13-16**

The 2018 conference of the Land Rehabilitation Society of Southern Africa will take place at the Champagne Sports Resort, Drakensberg. The theme for the conference is 'Transforming the rehabilitation landscape'.

**Visit:** <http://larssa.co.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/>

### Groundwater

**September 26-28**

The SADC Groundwater Management Institute, together with the International Water Management Institute and the Department of Water and Sanitation are

hosting a groundwater conference under the theme 'Adapting to climate change in the SADC region through water security – A focus on groundwater'. The conference will be held at Birchwood Hotel and OR Tambo Conference Centre, on the East Rand.

**Visit:** [www.sadc-gmi.org](http://www.sadc-gmi.org)

### Wetlands

**October 8-11**

The National Wetlands Indaba will take place at the Mittah Seperepere Convention Centre, in Kimberley, Northern Cape. The theme of the conference is 'Drylands and wetlands: connecting and managing heterogeneity across landscapes'. **Visit:**

[www.nationalwetlandsindaba2018.com](http://www.nationalwetlandsindaba2018.com)

### Municipal engineering

**October 31-November 2**

The annual conference of the Institute of Municipal Engineering of Southern Africa will be held in Port Elizabeth with

the theme, 'Innovative Infrastructure Solutions'. **Visit:** [www.imesa.org.za](http://www.imesa.org.za).

### Irrigation engineering

**November 13-15**

The South African National Committee on Irrigation and Drainage (SANCID) will be holding its 2018 conference with the theme 'Opportunities to manage climate change'. The conference will be held in White River, Mpumalanga.

**Visit:** [www.sancid.org.za](http://www.sancid.org.za)

### Science and technology

**December 3-6**

The 4th National Conference on Global Change will be held in Polokwane with the theme 'Sustainable futures through science and innovation'. The conference is hosted by the Department of Science and Technology and the National Research Foundation, in partnership with the University of Limpopo. Online registration is mandatory.

**Visit:** [www.ul.ac.za/globalchange2018](http://www.ul.ac.za/globalchange2018)

## NEWS

## Water and sanitation department presents sober budget



An urgent intervention is required to re-align project management and planning within the available budget of the Department of Water and Sanitation (DWS). This is according to minister, Gugile Nkwinti. He tabled the department's budget in Parliament on 22 May.

"Urgent intervention is required in our project management as well as contract management to ensure that the project planning is aligned with the available budget, and to prevent our projects from being ahead of the available budget," he noted. Nkwinti's words come amid concerns that the department is faced with historical contractual commitments that were not budgeted for.

He said the preliminary commitments for which contracts have been signed and service providers are currently rendering services amounted to R7.5 billion, of which R6.3 billion is for infrastructure projects and R1.1 billion for operational

goods and services.

"Of this figure, R2 billion is expected to be paid to the service providers in the current financial year. We have also noted with concern that in certain instances, contracts without a value have been entered into, and these pose difficulty in accurately budgeting for them, which leaves the department vulnerable."

Nkwinti added that the department's bucket eradication programme falls into this category. This has caused unauthorised expenditure caused by overspending in the bucket eradication programme. "Poor project management within the department has created a situation whereby service providers are accelerating the work at a much faster pace than what the department had budgeted for. A typical example is our project in Giyani which was initially planned to be completed over 5 years; and was budgeted for accordingly.

However, the work was accelerated and completed within a two-and-a-half year period. "There is poor alignment between the budget and the project milestones; and, in certain instances, the project milestones are much ahead of the budget."

In the coming year the DWS plans to implement several interventions to bring stability to the department. This includes, among others, reprioritising and streamlining the department's spend to align it with annual performance plans, with a view of reducing unauthorised, irregular, fruitless and wasteful expenditure; reviewing the department's delegation of powers with a view of reactivating and rebuilding the construction unit towards the formation of a State-controlled construction company; hastening the establishment of the transformation of the Water Trading Entity, into a Water Trading Agency to be located in the Financial Management Services Branch; and fast-tracking the establishment of Catchment Management Agencies in the remaining seven regions as well as enforcing the polluter pays principle.

