FLUID THOUGHTS

WRC CEO, Dhesigen Naidoo

Research, development and innovation: Armoury for a new world order

We are meeting in the time of a new world order. This is illustrated by the 2015/16 El Niño – globally the worst in 20 years that plunged America, Africa and Asia into some of the most challenging dry conditions in recent times; and South America into some of its most devastating floods.

While the hot air rhetoric and conflict across the Atlantic divide continues around the future of the global agreements on climate change – Paris and its predecessors; Mother Nature herself, Gaia, shows little consideration for the theatricals of humans. We have seen some of the most devastating Atlantic hurricanes barrelling through the Caribbean through the Gulf of Mexico into the North American mainland, mirrored by tropical storms and typhoons ripping through East Asia and the Far East in the Pacific border. South Asia has seen the return of the monsoons with a vengeance, with annual precipitation being delivered in weeks, if not days with dire consequences. Here in South Africa, while we steadily, but very slowly ease out of drought, with the Western Cape struggling through what has been called its biggest drought in 100 years. And this reflects the Southern Africa picture.

At the same time we have seen the steady pattern of changing weather patterns, with this part of the world becoming steadily drier over the past 20 to 50 years, with milder blue wet seasons and increasingly brown, more severe dry seasons. The world had its hottest year in 2015, a few of its hottest months ever in 2016, and a continuing trend in 2017.

The New Normal

While this has been the pattern for the last decade globally, and for the last three in southern Africa, the public discourse is still that of waiting to return to a more familiar time. It is time to consider this as the New Normal. The best science we have available to us in the form of weather and climate prediction says that this is either the new normal – or a very long period of transition to a different weather and climate pattern that may be even harsher on the back of global climate change.

That is why we brought together some of the best minds in the country and around the world to deliberate on this matter at the WRC Symposium, which took place at Birchwood, Ekurhuleni, from 18 to 20 September. The engagements in the plenaries and the specialist parallel sessions led to detailed exploration of the new normal and its implications. Implications at a local to international level. Implications for decision-makers, water managers, water users, business strategy and the community at large.

The best science we have available to us in the form of weather and climate prediction says that this is either the new normal – or a very long period of transition to a different weather and climate pattern that may be even harsher on the back of global climate change.

Adaptation to the new normal

It was important that our deliberations were textured by a solution-oriented vector. We do not want to consolidate the data and information to mourn the new normal, but to work out a range of interventions to enable a sustainable development pathway in the New Normal. This must be characterised as follows:

- A new research agenda and a new way of doing that research not just inter-sectorally and in a transdisciplinary manner, but predominantly in partnership with the practitioner and user communities,
- This is a giant challenge and the little pockets of knowledge and solutions we have in different parts of the world must be brought together with greater impact through smart and generous international collaboration. We will be signing some important agreements this week to further enable that.
- We need to re-visit the regulatory environment and current infrastructure paradigm with vigour. The Millennium Development Goals had a limited global success ratio, primarily because we were trying to solve a 21st century problem with 20th century technology and 19th century operating rules. We cannot abandon the ambitious Sustainable Development Goals to the same fate.
- Enabling sustainable development and ensuring universal access to basic services in the new normal will be characterised by creativity, innovation and system amenable to dynamic adaptation and improvement.
- It also has to be one that is characterised by local actions supported by national and global endeavours. The coal face of the new normal cannot fall victim to the fluctuations of the multilateral mood. Lead locally and allow the multilateral mandarins see the light in catching and empowering human progress in harmony with the environment.

WATER DIARY

Service delivery
November 26-29
The Water Research Commission, together with the Water Institute of Southern Africa (WISA) 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

Water treatment
29-30 November
WISA along with its Process Controllers Division (Western Cape) is hosting the 8th Process Controller Workshop in Bitou Municipality. The theme for the workshop is 'Serving the water sector with professionalism'.
Visit: www.wisa.org.za for more information.

