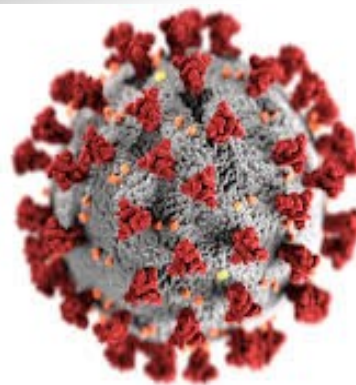


## Welcome Note

We have now gone over the half year mark of 2020. This is not an ordinary year mainly due to the rapid spread of the COVID-19 pandemic worldwide which has seen economies being shut down completely as governments take strong measures to halt the spread of the virus. Activities for organisations in the water sector in the Southern African Community region have also been affected as programmes had to stop while some had to take place online. Some of the WaterNet programmes have also been affected by the spread of COVID-19 pandemic.

In this issue:

- ♦ Message from the WaterNet Trust Chairperson - Prof Hodson Makurira
- ♦ Preparations for the 21<sup>st</sup> WaterNet/WARFSA/GWP-SA Symposium
- ♦ Regional Masters Programme in IWRM
- ♦ Projects
- ♦ Hackathon
- ♦ Upcoming Events



WaterNet held its 27<sup>th</sup> Management Board meeting online during the week of 11—15 May 2020. The rapid spread of the COVID-19 pandemic worldwide which has seen countries imposing lockdowns and airspaces being closed, necessitated the board meeting being held online. This was the first time for the WaterNet Management Board meeting being held virtually.

The Board dealt with issues related to all the WaterNet programmes, i.e. education, short professional courses, research and outreach. The Board noted how the COVID-19 has affected WaterNet programmes since the beginning of 2020. The Board highlighted that despite the effects of the spread of the COVID-19 pandemic, there is a need for programmes to continue in other forms.

One major lesson emanating from the COVID-19 pandemic is that organisations have to change the way they conduct their business. A new normal way of conducting business emerging which WaterNet and other water sector organisations have to embrace.

## Message from the WaterNet Trust Chairperson



May I take this opportunity to greet all of you wherever you are. I hope that we are all safe from the COVID-19 pandemic which the whole world is currently grappling with. The COVID-19 pandemic is a major shock that has affected all facets of our lives, that is, social, economic and political. Economies across the globe have shrunk drastically with resultant devastating impacts particularly in developing countries where safety nets are very weak.

Governments, worldwide, have taken plausible measures to help contain the pandemic which infected millions across continents. In the SADC region, capacity building activities for IWRM which are largely supported by WaterNet have equally been affected as a result of these measures. One major lesson coming out of this experience is the need to adapt to shocks of this nature by defining “new normal” so that business can still proceed.

From a Waternet perspective, measures have been put in place to minimise disruptions while maintaining safety guidelines. Our running academic programmes continue as remotely as possible in efforts to see completion of advanced dissertation studies.

The WaterNet Management Board Meeting, including the various committee meetings, scheduled for May 2020 was converted to a virtual meeting due to the travel restrictions. The process ensured that key issues regarding the governance of the network were discussed and decisions taken. However, the key outcome from this experience was the new experience of meeting remotely and still achieve efficiency through fruitful strategic deliberations on virtual platforms.

The Regional Masters Programme in IWRM students for the 2020/21 intake at the University of Zimbabwe, who had just embarked on their academic year, have been allowed to return home but will now work on their researches and present on progress through virtual platforms. The Research Methods course for this group has been offered online after which students are now at advanced stages of developing research proposals. If conditions permit, they will proceed to data collection and analysis while still at home. The participation of the students in both the online research methodology course and proposal presentation was over 90%. This is an impressive statistic for a trial period.

The short professional courses programme which were supposed to take place during the second quarter of this year have been postponed. Plans are at an advanced stages to offer a wide range of short professional short courses online as this will see more professionals from across the region benefiting from these courses even with the current travel restrictions. .

Under the ongoing research projects which include AfriAlliance, BRECCIA and ZAMSECUR, face to face planned activities (such as field visits and workshops) were suspended due to the pandemic. In order to ensure that some of the activities proceed, online meetings and workshops have been set up and are continuing during this lockdown period in many countries.

The 21<sup>st</sup> WaterNet/WARFSA/GWPSA Symposium is planned for 28-30 October 2020 in Victoria Falls, Zimbabwe. The National University of Science of Technology is the host institution. However, the hosting of the event is in doubt due to the spread of the COVID-19 pandemic. The WaterNet Board is due to take a decision on whether to postpone to next year or hold it online this year.