The Minister reported that the department will further engage National Treasury and the Department of Cooperative Governance and Traditional Affairs (COGTA) to address the perennial problem of billions of municipal grant funds that are either unspent or irregularly spent, for which the department must account. "The department is committing to working closer with COGTA to ensure that bulk water projects that were completed in municipalities without reticulation services are provided with such reticulation in the current financial year."

## Environmental department hosts Interpol meeting on waste and pollution



From 22 to 24 May the Department of Environmental Affairs hosted Interpol's 23rd Pollution Crime Working Group

(PCWG) and Environmental Compliance and Enforcement Committee (ECEC) Advisory Board meetings at Skukuza, in the Kruger National Park.

This is the first time the PCWG met in South Africa. The working group network meets annually to discuss new and growing global concerns relating to pollution crime, share best practice in dealing with existing and emerging pollution threats, plan joint operations and also to develop strategies going forward.

The objective of this year's meeting was to, among others, consider key trends and emerging threats linked to pollution crime, discuss challenges and opportunities in achieving effective enforcement against pollution crime, especially through international and multi-agency cooperation, and to identify opportunities and risks associated with information and intelligence sharing, data management and analysis.

## Government pledges support to struggling municipalities

Cooperative Governance and Traditional Affairs (COGTA) Deputy Minister, Andries Nel, has welcomed the release of the audit outcomes for municipalities, saying government will provide support to distressed municipalities.

This is after Auditor-General, Kimi Makwetu, released his report in Parliament on the outcomes of municipal audits for the year 2016/17. According to the Auditor-General there had been an overall regression in municipalities that received clean audits in the period under review

compared to the previous year. "The Ministry of COGTA welcomes the audit improvements in some municipalities, and we express serious concerns regarding those that have regressed. We congratulate those 33 municipalities that have received unqualified audit opinions," noted Nel. He added that the outcomes of the audit provides a basis for government to intervene to support struggling municipalities.

"While the number remains low, COGTA

does note from the Auditor-General's report that 145 (or 56%) of municipal outcomes are classified as unqualified. We believe that this represents a basis for national and provincial governments' ongoing support programme to improve financial management in municipalities. We are encouraged that in the ongoing efforts to improve municipal audit outcomes, there are municipalities that do get things right and do become examples for others to follow," said Nel.

*Source: SAnews.gov.za*

## Summit calls for enabling environment to support Africa's innovators

Greater investment and the creation of enabling ecosystems are required to support Africa's innovators.

This was one of the key messages that emerged from the African Innovation Summit (AIS) held in Kigali, Rwanda, earlier this month. The AIS is an Africa-wide initiative to mobilise investors, policy-makers, researchers, the youth, innovators and thinkers into a coalition for collective action to foster an enabling environment for innovation in Africa.

Speaking at the summit, Rwandan Prime Minister, Edouard Ngirente, said that initiatives such as the AIS were critical for Africa's development. "The challenge facing Africa is building robust ecosystems of innovation," the Prime Minister said. "I am happy that AIS is helping our countries build a culture of innovation as a way of life. It is a critical element of development and economic growth".

Delegates at the summit agreed that a multi-sectoral and multi-stakeholder

approach was needed to ensure that policies, investments and enabling ecosystems were put in place to empower and propel African innovators and their solutions forward.

The summit concluded with a call to action addressed to innovators, government leaders, the private sector, civil society and academia: "Let us throw out the boxes that have caged us."



# GLOBAL

## Tackling corruption ‘from the top down’ essential, declares UN chief

Corruption and complicity know no geographical boundaries, and it is society’s most vulnerable who get hurt the most. By tackling corruption, governments can show they mean business.

This is according to United Nations (UN) Secretary-General António Guterres. He was speaking at a high-level event marking the 15th anniversary of the UN Convention Against Corruption.

