

FLUID THOUGHTS

No woman, no cry

R*E*S*P*E*C*T demanded the queen of soul, Aretha Franklin, in what became an anthem for the struggle for gender equality in the 1970s and 1980s.

There was a rising optimism, globally, that perhaps finally we were gaining momentum toward gender equality. The year 1979 heralded the United Nations CEDAW (Convention of the Elimination of All form of Discrimination Against Women) and sixteen years later saw the adoption of the Beijing Platform for Action at the Fourth World Conference on Women. For a country like South Africa, then a one-year-old democracy having just thrown off the shackles of racism and sexism that defined the patriarchal Apartheid State, this was a historical point of inflection for the establishment of real equality in South Africa and the world.

And yet in 2018, Statistics South Africa's *Crime against women in South Africa* report shows a decline in transgressions against women compared with historical levels, but still unacceptably high levels in the major categories. Worldwide we see the strengthening of conservative right-wing movements, even in previous bastions of democracy in Europe and North America. One of the victims of this shift is women's rights and the position of women in society. It is achieved with both directed policy like restricting women's reproductive rights; and through more subtle means like making it harder to integrate women and the girl-child into streams and professions that were historically the domain of men. Utterance by folk in the leadership of influential organisations, like the South African Institution of Civil Engineering (SAICE), take the struggle for gender equality back decades.

The progress to overcome this is slow. The latest World Economic Forum's *Global Gender Gap Report* (published in November 2017) measures progress in four categories. The findings are expressed as a percentage, with 0% as maximum inequality and 100% being gender parity. In the categories of Educational Attainment as well as Health and Survival, the world has made great and rapid strides, with gap percentages of 95% and 96% respectively. We have indeed seen an increased access to education for the girl-child in most parts of the world, and the old adage of 'educate a woman, and you educate a village' has indeed proven to be true. Amartya Sen, economist and Nobel Laureate quoted Bangladesh as a prize case study where the economic fortunes of the country changed radically on the back of women's education. In fact, health and survival is, in fact, in many ways a direct result of this.

The other two categories in the Gap report fair far less favourably. The category of Economic Opportunity and Participation scores



WRC CEO, Dhesigen Naidoo

an unsurprising 58%. We all know of the barriers to entry and, even when women get in, they may face multiple glass ceilings. The cost of this to society is high. The cost to the economy is even more direct. In the World bank's *Unrealised potential* report, it is calculated that women account for only 38% of human capital wealth globally. The number drops to less than one third in low-income and lower middle-income countries. Part of the reason is limited opportunity for participation. The other is a complete lack of income parity even when women and men are in the same job performing at the same level. This area of transformation is proceeding at a snail's pace. In fact, it is estimated that at the current rate of change, it will take 217 years before gender-based income parity is achieved. The prevention of full economic participation of women in the economy has a wealth loss of US\$23 620 for every one of the seven billion people on Earth today, according to the World Bank report. Globally, for the 141 countries that participated in the survey, the loss in human capital wealth notches up to US\$160.2 trillion.

How can it be that we are currently in a prolonged global economic recession on the one hand, and an undeveloped and therefore unrealised human capital dividend, estimated at US\$160.2 trillion, in the form of women and the girl-child on the other. The reason could lie in the fourth category of the Gap report, namely, Political Empowerment. This relates not only to women representation in political formations at various levels of governance, but also to general participation in decision-making at all levels. The political empowerment gap is at 23%. Loosely interpreted, this means that 77% of all the decisions that matter in the world today are taken by men. Enough said!

The current quagmire is influenced by the attitudes of the 1st and 2nd industrial revolutions that have been instrumental in determining the shape and attitudes of the modern economy. Traits of physical strength and specialisation in silos were deemed to be key, and tended to favour a male dominance. But, that was two industrial revolutions ago. The challenges of the twenty-first century society demands integration, synergy and social skills. The very traits that were previously regarded as the bastion of women, and a weakness. And, in particular, success in the twenty-first century economy demands high emotional intelligence. Does this mean that the 4th industrial revolution depends for its success on a much higher participation of women? Does this mean that the dividend of the Industry 4.0 can only be fully realised on the back of full and equal gender participation in the economy and in society? The arithmetic seems to indicate that this is, in fact, the only pathway to a prosperous and sustainable future.