Young water professionals
December 10-13
The eighth 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://iwaywpconference.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: http://bit.ly/2yFwity

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

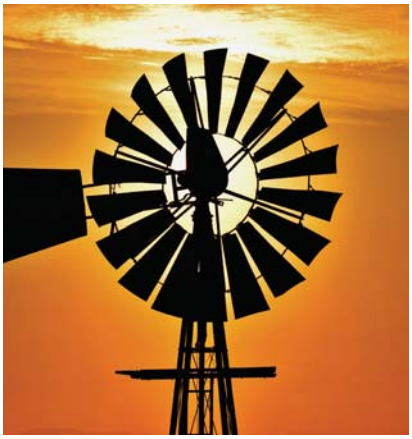
Groundwater – A solution to South Africa's drought

The possibility that drought-stricken areas in South Africa will only survive the current dry spell if the country's groundwater is effectively harnessed as an alternative water supply was one of the critical topics on the agenda at a conference hosted by the Ground Water Division of the Geological Society of South Africa in October.

The 15th Biennial Groundwater Conference, which took place in Stellenbosch, attracted more than 100 local and international delegates. Keynote speakers included John Cherry, Distinguished Professor Emeritus at the University of Waterloo, Canada, and winner of the 2016 Lee Kuan Yew Water Prize, and Prof Bruce Misstear, Associate Professor and Fellow of Trinity College in Ireland. Prof Cherry addressed state-of-the-art groundwater monitoring techniques while Prof Misstear discussed sustainable development goals and global change as related to groundwater resources development. The conference was opened by Western Cape Premier, Helen Zille.

Groundwater is a prominent topic in the drought-stricken areas of South Africa, particularly the City of Cape Town, where it has been identified as an important alternative water supply. "In times of water scarcity, we are reminded about the need for alternative, sustainable and emergency water supplies," said Chair of the Ground Water Division, Dr Matthys Dippenaar.

"There is no better time for a conference of the groundwater specialists of our water scarce country than now, while we are dealing with the repercussions of one of the worst droughts in recorded history. We trust that the conference will highlight our ability as a profession to contribute to solutions regarding water supply in our country."



NEWS

Gremlins scramble Water Wheel article

Some layout gremlins scrambled the article, 'Beyond the farm gate: Fruitlook unlocks bigger picture', that was published in the September/October edition of the ***Water Wheel***. The corrected article can be found online, Visit: http://bit.ly/2zKgWSa. The ***Water Wheel*** team regrets the error.

Helping municipalities plan for climate change

Responding to climate change is a priority for local governments, as they work to protect the quality of life of the country's most vulnerable residents; to help with this process, SRK Consulting has developed a rapid vulnerability assessment (RVA) tool.

"Understanding climate risks is essential for local government, in particular, to be able to effectively implement adaptation measures for vulnerable communities and sustainable local economic development – in terms of the Durban Adaptation Charter for Local Governments," said Warrick Stewart, SRK Consulting principal environmental scientist. "The RVA tool helps municipalities to understand the links between climate change and local environmental and socio-economic implications – and to determine the necessary proactive and reactive response measures."

While climate changes are intrinsically linked to climatic events, climate impacts are linked to the existing socio-economic and environmental conditions of a region. SRK environmental scientist, Victoria Braham, therefore highlighted that vulnerability was a function of the exposure of an area to climate change and its sensitivity to the resultant impacts – while its adaptive capacity would cushion such impacts. So exposure, sensitivity and adaptive capacity all had to be carefully measured, and this is where the RVA tool comes into its own.

The City of Mbombela is among those where the tool has been successfully applied. "The municipality appointed SRK Consulting to develop a climate change strategy and implementation plan," noted Khethiwe Malaza, head of the municipality's Environmental Management Unit. "The strategy is meant to guide and equip the city to build climate resilience and improve the community's adaptive capacity."

Some of the actions contained in the implementation plan are already being implemented by the city, said Malaza. "Working with the City of Mbombela, the spatial context of the area was analysed through the municipality's Spatial Development Framework and Integrated Development Plan – breaking each development zone down into economic sectors," explained Braham. "We could then determine the vulnerability per zone and sector by assessing existing and future stresses to the system, by projecting future climate change impacts for the municipality (its exposure), and by determining the degree of sensitivity and adaptive capacity of the system."

The RVA's findings were then used to inform the management actions that the municipality should prioritise in their climate change response strategy.

Values of water must be better understood

Water is the lifeline of our civilisation. Without it, there is no hope of sustaining households, industries, food and energy production, or such key functions as hospitals. Access to safe water is necessary in order to implement the global development agenda.

This was the main message from the closing ceremony of the World Water Week, held in Stockholm in August. Over 3 200 participants from 133 countries attended the event, an annual highlight on the international water calendar.