In his remarks, Guterres also underlined

that in addition to robbing vital resources from public services such as schools and hospitals, corruption also fuels human trafficking and the black market in natural resources, weapons, drugs and cultural artifacts.

“It fuels conflict, and when a hard-won peace is achieved, corruption undermines recovery. Corruption and impunity are corrosive, breeding frustration and fostering further corruption when people see no other way of achieving their goals,” said the UN chief, calling for greater

political and popular support for the fight against corruption.

He described the Convention Against Corruption as one of the most effective tools the world has to achieve the common goals of good governance, stability and prosperity. “The UN will continue to support member states every step of the way, from helping to engage and empower citizens in this fight, to helping build and enhance institutions that can deliver on their promise,” Guterres concluded.

## Hunger surges amid deadly conflicts, poor weather conditions – FAO

Despite ample food supplies, persistent conflicts and adverse climate shocks are taking a toll on global food security, according to a new report from the UN agriculture agency, the FAO.

The publication, *Crop prospects and food situation*, reveals that since FAO’s last report in March, the number of countries requiring external food assistance has jumped by two, namely Cabo Verde and Senegal, to 39.

According to the report, civil war and insecurity in Africa and the Middle East have displaced millions – resulting in high hunger rates. “Poor rains have hit cereal production prospects in South America and Southern Africa. Unfavourable weather conditions are also placing a heavy burden on pastoralists in West Africa.”

The African food insecure countries on FAO’s list are: Burkina Faso, Burundi, Cameroon, Central African Republic,

Chad, Congo, Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Niger, Nigeria, Senegal, Sierra Leone, Somalia, South Sudan, Sudan, Swaziland, and Zimbabwe.

Turning to cereal production, FAO foresees a 1.5% annual drop from last year’s record high, with a larger decline in some areas, such as South and North America and Southern Africa. “Conflicts have choked agricultural activity in swathes of Central Africa, notably in the Central African

Republic and parts of the Democratic Republic of Congo, where access to food is further hindered by surging inflation,” FAO elaborated.

On a brighter note, after consecutive seasons of drought-reduced harvests, fresh rains point to cereal production gains in East Africa.

To download the full report visit: <http://www.fao.org/giews/reports/crop-prospects/en/>



## Earth's climate to increase by 4 degrees by 2084



A collaborative research team from China has published a new analysis that shows the Earth's climate would increase by 4°C, compared to pre-industrial levels, before the end of the 21st century.

The researchers published their analysis in *Advances in Atmospheric Science* on 18 May.

"A great many record-breaking heat events, heavy floods, and extreme droughts would occur if global warming

crosses the 4°C level," noted Dabang Jiang, a senior researcher at the Institute of Atmospheric Physics of the Chinese Academy of Sciences. "The temperature increase would cause severe threats to ecosystems, human systems, and associated societies and economies."

In the analysis, Jiang and his team used the parameters of scenario in which there was no mitigation of rising greenhouse gas emissions. They compared 39 coordinated climate model experiments

from the fifth phase of the Coupled Model Intercomparison Project, which develops and reviews climate models to ensure the most accurate climate simulations possible.

The researchers found that most of the models projected an increase of 4°C as early as 2064 and as late as 2095 in the 21st century, with 2084 appearing as the median year. This increase translates to more annual and seasonal warming over land than over the ocean, with significant warming in the Arctic. The variability of temperature throughout one year would be lower in the tropics and higher in polar regions, while precipitation would most likely increase in the Arctic and in the Pacific. These are the same effects that would occur under 1.5°C or 2°C increases, but more severe.

"Such comparisons between the three levels of global warming imply that global and regional climate will undergo greater changes if higher levels of global warming are crossed in the 21st century," wrote Jiang.

To access the original article, Visit: <https://bit.ly/2s7EQEk>

## Largest-ever global response to cholera targets 2 million people in Africa

The largest cholera vaccination drive in history targeting two million people across Africa has been completed. The drive, which ran between May and June, came in response to a series of recent deadly outbreaks of the waterborne disease.