Table 1. Examples of interventions to address constraints on women's paid work.

Constraints/Type of work	Wage employees	Farmers	Entrepreneurs/Self-employed
1. Time use constraints			
Basic Infrastructure	Access to basic infrastructure (cooking energy, water, electricity) Access to safe and affordable transportation		
Childcare	Access to quality, affordable, publicly sponsored or employer-provided childcare		
Laws & technology	Workplace flexibility including parental leave	Time saving technology	Time saving technology
2. Access to productive assets			
Land	-	Joint titling	-
Skills	Bundled training (technical and managerial) including socio-emotional skills (persistence), and asset-specific training		
Micro-credit (self-employed)	In-kind and cash grants		
Credit (Small & Medium Enterprises)	-	Alternative collateral: moveable assets, payment history, psychometric tests	
Digital finance/savings and payments systems	Direct payments to accounts	-	Individual saving accounts
Other financial services	Bundled financial services for risk management including insurance products for business and health needs among others		
Banking	Mobile/web banking and simplification of KYC (Know your customer) rules		
3. Market and institutional failures			
Information	Payment transparency Workers' rights	Innovations in rural extension Engagement in value chains	Returns to traditionally male-dominated sectors
Social capital	Expanding social networks: mentorship and sponsorship, role models		
Legal frameworks	Removing gender differences in business, labor and family laws, enforcing existing laws supporting gender equality		
Taxation	Individual income tax	-	Differential VAT
Social norms	Preventing and mitigating gender-based violence Building aspirations and self-confidence		

Source: Authors.

Source: World Bank

WATER DIARY

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**

Water management

October 3

The Strategic Water Partners Network is hosting its 4th Annual Water Stewardship Conference in Sandton. **For enquiries Email: swpn.secretariat@thenbf.co.za**

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**

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**

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 management climate change'. The conference will be held in White River, Mpumalanga.