"With increasing scarcity, we must recognise the many values attached to water, be it economic, social, environmental, cultural or religious. I believe that by re-valuing water, we will develop a deeper understanding and respect for this precious resource, and thus be better prepared for more efficient use," said Stockholm International Water Institute (SIWI) Executive Director, Torgny Holmgren.

Throughout World Water Week, links were made between the different values of water, including its monetary value. "I believe we will see more diverse pricing structures in the future, allowing for more economical and efficient use," said Holmgren.

A growing global population is creating a higher demand for fresh water. Climate-driven changes in weather patterns, leading to extended droughts and devastating floods, further exacerbate pressure on our common water resources. "Efficient use, therefore, is not an option but a must to ensure availability for all of us," Holmgren added.

Nomvula Mokonyane, South African Minister of Water and Sanitation, stressed that we need to embrace new technologies which support our route towards the realisation of the Sustainable Development Goalss and that an appreciation must also be given to new world class technologies emanating from Africa. "We cannot afford to continue to do what we did yesterday and expect to see a different result tomorrow. We must be bold!," noted Mokonyane.

UKZN prof appointed to National Agricultural Research Forum

Prof Albert Modi, the acting Deputy Vice-Chancellor of the College of Agriculture, Engineering and Science at the University of KwaZulu-Natal (UKZN), has been elected Deputy Chairperson of the National Agricultural Research Forum (NARF).

"It is a great honour to be appointed as NARF Deputy Chair," said Prof Modi. "This role will allow me to make a significant contribution to the development of South African agricultural science and technology and, in addition, to pursue the strategic objectives of UKZN.

During his two-year term, Prof Modi will – according to a UKZN statement – provide leadership to the NARF and its Secretariat, and monitor the implementation of the programme of work approved by the organisation in Plenary. This will involve providing leadership and guidance in the achievement of strategic objectives and goals, representing the NARF formally in agricultural research bodies and strategic gathering forums, monitoring implementation of the NARF Plan of Action, chairing meetings and reporting to plenary sessions on the progress and operations of the NARF.

The statement said the role demands ability and commitment to lead agricultural research and technology development to enhance the competitiveness of the agricultural sector and contribute to economic growth and environmental sustainability.

Members of the NARF deliberate on research issues affecting the agricultural sector such as drought, climate change and variability, and their impact on agricultural production, adaptation and mitigation.

The NARF promotes and advocates the use of science, technology and innovation in the agricultural value chain as key enablers for food and nutrition security, poverty alleviation, growth and socioeconomic development.

A crop scientist, Prof Modi champions sustainable agriculture and the value of indigenous knowledge in informing Scientific research. In 2015, he received the Water Research Commission Knowledge Tree Award.

GLOBAL

New Executive Director for International Water Association

Internationally recognised water resource management expert, Kala Vairavamoorthy, has been appointed Executive Director of the International Water Association (IWA).

He took up his position on 25 September, and will be based in the IWA's Global Operations Office in The Hague, Netherlands.

Vairavamoorthy has a particular interest in urban water issues, combining a strong engineering background with practical international experience. He has published extensively and has a strong international profile working closely with the World Bank, African Development Bank, UN-Habitat, Global Water Partnership and the European Union.

Commenting on the appointment, Diane d'Arras, President of the International Water Association, said: "Prof Vairavamoorthy brings many years of high-level international experience, including as an active and well-respected IWA member. His wide scientific, managerial and cultural experience will be invaluable in shaping the IWA's future strategy. In particular, how we as a global network of water professionals can be instrumental in achieving the water-related targets of the Sustainable Development Goals."

Vairavamoorthy is joining IWA from the International Water Management Institute (IWMI), where he was the Deputy Director-General for Research. He expressed enthusiasm regarding the IWA appointment, "IWA can help the international water sector navigate a period of rapid change, and its membership is well placed to provide both innovative and well-tested solutions. IWA can also provide critical help to emerging economies in their quest for sustainable water management."

Vairavamoorthy has a PhD and MSc in Environmental Engineering from Imperial College, London and a BSc (Hons) in Civil Engineering from King's College, London. He is a Chartered Engineer and a Fellow of the Institution of Civil Engineers (UK).

Researchers develop cheaper, faster test for E.coli in drinking water

Researchers at the University of Waterloo have invented a fast, affordable way for developing communities to test their drinking water for potentially deadly E.coli.