WaterNet will strive to adapt to the current situation and continue with its mandate to build human capacity in the region even under challenging times. I call upon all SADC Member States, SADC Water Division, WaterNet family and our International Cooperating partners to continue with their support to WaterNet. Water plays a vital role even during such periods of restricted movement and contact. We, thus, need to continue searching for solutions that will enhance water security in the region.

I would want to conclude by urging all of you to take the necessary steps that ensure your safety and that of others during these trying times.

## Preparations for the 21<sup>st</sup> WaterNet/WARFSA/GWP-SA Symposium

The annual symposia has been hosted consistently in different SADC countries including Uganda since the year 2000. This annual event has attracted policy makers, academics and development practitioners who all gather to discuss issues related to integrated water resources management and development. The event has given a lot of young scientists within the region a platform to share their research outputs and to get feedback from well experienced academics.

The preparations for the 21<sup>st</sup> WaterNet/WARFSA/GWP-SA Symposium scheduled to be held on 28 - 30 October 2020 at the Elephant Hills Resort, Victoria Falls, Zimbabwe had been on course. The theme for the 21<sup>st</sup> Symposium is Integrated Water Resources Management for Sustainable Development in Eastern and Southern Africa. The National University of Science and Technology, Zimbabwe has been the lead host of the event.

The local organizing committee for the 21<sup>st</sup> Symposium has been led by Dr William Goriwondo, of NUST. The LOC has been composed of members from NUST, Lupane State University, Dabane Trust, Bulawayo Polytechnical College and the Victoria Falls Town Council.

The COVID-19 pandemic has presented a major challenge to the hosting of the WaterNet/WARFSA/GWP-SA Symposium. With most countries and economies being put under lockdown and airspaces closed, it is challenge to convene a face to face event this year. Infections cases are rising in the Southern African region in countries such as South Africa and Zimbabwe where the event is supposed to take place. It is only prudent that the event does not take place through the conventional way.

The LOC made all the necessary arrangements related to the hosting of the Symposium such as securing the venue accommodation, airport transfers as well as excursion activities. The Victoria Falls Town Council, Tourism Authority and the Department of National Parks and Wildlife had been brought into the LOC as they are institutions which have a heavy presence in Victoria Falls and are able to provide useful advice related specific to Symposium activities



Dr Eugene Makaya Chairing the Online LOC meeting

The LOC held its meeting online on the 26<sup>th</sup> June 2020 where it considered different possibilities of hosting the symposium. The first proposition discussed was hosting the event virtually. This was seen a viable option given the prevailing circumstances. However, major limitations with this option borders around the data costs including connectivity challenges.

The merits of hosting the symposium physically were that the symposium would present the opportunities to network and possibly come up with partnerships and collaborations, interaction with participants, exhibition of different technologies and presentations. There was also value addition as participants will experience the Zimbabwean heritage and view one the world's seven natural wonders, the Victoria Falls.

The Committee noted that the advantages of hosting the symposium face to face far outweigh the advantages of hosting the symposium virtually. It recommended to the WaterNet Management Board that the symposium be deferred to 2021; and the situation be reviewed.

The WaterNet Management Board in consultation with the International Scientific Committee of Symposium 21 will thus come up with a position regarding the hosting of symposium for this year.

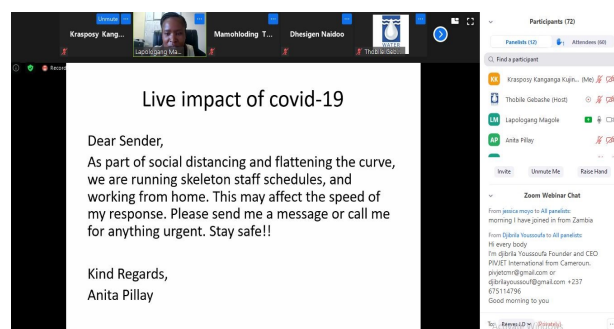
## WaterNet - WRC Webinar Series

As part of knowledge sharing process, WaterNet and the Water Research Commission of South Africa lined series of webinars. The webinars commenced on the 26<sup>th</sup> June 2020 and the last one will be held on the 21<sup>st</sup> July 2020. The first webinar which took place on the 26<sup>th</sup> June 2020 was on the Impacts of COVID-19 on Capacity Building activities in the Water Sector in the SADC Region.

