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“South Africa is to move towards a more diversified water resource mix”

South Africa’s Water Research Commission – the country’s dedicated national Water and Sanitation Innovation, Research and Development Agency – aims to be a water knowledge hub active across the innovation value chain, through research and development for South Africa, Africa and the world.

The water Research Commission (WRC) was founded in 1971 to generate and promote water research in South Africa, already recognising water would be one of the most limiting factors in the country in the 21st century. As water quality and availability issues become more acute, the WRC contributes to the development of the capacity of the water sector. Dhesigen Naidoo, a thought leader and part of the global pioneering group conceptualising and implementing the New Sanitation Economy, has been leading the WRC for 10 years. A former senior civil servant with the South Af-

rican national government, he is the President of the global NGO Human Right 2 Water and a founding member of the Water Policy Group. He is also a Councillor on South Africa’s National Advisory Council on Innovation (NACI) and an inaugural member of South Africa’s Presidential Climate Change Commission. In this interview we hear the views of this leader, scientist and activist for positive social change on the present and future of water research and practice in South Africa.

How has the coronavirus pandemic affected South Africa’s water sector? And how can water security be improved?

It is without a doubt that the current COVID-19 pandemic has impacted the water sector, however, manifestation of this is at its early stages. It is well known that access to safe and reliable water, hygiene and sanitation services is central to curbing the spread of COVID-19. The South African government’s plans to organise for the provision of emergency

water supplies at the onset of the pandemic and lockdown period, through the distribution of storage tanks, water tankers and sanitisers to unserved communities showed a remarkable foresight. However, this is not to say that communities that already have access to these services or the municipalities providing this service are immune to the COVID-19 pandemic. Household and industrial water users are also at risk, especially if they can no longer pay their bills due to a lack/reduced income or job losses or cuts in the case of employees. In this case the government has to make a concession for both the user and the municipality which might be faced with a cost recovery challenge.

In a way, the COVID-19 pandemic has re-emphasised the need to improve water supply governance and ensure universal access to basic services. However, the ambition to provide universal and reliable access to water and related services also brings with it the need to seriously engage the water security

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challenge and fast track the National Water and Sanitation Masterplan interventions in order to ensure a more water secure future for the country. According to this plan, South Africa is to move towards a more diversified water resource mix, where the contribution of other water sources, such as groundwater, water reuse and desalination will be increased.

Other challenges that the water sector will have to deal with, both during and post-COVID-19 is the potential contamination of the environment and ultimately water resources, by the inappropriate disposal of used personal protective equipment such face masks and the excessive use of disinfectants. In this regard, the Water Research Commission has initiated a study to examine the extent of this potential problem and associated risks for the ecosystem.

The WRC has been researching the implementation of the circular economy in sanitation. Could you tell us a bit more about this project?

This is an area where South Africa plays a global leadership role, stimulated by and partnered with the Bill and Melinda Gates Reinvent the Toilet Campaign, now in its 10th year. Core to it is 'new sanitation'. These are innovative sanitation solutions that are generally non-sewered, with major savings on money, water and energy, as regular sewage systems are not required. South Africa, through the WRC and the SABS, pioneered the establishment of an ISO standard for non-sewered sanitation

The WRC has initiated a study on water resources contamination by the inappropriate disposal of used personal protective equipment

and then adopted a national standard in the form of SANS 30 500. The circular economy acceleration comes at the back end with decentralised waste treatment, and the beneficiation of the waste. The potential products are amazing.

The first is energy production through both biogas as well as extrac-

tion of liquid fuel using biological vectors. We are already familiar with use of slurries as fertilizer products as well as urine products for brick production. In addition, there are high value chemicals, protein and lipids. All have been proven at laboratory scale and many are used in demonstration projects and pi-



lots. Imagine a scenario, as an example, of one of these new toilet blocks in a school that saves water, provides dignified and safe sanitation service while producing energy to meet some of the school's power needs, while it contributes to accelerating a school and community food garden with almost zero

residual waste. This in turn can be replicated in most settings and at small to large scales.

What other R&D is the WRC currently working on?