Unlike current tests that cost tens of Dollars and take up to three days to get back from the lab, the Waterloo invention uses paper strips similar to those in litmus tests to produce results in less than three hours at a cost of 50c.

"This has the potential to allow routine, affordable water testing to help billions of people in the developing world avoid getting sick," said Sushanta Mitra, Executive Director of the Waterloo Institute for Nanotechnology.

Now being refined by Glacierclean Technologies Inc., a startup company, the test could also improve water safety in remote or rural areas of the developed world and greatly reduce testing costs for municipal treatment systems.

The bottom of the paper strip is laced with sugars, which begins to dissolve when placed in water. E.coli bacteria are attracted by the resulting sugar trail and get trapped in the porous paper when they come into contact with it. As water enters the paper, it carries the trapped bacteria into an area of the strip containing a mixture of chemicals. The E.coli react with those chemicals and turn the strip pinkish red to signify a positive test.

With high levels of contamination, a result is produced in just 30 minutes. Low levels of contamination take up to 180 minutes. Work is underway to reduce test times.

It is hoped to get the test kits onto the market within the next nine months.

Trailblazer in international water law wins global water prize

Prof Stephen McCaffrey, USA, is named 2017 Stockholm Water Prize Laureate for his unparalleled contribution to the evolution and progressive realisation of international water law.

McCaffrey, Distinguished Professor of Law at the University of the Pacific, McGeorge School of Law, in Sacramento, California, is the single most respected authority on International Water Law. His work continues to influence scholars, legal practitioners and policy-makers and contribute to the sustainable and peaceful management of shared waters.

On receiving news of the prize, Prof McCaffrey said: "Learning about the Stockholm Water Prize literally took my breath away. I am deeply honoured and humbled to have been selected for this prestigious award. But one also stands on the shoulder of others, and I am most grateful to those who have paved the way for me."

In his citation, the Stockholm Water Prize Nominating Committee recognised Prof McCaffrey's "path-breaking leadership and legal scholarship in international water law". He has made a unique contribution in three specific areas: his seminal work on Treaty negotiation; his major scholarly works, including his book, The Law of International Watercourses, and his leadership providing expert legal advice, wise counsel, training and facilitation of complex negotiations with a wide range of stakeholders."

Prof McCaffrey has been acting as legal counsel to states in several negotiations concerning international watercourses. He has served as counsel in many inter-State disputes over shared water resources, for example, between Argentina and Uruguay, Pakistan and India, and Slovakia and Hungary, which have been heard by international courts and tribunals.

He has guided, often multi-year negotiation processes among riparian countries with respect to transboundary water law, for example, on the Nile, Mekong, and Ganges, some with numerous countries involved. Although he has experienced first-hand the potential conflict over freshwater resources, he remains an optimist, pointing to studies that have shown that shared freshwater is generally a catalyst for cooperation rather than conflict.

Prof McCaffrey received his prize during the World Water Week, held in Stockholm at the end of August.

WWF launches last-ditch effort to save world's wild sturgeons

With most sturgeon species heading for extinction, global environmental conservation body, WWF, announced a new global strategy to tackle the threats facing the world's most endangered group of fish. The announcement was made at the 8th International Symposium on Sturgeons which took place in Vienna in September.

Over the past 50 years, sturgeon populations have collapsed around the world due to poaching, habitat loss, pollution and new dams blocking their migration routes. With numbers continuing to dwindle, every sturgeon species is now classified as endangered on the IUCN Red List, with 17 of the 21 species listed as critically endangered and four categorised as possibly extinct.

"Sturgeons swam with the dinosaurs 200 million years ago, but these extraordinary fish could soon disappear from the earth if we do not halt the illegal fishing and habitat destruction that are driving them towards extinction," said Stuart Orr, WWF Freshwater Practice Leader.

"Beluga sturgeon used to be the biggest freshwater fish on earth, but no one sees giant sturgeon any more: in fact it is very rare to see any sturgeon at all. We've lost some species already and we could lose them all unless governments, communities, scientists and conservationists join forces now," added Orr.

Working with partners in regions of Europe, Asia and North America where sturgeon still survive, WWF aims to help put a stop to the overexploitation of wild sturgeon for caviar and meat, preserve key migration routes, protect and restore critical river habitat, and create breeding centres to restock wild populations.