The welcoming remarks were delivered by Mr Dhesigeng Naidoo, the Chief Executive Officer of the WRC. He underscored that COVID-19 has pushed us on two parallel pathways. On the one hand we have found many advantages to operate on, such as meeting online through webinars. Along this pathway, we might actually be forced into the fourth industrial revolution which could be very positive for institutions and the African continent. On the other hand, the pandemic has caused serious hardships all over the world, though Africa has up to now escaped the serious impacts of the pandemic. However, as a result of this pandemic, the global economy is expected to shrink by between 3% and 7% in 2020 and Africa's contraction will be about 4.5%. This will mean less opportunities for meeting development objectives, increase of conflict around the world and a de-development phase in our trajectory. On the other extreme end, the pandemic will force us to re-visit the development path that we had chosen for ourselves. This is an opportunity to organise for a much greener, sustainable and sharing economy closely linked to the SDGs. It is only science and technology that will enable us to go from a downward moving trajectory to an upward and moving trajectory. Science and technology will play a key role in water and sanitation if we are to have a more greener economy and food security. We need the right numbers of scientists who can create the new knowledge that will organise for a better future. Capacity is needed at all levels including for decision making. Decision makers should see the need for investment in science and technology. More partnerships are needed to achieve SDG 6 and 17.



Mr Dhesigeng Naidoo, CEO of the Water Research Commission



Dr Lapologang Magole presenting during the webinar

Dr Lapologang Magole from the University of Botswana highlighted how the COVID-19 has affected teaching and research at higher education institutions in general and University of Botswana in particular. She indicated that there has been socio-economic and technical impacts on higher learning institutions. The Socio-economic impacts being experienced include unbudgeted costs for COVID-19 preventive equipment and accessories, more reliance on online learning which is not accessible to everyone and need for online learning technological devices.

Technical impacts of the pandemic include lack of hands on practical exercises as laboratory demonstrations are done online, access to internet for students living in remote and poor communities, lack or limited accessibility to the field or laboratories and more and more reliance on secondary data which may be outdated and not useful for policy makers who need current information to make decisions.

The water sector within the SADC region will need to do the following in order to continue building capacity within the region:

- Leverage on further elevated status of water to access resources;
- Leverage on the positive impact of the pandemic of reducing costs of capacity development through remote learning
- Regional cooperation to establish robust digital infrastructure necessary for capacity development

## WaterNet - WRC Webinar Series

Dr Julie Reeves from the University of Southampton in the United Kingdom presented on the impacts of the COVID-19 pandemic on the Building Research Capacity for Sustainable Water and Food Security in Dry lands of sub-Saharan Africa (BRECCIA) project which is being implemented in Kenya, Ghana and Malawi where it aims to “strengthen individual research capabilities and institutional capacity in the three countries”

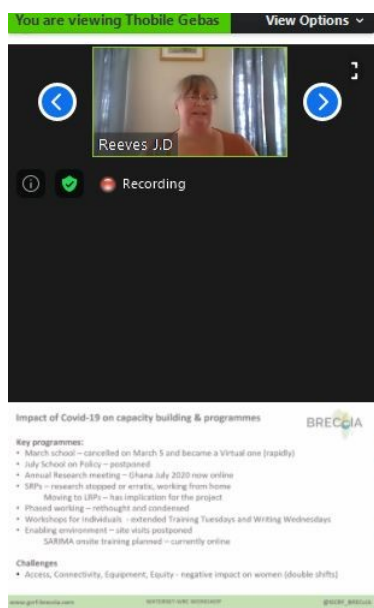
A number of activities had been planned for the project in 2020 but due to the COVID-19 pandemic these had to be re-organised and some of the activities now being offered online. There were school activities, workshops and field data collection planned which all had to be stopped. Activities such as courses and workshops are now being done online.

Dr Reeves noted that the following are some of the advantages from the COVID-19 pandemic:

- Online programme open to larger number of participants & no-boundary (SARIMA)
- Facilitates inclusivity – levels interactions, more equitable partnership working
- Attendance of online activities without moving location
- Online activities drastically reduces costs for participants and projects at large
- Facilitates an appreciative relationships – ‘bookending’ - getting to know each other – aware of contexts
- Improvise and respond to opportunities – way we utilise networks and connections to benefit programmes

However, since most activities are now being done online, the following have been noted as the disadvantages:

- Social element missing - requires effort at networking

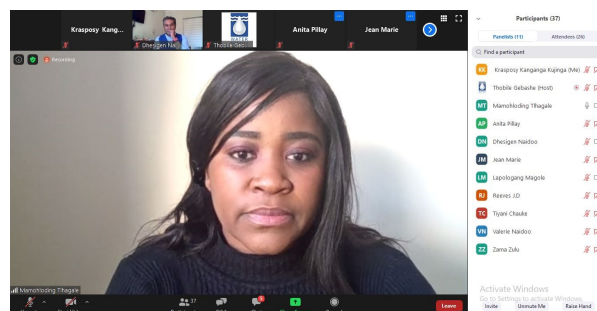


Dr Julie Reeves

Dr Valerie Naidoo gave a presentation on the impacts of the COVID-19 pandemic on the activities of the Water Institute of Southern Africa (WISA). WISA is a membership based organization which does trainings, seminars, conferences and workshops in water related areas such as water governance, sustainable operation and maintenance of water treatment plants, management of domestic wastewater sludge and advanced water control – coagulation and flocculation.