Visit: www.sancid.org.za

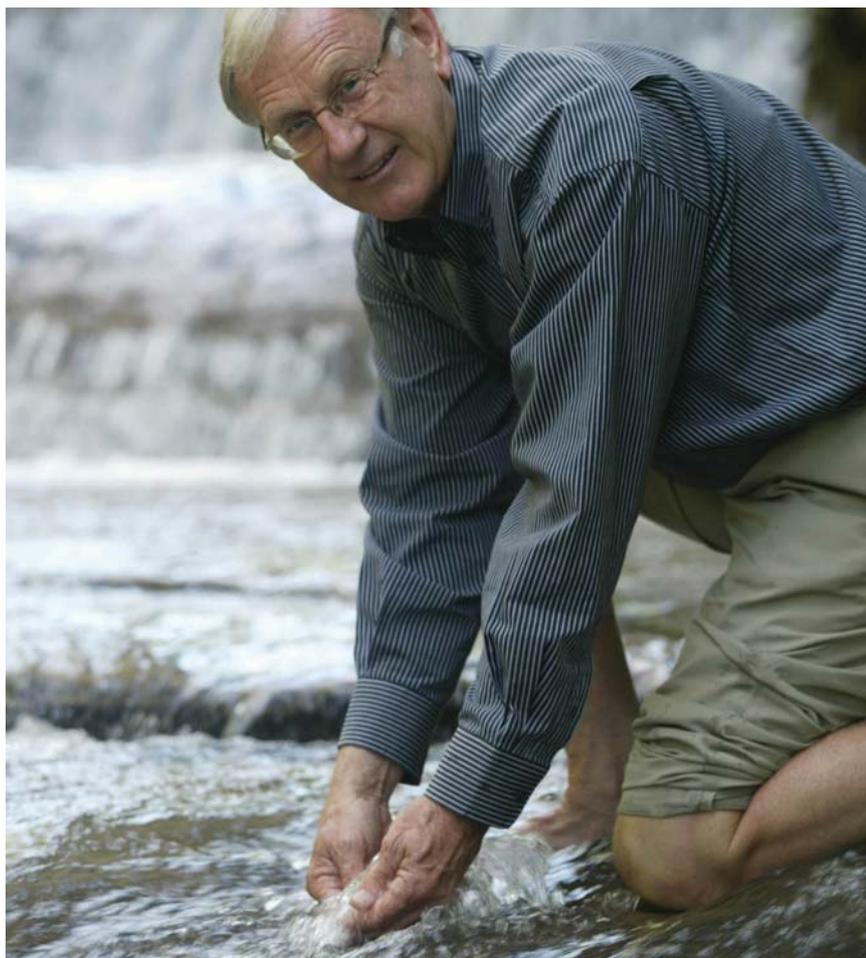
Science and technology

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**

NEWS

Prestigious lifetime achievement award for renowned hydrologist



Prof Roland Schulze, University of KwaZulu-Natal Hydrology Professor Emeritus and Senior Research Associate in the Centre for Water Resources Research (CWRR), received a Lifetime Achievement Award at the African Utility Week Industry Awards which recognises energy and water influencers in Africa.

Over 600 guests from 30 countries attended the glamorous black-tie event, many of them Africa's most renowned power and water industry professionals. Prof Schulze was selected winner of the Lifetime Achievement Awards by a panel of 22 international judges.

"This is a proud and emotional moment and a humbling experience," said Prof Schulze, who also reflected on the individuals and institutions who influenced his outlook and success, including his parents whose dreams were cut short by the Great Depression, leading them having to curtail their schooling at the age of 14 to start work.

Prof Schulze, who completed his studies at the then-University of Natal, began his career as a mathematics and science teacher, joining his alma mater in 1969 where he worked until his formal retirement in 2007. He piloted

South Africa's first hydrology degree course in the early 1980s; the discipline grew under his leadership to form the CWRR. The centre now trains more than 150 undergraduate students and 30 postgraduate students a year from around the world.

Prof Schulze was also visiting professor at the IHE Delft Institute for Water Education in the Netherlands, and at the Swedish Meteorological and Hydrological Institute. He has been involved in more than 100 short courses on hydrological modelling and climate change in South Africa, Africa and Europe.

Prof Schulze's involvement in national and international level hydrological research spans more than 50 years. For the past 30 years he has been pursuing applied climate change research. Landmark achievements include development of the Agricultural Catchments Research Unit agrohydrological modelling system and the SCS-SA design hydrology simulation model.

He has over 600 varied publications to his name, from refereed journal papers to books and popular articles. He has further supervised 67 Masters and 20 PhD students, with eight students currently under his supervision.

Prof Schulze's accolades include a Fellowship of the University of Natal, a Fellowship of the Royal Society of South Africa, Life Membership of the International Water Academy in Norway, a South African Institute of Agricultural Engineers (SAIAE) Fellowship, Membership of the Academy of Science of South Africa and numerous 'Best Lecturer' awards. He is also the recipient of gold and silver medals from the SAIAE.

Highly invasive freshwater crayfish found in Free State freshwater



A highly invasive alien freshwater crayfish species has been discovered in the Free State Goldfields.

The Department of Environmental Affairs is working closely with the Free State Department of Economic, Small Business Development, Tourism and Environmental Affairs (FS DESTEA) as well as local and district municipalities in the Goldfields area to eradicate and stop the spread of red swamp crayfish. The species, which is native to northern Mexico, and southern and southeastern United States, is considered highly invasive.