To achieve these goals, the new, long-term strategy will incorporate a wide range of activities from supporting stronger enforcement of existing laws, including fishing bans, to developing alternative livelihoods for fishing communities and ensuring sturgeon safeguards are included within the investment policies of public and private financial institutions.

THE WATER WHEEL

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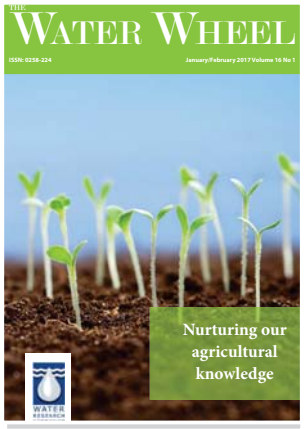

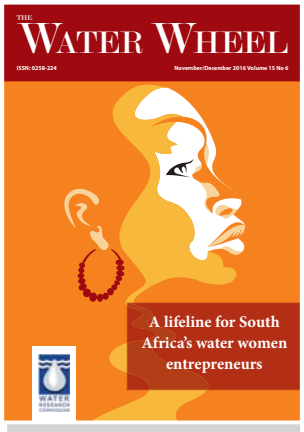

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WATER RESEARCH COMMISSION

The Water Wheel

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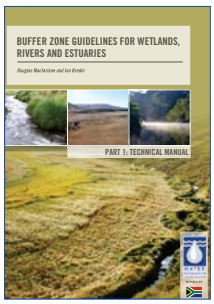
NEW WRC REPORTS

Healthy toilets are possible! School sanitation management handbook

This handbook has been produced as part of a research study titled 'Evaluating the design of existing rural school sanitation infrastructure and developing a model and guidelines for optimal design'. This research project found that many South African toilets are dangerous, dirty and degrading. Some toilets were found to pose a threat to the very lives of learners, who could fall into the pit and drown. And unpleasant toilets that are not monitored can create a space where the worst of learner behaviour can flourish, placing learners at risk of bullying, abuse and humiliation. All this of negatively affects teaching and learning. This handbook aims to ensure that the basic rights of learners are protected in the toilets. The publication covers, among others, the right to be safe at school, the need for toilets to be clean, the right to dignity and security and special support for special needs (such as menstruating girls and learners with disabilities).

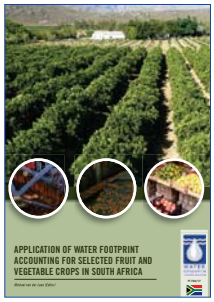
Report No. TT 699/16



Buffer zone guidelines for wetlands, rivers and estuaries part 1 and 2

These reports are some of the key outputs of a research project funded by the Department of Water and Sanitation, through the WRC. The reports are designed to be used together with a range of accompanying products as part of this project. Part 1 (Technical manual) documents the step-wise assessment procedure developed to determine appropriate buffer zones for rivers, wetlands and estuaries. This includes the rationale for the approach taken, together with important supporting technical information used as a basis for developing the tools for buffer zone determination. Part 2 (Practical Guide) was developed to assist users with the practical application of the buffer zone tools. It includes field sheets and practical guidance for collecting and interpreting relevant desktop and field information. Supporting information required to assess selected criteria has also been compiled, and includes a range of spatial datasets (shapefile or Keyhole Mark-up Language – KML – format).

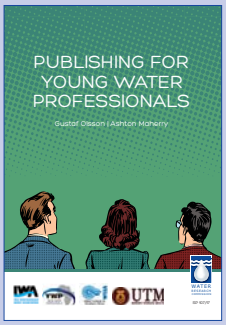
Report No. TT 715/1/17 (part 1) and TT 715/2/17 (part 2)



Application of water footprint accounting for selected fruit and vegetable crops in South Africa

This research report represents the first in a series of WRC projects on water footprint assessments for different crop types, and focuses on fruit and vegetable crops. Prior to this study, a review of the applicability of water footprints in South Africa was commissioned and published by the Commission (**Report No. TT 616/14**), which identified several potential benefits as well as shortcomings in the use of water footprints. The research conducted in this project, therefore, aimed not only to estimate water footprint metrics for important fruit and vegetable crops, but also to explore the use of different water footprint assessment approaches and to interpret the usefulness/applicability of the information generated.