As a result of the COVID-19 pandemic, WISA has had to cancel a number of face to face courses and seminars. In order to adapt to the impacts of the pandemic, some of the course had to be offered online. Participants to courses are being given the option of learning online at their own pace.

In order to promote knowledge sharing in various water related areas, WISA embarked on the process of webinars where various topics are tackled. This has also ensured that it stays in touch with its membership during the lockdown period.



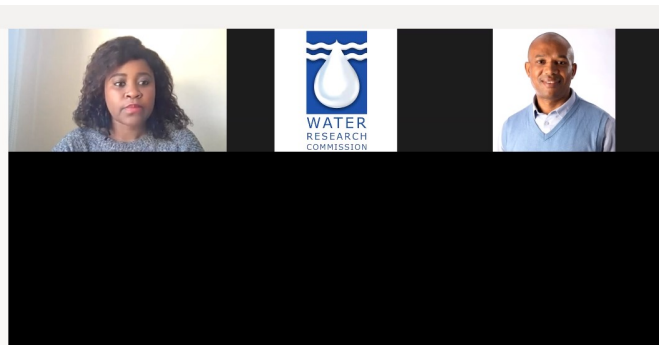
Dr Mamohlodig Tlhagale (WRC), the webinar moderator

## WaterNet - WRC Webinar Series

The second WaterNet - WRC webinar was held on the 7<sup>th</sup> July 2020 and this was on Implications of COVID-19 on the SADC Research Agenda. The opening remarks were given by Dr Nico Elema, the Programme Manager for the AUDA-NEPAD Southern African Network of Water Centres of Excellence, and Manager of the Centre for Collaboration in Africa at Stellenbosch University. Dr Elema highlighted the importance of the SADC Research Agenda which was developed in 2015 as well as its major themes. He highlighted that the major aim of the agenda is to promote evidence-based implementation of SADC water programmes and projects through multi- and inter-disciplinary research, and synthesis of existing and new information, which will lead to a realisation of SADC developmental goals.

The first presentation was given by Dr Harrison Pienaar from the Council for Scientific Industrial Research (CSIR) of South Africa. He highlighted the water related areas that CSIR focuses on:

- Big Data: acquisition, management and application-water quality, quantity, availability, use and impacts.
- Technologies: to monitor and to acquire data (static, near real-and real-time) and across a wide spectrum of applications.
- Smart/Intelligent (Water Management) Systems: for monitoring, process control and operations (individual user –industry, household, office; local and systems levels).
- Modular (Water) Systems/Technologies: waste-water treatment, purification, networks and controls (allows incremental development).
- Integrated Designs, Processes and Systems: (multiple-use) for enhanced, efficient, optimal and sustainable use of water and other natural resources (circular economies, water-food-energy, wastewater treatment and reuse).



Dr Pienaar said that due to lockdowns in most SADC countries, field research has been affected. It has been challenging for researchers to go into the field with their equipment as mobility has been constrained. Researchers need special permits either to go to the field or to access laboratories to ensure that work done is analysed. This also presents challenges for researchers who have children who have to be taken care of who are not going to school due to lockdowns. Also researchers who have compromised health situations cannot also go into the field.

Dr Pienaar highlighted that research institutions do not necessarily have to change their programmes, but have to change the way they do business. There is a greater need to think out of the box and do things differently especially intensifying the uses of certain tools for field data collection such as earth observation technologies and citizen science. Member States will need to start sharing of data at a more increased rate than before. There is need to address human capital development in partnership with regional universities. This is basically enhancing more collaboration and networks. Research personnel has to be more versed in health and safety measures.