Acting on a tip-off from a member of the public in Welkom, FS DESTEA aquatic scientist, Dr Leon Barkhuizen, discovered

a large population of red swamp crayfish (*Procambarus clarkii*) in a dam in the Free State Goldfields. The identification of the species was confirmed by Prof Linda Basson from the University of the Free State's Zoology and Entomology department. The reason for the presence of this species in the dam is not clear, but anecdotal reports indicate that it might have been released by members of the public.

During two sampling periods in June, Dr Barkhuizen caught 53 individuals. From the preliminary results it is clear that it is an established and breeding population due to the large number of juveniles that were collected. It seems that the crayfish have been present in the area

for a number of years, considering that two large individuals were found in a swimming pool in the area in October last year.

The red swamp crayfish has spread throughout the world where it decimates indigenous crayfish species and other aquatic organisms. The species is also a carrier of the highly infectious crayfish plague which has wiped out indigenous crayfish species in parts of Europe. Females may carry up to a thousand eggs at a time. Adults dig tunnels with depths between 30 to 90 cm and can reach lengths up to 40 cm. Due to this digging behaviour, these crayfish hold a specific threat to irrigation canals and dams.

According to reports, there are people in the Goldfields who catch the crayfish and sell them. This action must be stopped immediately to prevent the further spread of this highly invasive species. According to legislation, it is an offense to be in possession of the red swamp crayfish, guilty persons may be fined up to R10 million or jail time upon conviction.

Various meetings and onsite inspections are being undertaken to determine the exact extent of this invasion.

Technical experts to assist distressed municipalities

The Cooperative Governance and Traditional Affairs (COGTA) Department has appointed 81 new engineers and town planners in an effort to assist distressed and dysfunctional municipalities to get back on track.

The appointment follows a report by Auditor, Kimi Makwetu, detailing the dire state of municipalities, with 87 municipalities classified as dysfunctional.

In a bid to provide support to the municipalities in the nine provinces, COGTA announced an intervention programme focusing on three areas, namely governance and administration,

service delivery and infrastructure as well as financial management.

"The ability of municipalities to plan, deliver, operate and maintain infrastructure is dependent to a greater extent on the capacity of officials to execute their responsibilities. The technical nature of the responsibilities demands requisite levels of expertise and skills, mainly in the field of civil engineering," noted COGTA Minister, Zweli Mkhize.

The cohort of technical experts has been appointed as part of District Technical Support Teams in affected municipalities.

The teams comprise:

- Nine provincial managers, most of whom are engineers
- Thirty-six civil engineers
- Fourteen electrical engineers
- Sixteen town and regional planners
- Seven candidate civil engineers, who are experienced engineers in the process of completing their professional registration

The placing of the teams is being done by the Municipal Infrastructure Support Agency.

Source: www.sanews.gov.za

GLOBAL

Tunisia launches drone data collection project

Tunisia and the African Development Bank have signed an agreement for the launch of a pilot project to use drones for data collection to enhance management of agricultural projects in the country.

The project, to be implemented over ten months, would receive technical management and assistance from South Korea, Minister of Development, Investment and International Cooperation, Zied Laadhari, announced during the signing ceremony in July.

The pilot project will focus on agricultural operations in Sidi Bouzid in central Tunisia, under the management of Busan Techno Park, a Korean government agency based in Busan, South Korea. Laadhari said that the agency would provide equipment – drones and associated computer systems-training, as well as technology transfer.

The agency has already tested the drones for efficacy in managing similar urban projects. Korea is a leading country in the development and use of unmanned aerial vehicles for real-time data collection and

processing. Drones have been used in agriculture to provide fast and accurate data, helping to improve decision-making at all stages of a project, from preparation to implementation and evaluation.

According to Laadhari, the project was expected to benefit piloting and monitoring of irrigated areas, management of water resources, water tables as well as the effects of climate change in the pilot area.

Freshwater species in Africa's largest lake threatened

Seventy-six percent of freshwater species endemic to the Lake Victoria Basin, including many species important to local livelihoods, are threatened with extinction, an IUCN-led report has found.