Report No. TT 722/17



Publishing for Young Water Professionals

A new guideline, ***Publishing for Young Water Professionals***, is now available from the Water Research Commission (WRC). The guide, authored by Gustaf Olsson and Ashton Maherry, is the product of the Young Water Professionals (YWP) publications workshop previously conducted in Malaysia and South Africa. The workshops have been organised by the International Water Association (IWA)-YWP National Chapters, in cooperation with IWA and the Water Institute of Southern Africa, supported by the WRC in South Africa and Universiti Teknologi Malaysia.
The workshop highlighted a need for publication guidelines for YWPs. The contents of this book aim to advise and guide young people towards successful publication of their papers.
The authors have created an easy-to-read guidelines. Content covered in the guideline include language and style, writing the paper, plagiarism and cheating, the submission process, and the review process, among others.

Report No. SP 107/17

WRC SYMPOSIUM EXPLORES INNOVATION TO TACKLE NATURE'S EXTREMES

The Water Research Commission (WRC) successfully hosted its third biennial symposium with the theme 'Adaptation to the new normal' at Birchwood, in Ekurhuleni, earlier this year.

In response to the occurrence and frequency of extreme weather events, such as drought and flash floods, that have placed even more stress on South Africa's already limited water resources, the event brought together thought leaders, industry experts, government officials, young water professionals and innovators to exchange knowledge and map out bold interventions that would facilitate South Africa's adaptation to the challenges faced by the water sector.

During his opening address, WRC CEO, Dhesigen Naidoo, said the symposium took place at the time of a new world order where extreme weather and climate was becoming the order of the day. The 2015/16 El Niño event, one of the worst on record, brought large-scale droughts across South Africa. At the time of the symposium, Cape Town was still battling extreme drought conditions, and making emerging plans before its water resources ran out in March. Further afield, severe hurricanes, such as Irma and Maria, led to large-scale devastation to parts of the US and the Caribbean, while monsoons killed at least 1 400 and displaced thousands more in East Asia.

Instead of waiting for the world to return to "normal" there needed to be acceptance that, due to phenomena such as climate change, these extreme weather events were parts of a "new normal" being experienced around the globe, the CEO noted. Science, technology and innovation had a huge role to play in overcoming the challenges of a new world. "We do not want to consolidate the data and information to mourn the new normal, but to work out a range of interventions to enable a sustainable development pathway in the new normal. We need to engage this phenomenon in a way that empowers us to deal with this in a way to survive it and create the kind of world we want to see."

The symposium addressed questions such as what should the new research agenda be, how to design research programmes in a way so that all stakeholders are included, how to extract information from the pockets of excellence already in

WRC Chair, Dr Nozi Mjoli, welcoming delegates to the symposium.

Ambassadors from Mexico, Uruguay, Denmark, Israel, and Hungary joined discussions to share how their respective countries were dealing with water resource management challenges.

existence around the world, and how to organise for increased international collaboration so that we do not face these challenges in isolation.

Addressing the same symposium remotely, Minister of Water and Sanitation, Nomvula Mokonyane, reminded delegates about the reality of the rise of extreme weather patterns due to climate change and a growing global population. "These challenges require robust responses to ensure the required outcomes."

At the same time, governments around the world were tackling the ambitious targets as set by the United Nations Sustainable Development Goals. According to the minister, there was an expectation from the South African government that research and technology institutions, such as the WRC, science councils and universities, would come up with knowledge and solutions that could be translated into practical solutions to enhance water-supply, particularly to vulnerable groups.

WRC CEO, Dhesigen Naidoo, being interviewed by Rowena Baird of SAFM.

However, the new normal was not only filled with challenges, but also with opportunities, said Mokonyane. "This milieu offers additional opportunities for new entrepreneurs to enter the economy, particularly women and young people." The department, through programmes such as the Women in Water Programme, was building the necessary capacity and skill among women-owned businesses to tackle South Africa's water challenges.

WRC CEO, Dhesigen Naidoo, and CEO of the Namibian National Commission on Research, Science and Technology, Enid Keramen, following the signing of a Memorandum of Understanding between the two entities.

The first day of the symposium also included the signing of a Memorandum of Understanding between the WRC and the Namibian National Commission on Research, Science and Technology. The MoU serves as a framework that will coordinate and support water research and innovation collaborations between the two countries, building on existing partnerships between the two countries' governments. The WRC plans to strengthen its partnership in the Southern African Development Community and ultimately Africa as a whole to jointly address the challenge of water scarcity and inability to provide the human right of clean drinking water and sanitation for all.