Prof Emmanuel Manzungu from the University of Zimbabwe who led the development of the SADC Research Agenda highlighted issues which must be taken into consideration in terms of taking the agenda into the future. He emphasized the following:

- Modification or re-developing the Research Agenda
- Researchers should be given the room to do research around the pandemic rather than put pressure on them to solve COVID-19
- Clear configuration for modification and re-development processes of the Agenda under RSAP V
- A clear understanding of how the Agenda will reflect the scope of the COVID-19 “reality”
- A clear understanding of the COVID-19 reality
- Focus of the Agenda has to be on the epidemiology of COVID-19
- There is a need to understand the ‘sociology’ of COVID-19 vis-à-vis, general water shortage and dynamics in high density settlements and common water points

Prof Stanley Laphadzi of the WRC shared how the COVID-19 pandemic affected his organization’s research agenda. The lockdown imposed, affected all their partners who include private sector and universities. The WRC instituted a survey which looked at how their partners are impacted by the pandemic and how these can be minimized. WRC supports more than 400 students and all these were impacted by the pandemic. The survey showed that 46% of partners’ project were significantly affected by the pandemic. Project components mainly impacted on were research deliverables (71%) and final reports (16%). Researchers could not go to the field (38%), could not meet stakeholders or other team members (18%).

Students are mainly working from home and some of them could not be reached by their supervisors. International students who had gone back to their home countries cannot not come back to South Africa. Some contracting processes with students were affected by the pandemic.

Prof Laphadzi concluded by highlighting that the region should have a well coordinated initiative to enable rapid response for water research, development and innovation (RDI) to address impact of disasters such as the COVID-19 is urgently needed.

## WaterNet - WRC Webinars Pager

### WATERNET—WATER RESEARCH COMMISSION WEBINAR SERIES



#### IMPACTS OF COVID-19 ON CAPACITY BUILDING ACTIVITIES IN THE WATER SECTOR IN THE SADC REGION AND BEYOND

**Date:** 26 June 2020

**Time:** 10:00 – 11:00 (CAT)

##### Welcome Speaker



Mr Dhesigeng Naidoo  
(WRC)

##### Speakers



Dr Lapologang Magole  
(University of Botswana)



Dr Julie Reeves  
(University of Southampton)



Dr Valerie Naidoo  
(WISA)



Dr Joel Kabika  
(University of Zambia)

Register [here](#)

#### IMPLICATIONS OF COVID-19 ON THE SADC RESEARCH AGENDA FOR THE WATER SECTOR

**Date:** 8 July 2020

**Time:** 10:30 – 11:30 (CAT)

##### Welcome Speaker



Dr Nico Elema  
AUDA-NEPAD SANWATCE

##### Speakers



Prof. Emmanuel Manzungu  
(University of Zimbabwe)



Prof Stanley Liphadzi  
(WRC)



Dr Harrison Pienaar  
(CSIR)



Dr Mamohloding Tihagale  
(WRC)

Register [here](#)

#### WATER, ENERGY AND FOOD NEXUS AND THE COVID-19 PANDEMIC

**Date:** 21 July 2020

**Time:** 10:30 – 11:30 (CAT)

##### Welcome Speaker



Prof. J.M Kileshye Onema  
WaterNet

##### Speakers



Prof. Larry Swatuk  
University of Waterloo



Prof Sylvester Mapendeli  
(WRC)



Prof. Graham Jewtitt  
(IHE-Delft)

##### Moderator



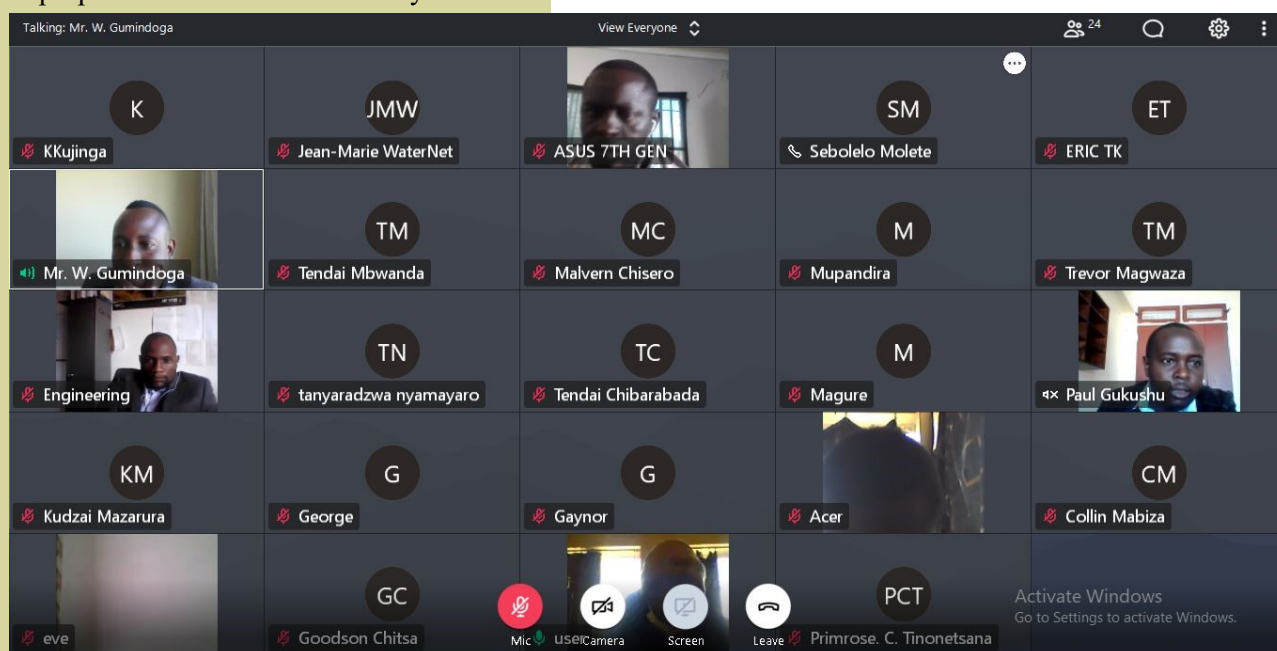
Dr Mamohloding Tihagale  
(WRC)