The report, *Freshwater biodiversity in the Lake Victoria Basin*, assesses the global extinction risk of 651 freshwater species, including fishes, molluscs, dragonflies, crabs, shrimps, and aquatic plants native to the Lake Victoria Basin in East Africa. The assessment found that 20% of these species are threatened with extinction. Of the freshwater species assessed, 204 are endemic to the lake area and three-quarters (76%) of these endemics are at risk of extinction.

Freshwater species are important sources of food, medicine and construction material for millions of people living in the basin and provide resources for communities who cannot access or afford market goods. The African Lungfish (*Protopterus aethiopicus*), for example,

is declining in the Lake Victoria Basin largely due to overfishing, poor fishing practices and environmental degradation as wetlands are converted to agricultural land. The lungfish is considered a delicacy for some local communities and is an important local medicinal product, used to boost the immune system and treat alcoholism. The lungfish is also traded at market, making it important to the local economy.

"The Lake Victoria Basin is incredibly rich in unique species found nowhere else

on Earth, yet its biodiversity is being decimated. The effects on communities that depend on the lake for their livelihoods could be disastrous. We hope this report will drive more sustainable land and water management in the basin by informing policy-makers and conservation programmes," noted Will Darwall, Head of IUCN's Freshwater Biodiversity Unit and co-author of the report.

To view the publication, Visit: <https://portals.iucn.org/library/node/47642>



Hospital bacteria are starting to tolerate hand sanitiser



Strains of bacteria have developed increased tolerance to the alcohols in hand sanitisers, which requires hospitals to rethink how they protect patients from drug-resistant bacteria.

A new study finds that strains of *Enterococcus faecium*, a notorious healthcare-associated bacterial pathogen, have emerged since 2010 that are ten times more tolerant of alcohol-based hand sanitisers than older strains.

A strict regime of hand washing with alcohol-based sanitisers before and after patient interactions has been in place in hospitals around Australia, and many other countries, since 2002, to curb a rise in deadly MRSA, an antibiotic resistant

form of *Staphylococcus aureus* (i.e. golden staph).

"Really regimented infection control ensures medical professionals, visitors, or patients themselves aren't spreading bacteria around the hospital," says lead author Prof Tim Stinear from Austin Health and the Peter Doherty Institute for Infection and Immunity, a joint venture of the University of Melbourne and the Royal Melbourne Hospital. "That's been highly effective at getting rid of golden staph. Rates of golden staph infection have been decreasing for the past 15 years."

But while MRSA infections have dropped considerably, Prof Paul Johnson, Director of research at Austin Health and co-lead

author of the latest research, noticed a rise in infections of *Enterococcus faecium*.

As reported in *Science Translational Medicine*, the research team took 139 different strains of *E. faecium* and treated them with isopropanol solution, an alcohol commonly used in hand sanitisers. "We started testing to see whether they had any tolerance to alcohol, and sure enough, the new isolates were more tolerant to alcohol exposure than the older isolates," said Stinear. This is an unfortunate side effect of the hygiene programme, he says.

"Alcohol use in hospitals has gone from hundreds of litres a month to thousands of litres a month of these alcohol-based disinfectants. Anywhere we repeat a procedure over and over again, whether it is in a hospital or at home or anywhere else, you are giving bacteria an opportunity to adapt, because that is why they do, they mutate. The ones that survive the new environment better then go on to thrive."

To view the original article, Visit: <http://stm.sciencemag.org/content/10/452/eaar6115>

Africa on the right path to eradicate plastics – UN Environment

The ongoing global movement for eliminating plastics is gaining momentum in Africa.

Several countries are now taking steps to eliminate the production and distribution of single-use plastics, some adopting a total ban on the production and use of plastic bags. Cameroon, Egypt, Eritrea, Ghana, Kenya, Mauritania, Morocco, Nigeria, Rwanda, South Africa and Tanzania have taken the lead, others, like Botswana and Ethiopia, are following suit.