The WRC has established a number of R&D programmes aimed at increasing

water security in South Africa, some of which are:

- Identifying and protecting Water Source Areas in South Africa. This is critical for a water scarce country like ours, where rainfall is high and surface water is abundant only in the eastern part of the country. We need to take care of the goose that lays our golden eggs.
- Enabling the multiple uses of water. We have worked with our funders to empower communities to use local sources of water to address their socio-economic needs that were hamstrung by water shortages.
- Finding and improving other alternative water sources. South Africa only focuses on surface water while ignoring and degrading other water sources. The WRC is promoting the use of all kinds of water (e.g., groundwater, seawater, springs and cisterns water, fog harvesting, rainwater harvesting, etc) to improve water security of all vulnerable communities.
- Developing world class and efficient water treatment technology (such as membranes). This will provide the assurance of high-quality drinking water in South Africa, especial in these times when our water resources are polluted by various elements or pollutants. We should be on top of our tech game regarding water treatment.
- Enhancing nature-based solutions as our ecological water infrastructure that can provide a sustainable water supply.
- The water energy food nexus (WEF) which has been proven to be one of



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the best approaches to adopt in water scarce countries like South Africa. WEF advances the ideal or principle which says “every drop matters”. It enables the establishment of a closed loop system where the same water can be used several times for different purposes, while also cementing the interdependence between water, energy and food systems (and practices).

How is the WRC supporting the water sector concerning climate change adaptation and mitigation?

The WRC climate change adaptation and mitigation activities are undertaken through collaborative research on priority water-related climate issues conducted with partnerships forged along the innovation value-chain, to enhance water research and development with the focus on increasing the resilience of the water sector.

The ultimate goal is to ensure the empowerment of people through improved adaptive capacity, and to develop a knowledge base for climate adaptation and decision support tools for

mitigation, while providing guidance and a framework for a coordinated sectoral response. Climate change impacts on water resources and development continue to threaten the sector. Increased occurrence of extreme climatic events comes with negative implications for infrastructure, health, production and economic growth, amongst others. Key issues of concern include disasters (floods, droughts, landslides, heatwaves, wildfires, amongst others),

water quality and health, coastal zone management, water supply, groundwater recharge and the energy–water nexus.

The WRC’s support for the climate change response is done in a coordinated effort to address the consequences of a changing climate through Climate Change Lighthouse, a flagship programme. This serves as a primary vehicle to drive research and knowledge generation on climate change



The Water Research Commission is promoting the use of all kinds of water to improve the water security of all vulnerable communities



adaptation, response, characterization of change and risks/vulnerabilities and also to contribute to human capital development to improve sectoral adaptive capacity and future response.

This programme made a significant impact, addressing a variety of issues on water and climate. These include amongst others characterizing sectoral impacts of climate change, planning for future scenarios, characterization of future disasters (drought, heat, floods), impacts on large mega dams and estuaries, adaptation, greenhouse gas dynamics and environmental footprints, and also societal impacts (displacements, vulnerability and gender amongst others). The focal areas covered in terms of research included predictive modelling/projections for the future, atmosphere-water interactions and the role of the ocean on inland climate, impacts of climate change on aquatic ecology/agriculture, water supply and local government/catchment level response.

All relevant stakeholders are actively involved in terms of participating in the activities of the climate change

programme. They also form part of an advisory panel and constitute a community of practice. More often research outcomes are communicated to stakeholders who are directly impacted by the research outputs to facilitate decision support and uptake. Operational stakeholder relations were established (DWS, DEA, DAFF on advisory and role-playing capacities). Climate change and drought atlases were published reflecting on the past and also projecting the water futures. These are amongst others tools used in terms of land use planning, spatial development planning, alternative and future land use options.

The role of South Africa in SADC and NEPAD (New Partnership for Africa's Development), especially regarding water resource and water supply and sanitation issues, poses new challenges and requires new initiatives. What projects is the WRC working on in this respect?

An important driver for the WRC is to develop solutions and models based on

science and innovation to be used and scaled up across the continent. Important very successful examples include the social franchising model as well as Multi-Use Systems. Having big African partners like the African Development Bank is an important facilitator to achieve this. In the SADC region, great strides have been made with new sanitation technologies in the Sanitation Research for Africa programme which has included 11 countries. The WRC has active partnerships across the continent with the latest being the African Water Association, which has as its members all major water and sanitation utilities across the continent.

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