Register [here](#)

## Regional Masters Programme in IWRM, 2019/20 Intake

The 2020/21 MSc in IWRM class has a total of 26 students. Seven of the students are being funded by WaterNet. The WaterNet funded students arrived at the University of Zimbabwe on 2<sup>nd</sup> March 2020 and started lectures on 9<sup>th</sup> March 2020.

Due to the COVID-19 Pandemic, the University closed on the 23<sup>rd</sup> of March 2020 after the students had taken and written the exam on the first module, Principles of IWRM. All the foreign students are currently in their respective home countries. The students have been able to do part of the Research Methods course online in April 2020. After the online course students were asked to start working on their research proposals and were also allocated supervisors. The students presented their proposals online on the 31st July 2020.



The online proposal presentation process

**Table 1: Project titles of students for IWRM students**

Name	Programme	Proposed Research Topic
Evelyn Tatire	IWRM	Analysing the contribution of indigenous knowledge systems of climate change adaptation in Zimbabwe: A case of Muzarabani district, Zambezi Valley.
Edimus Musona	IWRM	Understanding deforestation in resettlement areas in Bubi: Drivers, Implications and key options.
Paul Gukushu	IWRM	An analysis of water, irrigation systems efficiencies and the availability of WATSAN facilities for the revitalization of small holder irrigation schemes in Zimbabwe under the Small-holder Irrigation Revitalization Programme (SIRP)
Tendai Mbwanda	IWRM	Coping with floods and droughts and sustaining livelihoods in semi-arid Zimbabwe: A case study of climate resilience in Gokwe, Muzarabani, Mwenezi and Tsholotsho Districts
Tawanda Bangwayo	IWRM	Irrigation performance assessment using Remote Sensing based Surface Energy Balance Techniques in Hurungwe
Panduleni Shikongo	IWRM	The assessment of non revenue water losses implications in an arid environment
Martin Magure	IWRM	Application of remote sensing and GIS in assessing potential sites for wetland restoration in urban areas: A case study of Marondera.

## Regional Masters Programme in IWRM, 2019/20 Intake

Name	Programme	Proposed Research Topic
Nyasha Mkwanda	IWRM	An evaluation of water supply efficiency and management in Wenimbi dam supply system in Marondera
Farai Kwenda	IWRM	Using the adaptive framework policy assessment of adaptation capacity to droughts in the lowveld of Zimbabwe. The case of Mwenezi, Tsholotsho, Gokwe and Muzarabani Districts.
Eric Tshitende	IWRM	Assessing river morphodynamics and response to land use and climate change
Chrispen Nyangombe	IWRM	Investigating community management of solar piped water schemes in rural areas of Zimbabwe case study Mt Darwin District
Malvern Chisero	IWRM	Investigating groundwater contamination from sewerage, latrines and solid waste in St Mary's, Chitungwiza
Xolile Tsabedze	IWRM	Investigating spatial and temporal variation of water quality in large distribution systems. A case study of Mbabane town a capital city of Eswatini.
Sharon Chimbetete	IWRM	Reuse of treated sewage for irrigation
Ntombikayise Dhladhla	IWRM	Assessing water losses in the water supply system of the Central Region (Matsapha and Manzini), Kingdom of Eswatini
Forgiveness Muchaka	IWRM	Rainwater harvesting as an alternative water supply option in Harare
Rumbidzai Muvango	IWRM	Effectiveness of chlorophyll as a long term measure in water quality monitoring
Frank Chindomu	IWRM	Assessing water availability and consumption in the Manyame basin using rs and geostatistical approaches
Bright Mukandiwa	IWRM	Estimating of crop water productivity using satellite remote sensing at plot scale in and irrigation system
George Runzonza	IWRM	Distributed hydrological modelling to improve water balance estimation
Primrose Tinonetsana	IWRM	Mapping ground water potential zones in a Lower Mzingwane Subcatchment
Ruvimbo Tsomondo	IWRM	Assessment of non-point source pollution using AGNPS model, remote sensing and GIS
Moven Munoti	IWRM	Impact of land use and land cover changes on surface energy and water balance in Mazowe Catchment
Ibahnash Mupandira	IWRM	Impact of veld fires on water balance
Kudzai Tafamba	IWRM	Hydro-meteorological triggers for floods and landslides in Chimanimani
Fusi Mukhosuoe	IWRM	Wetland water balance assessment
Kudzai Mazarura	IWRM	Monitoring and Modelling phytoplankton distribution in an artificial wetland using Sentinel 2A Imagery and Semi Empirical band ratio model for Case 2 Waters: Mazowe
Aleck Sithole	IWRM	An evaluative analysis of prevalence of climatic change hazards in Gokwe, Muzarabani, Tsholotsho and Mwenezi districts of Zimbabwe