UN Environment and its partners are working closely with African governments to establish policies and create

programmes that are geared towards a plastic-free continent. The campaign Beat Plastic Pollution has mobilised the continent to come together and clean up plastics in land and water ecosystems. The campaign also encourages governments to adopt the initiative and come up with regulations to curb plastic pollution.

Partnerships with governments, private sector companies and the general public are key to eliminate plastic pollution. In Kenya, for example, UN Environment has partnered with Safaricom and the National Environment Management Agency to establish an end-to-end plastic waste management programme.

The partnership will see the creation of a working group that brings together stakeholders, mostly manufacturers, waste collectors and plastic waste recyclers, to formulate a comprehensive solution to hard plastic waste.

In South Africa, citizens have been mobilised through campaigns such as Bring Your Own Bag, which encourages people to reduce the use of disposable plastic bags. In Chemba Town, Tanzania, a group of young people turned plastic waste to their advantage with an innovative solution: they collected plastic bags and repurposed them into mattresses.

THE WATER WHEEL

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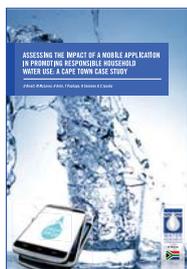
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NEW WRC REPORTS



Assessing the impact of a mobile application in promoting responsible household water use: A Cape Town case study

Research anticipates that water demand in the South African municipal sector will peak by 2035. In large municipalities, domestic water demand contributes approximately 26% to the total water demand. At the same time, mobile

phones (and other forms of information and communication technology) have become ubiquitous in households around the world, and have been identified in many contexts as being useful tools for providing citizens with contextual information to help steer behavioural change. This study assessed the effect of water-related information provided by a mobile phone application on water conservation participation at domestic or household level through a case study in the City of Cape Town.

Report No. TT 753/18

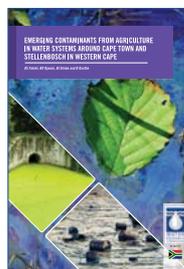


A multisectoral resource planning platform for South Africa's estuaries

The Oceans (Blue) Economy initiative is posing further demand on coastal and estuarine space and resources. On the other hand, the increased commitment to biodiversity conservation means serious multi-user conflicts emerging within these environments. In South Africa, estuarine resource management still has

a strong single sector focus (e.g. fisheries, conservation, water and waste, marine aquaculture). As a result, the use of natural resources (i.e. land, water and estuarine biodiversity) are planned and managed by different authorities through sector-specific statutory systems or mandates. The focus of this study was to address multi-sector strategic resource planning in South African estuaries.

Report No. TT 748/18



Emerging contaminants from agriculture in water systems around Cape Town and Stellenbosch in Western Cape

In recent times, residues of chemical products and contaminants, such as pharmaceuticals, have been found in aquatic ecosystems. Given the paucity of information on the occurrence of veterinary pharmaceutical residues in water resources in Africa, it becomes imperative

to undertake the assessment and monitoring of these emerging contaminants. The data obtained from such studies may play a key role in policy formulation that will ensure proper use and monitoring of veterinary pharmaceuticals; thus, preventing humans, biota and the environment from their harmful effects. In this study, a High Performance Liquid Chromatography coupled to ultraviolet detector method was optimised and validated for the separation and detection of selected pharmaceuticals identified from a screening programme.

Report No. TT 747/17



Quantifying water use and water productivity of high performing apple orchards of different canopy sizes

The deciduous fruit industry is a multibillion Rand industry in South Africa with apples accounting for about 30% of the area planted. High yielding apple orchards (≥ 100 t/ha) have become common in recent years as a result of improved plant material and orchard management

practices. International literature has shown that high crop loads are associated with high water demands. However, no information existed on the water requirements of high yielding apple orchards in South Africa prior to this study. The study focused on the main apple growing regions of the Koue Bokkeveld and Elgin/Grabouw/Vyeboom/Villiersdorp. Water supply in these regions are experiencing significant strain and the situation is expected to get worse in future as demand outstrips supply.

Report No. TT 751/18

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