"Oral cholera vaccines are a key weapon in our fight against cholera," noted Tedros Adhanom Ghebreyesus, head of the World Health Organisation (WHO) in a statement, "but there are many other things we need to do to keep people safe."

"WHO and our partners are saving lives every day by improving access to clean water and sanitation, establishing treatment centres, delivering supplies, distributing public health guidance, training health workers, and working with communities on prevention," he added.

The drive targeted Zambia, Uganda, Malawi, South Sudan and Nigeria. The vaccines were funded by the Vaccine Alliance, a public-private partnership known as Gavi, and were sourced from the global stockpile.

The burden of cholera remains high in many African countries. At the time of writing at least 12 countries were reporting active cholera transmission.



# THE WATER WHEEL

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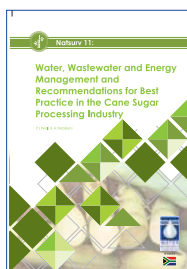
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# NEW WRC REPORTS

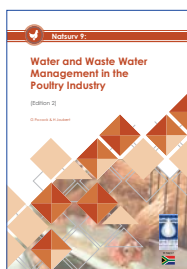


## *Natsurv 6: Water, wastewater and energy management and recommendations for best practice in the cane sugar processing industry*

The main aim of the NATSURV series is to serve as guides and benchmark tools for stakeholders, including local governments and industry players. The aims of this publication are to provide an overview of the sugar processing industry in South

Africa, highlighting changes that have taken place since the previous NATSURV was published in 1990; to provide information about generic industrial processes, with an emphasis on water use and wastewater generation and treatment; and to provide information about relevant national and local legislation and bylaws pertaining to water usage and wastewater generation. Similar to other NATSURVs this publication also provides water consumption, specific water consumption and wastewater generation data. Furthermore, it recommends best practices for water use, including intake, treatment and discharge.

**Report no. TT 721/17**



## *Natsurv 9: Water and wastewater management in the poultry industry*

The aim of this project was to undertake a survey of the South African poultry industry to obtain an overview of operations, specific water use, specific effluent volume and the extent to which best practices are being implemented. This was achieved by reviewing appropriate literature, disseminating questionnaires,

holding workshops, interviewing companies and undertaking site visits. This study follows on a previous NATSURV published in 1989. Since this time the industry has undergone several significant changes such as new legislation, new markets, social attitudes and change in ownership as well as the use of updated technology. In addition, there is growing awareness of the need to optimise water and energy use and reduce the production of waste, and this should be reflected in the specific water consumption and effluent production. It was therefore considered an opportune time to review the water and wastewater management practices of the poultry industry and identify the changes that have been made since the 1989 survey.

**Report no. TT 730/17**



## *Assessing the adaptive capacity of rural municipalities to implement ICT interventions for community engagement in drinking water supply management*

This study provides the necessary background information on community engagement in drinking water services delivery and the role of information and communication technology (ICT) in incentivising public participation. The

study was based on the notion that an increase in community engagement – particularly in rural areas – would result in an increased understanding of the current shortcomings of drinking water supplies, an increased understanding of the communication challenges between communities, water service authorities and water service providers as well as an improved experience of greater transparency and accountability for all stakeholders. The other report emanating from this project is Design and implementation of an ICT system for community engagement in drinking water supply management (**Report no. TT 744/2/17**).

**Report No. TT 744/1/17**



## *Assisting municipalities to determine the most appropriate indicator for funding allocations towards maintenance*

The poor state of operations and maintenance of infrastructure in South Africa, not only in water services but across all sectors, is widely bemoaned. It has been found that few municipalities put enough of their budgets aside for infrastructure maintenance. Within this context, assisting

municipalities to determine what level of funding they should allocate to maintenance is of vital importance. For this reason the Water Research Commission commissioned this research study.

**Report No. TT 736/17**

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