## IHE - Delft Symposium on Water Sector Capacity Development

The IHE Delft organized the online Symposium: 'From Capacity Development to Implementation Science' on May 26-29, 2020. This was the 6<sup>th</sup> edition of its international symposium on knowledge and capacity development for the water sector. The symposium called attention to the strategic importance of knowledge and institutional capacity for policy, operational practice and education. This is urgently needed to address the current and growing challenges in water management for a sustainable, secure, just and equitable world.

The online event brought together scholars, decision-makers and practitioners to discuss the current and future role of capacity development and take a forward-looking and action-orientated approach. This is required to identify priority capacity development subjects and projects that increase resilience, equity and water security - by water themes, geographical areas, policy and implementation issues and education. As in previous years, the symposium acted as a catalyst to build commitment among participants, leading to future action and collaboration.

Plenary sessions of the symposium focused on implementation science, models for education and managing organizational change. There were 8 tracks focusing on:

**Track 1:** Moving to an implementation science – explored the barriers and bridges to capacity development and the potential of implementation science.

**Track 2:** Capacity to operate under complexity and uncertainty – focussed on operating within an increasingly complex and unpredictable global environment.

**Track 3:** Capacity for managing conflict and for negotiation - looked at the potential for partnerships in resolving conflicts.

**Track 4:** Capacity in utilities and other institutions to achieve the “last mile” of the SDGs – explored institutional capacity and delivering the SDGs.

**Track 5:** Capacity for water financing – looked at the challenges, opportunities and needs for developing sustainable water finance.

**Track 6:** Accelerating knowledge sharing among organizations and in civil society – focused on collaboration, partnerships and reaching local communities.

**Track 7:** Enhancing education and training, and behavioural skills – explored the competences, collaborations and technologies we need for effective education and training for future water capacity.

**Track 8:** Using ‘big data’, ICT, AI and e-based tools – looked at the potential of data tools and reuse in specific applications.

Prof Jean-Marie Kileshye Onema, Executive Manager of WaterNet presented on ‘Partnerships for sharing and learning Water and Climate knowledge in Southern Africa and beyond’ during this online Symposium. He defined purpose driven partnerships giving examples of partnerships established by WaterNet in the Southern African Development Community (SADC) and beyond. His take home message highlighted on the importance of institutionalization to sustain partnerships, strategic alignment, integrated approaches, common challenge, mutually enriching endeavours and commitment. Another issue that emerged was the partnership ladder that comprises of communication, coordination, cooperation and collaboration.

## AfriAlliance Project

# Save the date

## Massive Open Online Course

## Social innovation in water and climate change in Africa

2 June - 12 July 2020



Join this AfriAlliance MOOC:

- Relate social innovation to real life water and climate challenges
- Apply your knowledge to case studies in Africa
- Discuss social innovation with other MOOC participants

[Register now!](#)



### For Whom

Young & experienced water professionals with a background in natural, applied or social sciences, working or interested in Africa

### Workload

2-3 hours per week (over 6 weeks)

### Certificate of attendance upon completion:



Find out more: [www.afrialliance.org](http://www.afrialliance.org) [afrialliance@un-ihe.org](mailto:afrialliance@un-ihe.org) [@AfriAlliance1](https://twitter.com/AfriAlliance1)



AfriAlliance has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no 689162.

WaterNet co-organizes the 2<sup>nd</sup> AfriAlliance MOOC on Social Innovation in Water and Climate Change in Africa

The AfriAlliance project held a Massive Open Online Course (MOOC) on "Social innovation in water and climate change in Africa" from 2 June to 12 July 2020. IHE Delft together with several partners (WaterNet, Water Research Commission, WE&B and Global Water Partnership), were directly involved in developing and delivery of course content. The MOOC aimed to increase awareness of the potential of social innovation to address water and climate challenges in Africa and targeted at Water Professionals across the globe. The MOOC was well received by water professionals with 862 participants registering the course. Professor Onema who was tasked with the introductory module to the MOOC hoped that at the end of the course participants would better understand social innovation and apply the newly acquired knowledge to specific water-related issues.

## BRECCIA Project

**Understanding magnitude and variability of yield gaps in smallholder farming systems of sub-Saharan Africa**

**By Dr Tendai P. Chibarabada**



Maize harvesting and yield determination at SeedCo Research Station in Zimbabwe

Driven by the need to improve food security in sub-Saharan Africa (SSA), BRECCIA researchers are undertaking research to model crop yield and yield gap of maize in SSA and to further understand drivers of productivity gap under different socio-economic and biophysical environment contexts. Understanding the drivers of poor productivity will aid in identifying solutions to improve food production and ultimately food security. Hydrological and crop models are being coupled with earth observation data to estimate crop yield at fine spatial scale. During the 2019/20 cropping season the team embarked on collecting field data and socioeconomic household data in 150 farmers' fields in the lake Chilwa basin in Malawi. In addition, maize experimental trials were conducted in Malawi and Zimbabwe. The project was well received by the local governments and rural communities who allowed BRECCIA researchers to collect ground data on leaf area index and yield in their fields. In addition, rural communities and extension workers assisted in the establishment of the experimental trials (planting), management of the trials (weeding and data collection) and determination of yield. They were eager to learn more on agricultural research and to also share their knowledge in managing maize trials. To determine the causes behind yield gaps, meteorological, biophysical and socio-economic data are being collected in the different regions. All the data being collected will be used to develop a spatialised crop model that can be applied to determine optimal crop management to reduce the observed yield gap and to optimize the environmental performance of maize. This can guide farmers on more productive management and guide policies on how to improve productivity of rural small holder farmers which will in turn improve food security and livelihoods.

# BRECCIA Project

## How virtual tools support a team of international researchers amid the Covid-19 pandemic

BRECCIA team members who include Catherine Tlotlo Kerapetse, Daniela Anghileri, Julie Reeves, and Justin Sheffield developed a Blog aimed at knowledge sharing during the current lockdown due to the Covid-19 pandemic. The blog was inspired by the team's immediate response to Covid-19 strict measures which compelled for a responsive lockdown and movement restrictions around the world. A face to face two weeks workshop was immediately converted to a two-week virtual workshop without prior planning! Many lessons for researchers can be drawn from the blog post.

Find the BRECCIA project post on the website: <http://www.gcrf-breccia.com/>



The 2019 Covid-19 pandemic is forcing humanity to develop adaptive measures for communicating, and virtual platforms have become the standard mode for personal and professional communication globally. This has been the case for a team of 60 international researchers, from Europe and Africa, collaborating on the interdisciplinary project BRECCIA addressing food and water security in sub-Saharan Africa. As with many international research projects, face-to-face meetings are vital to support collaborative and innovative team working; but Covid-19 has forced BRECCIA to embrace technology more than ever and as the only option for collaboration. Due to the pandemic, a two-week's face-to-face workshop had to be transformed into a virtual one, rapidly. Initially, most researchers were sceptical about this decision: How can a virtual interaction be as effective as an in-person meeting? Can it be sustained for 2 weeks? How can technological challenges be addressed to guarantee equitable participation from both Europe and Africa? Below, we share some lessons learnt from this experience which can be useful for other international research teams. The following are key

areas for the success of virtual platforms:

**Plan yet be flexible:** Power disruptions and internet instability are a challenge for many developing countries; establishing alternative modes of communication, or back-channels, are vital to ensure participation despite technical challenges. Mix on-line group and off-line individual activities; record sessions and take minutes for participants to visit later. Allow for parallel use of alternative communication platforms (such as emails or WhatsApp).

**Budgeting to level technology disparity:** Poor internet connectivity undoubtedly hinders participation. Adjusting research budgets to ensure participants have secure internet connectivity might be necessary; indicating that research investments particularly in ICT are key to success. Dedicated rooms such as boardrooms are useful for local small group online participation, whenever possible.

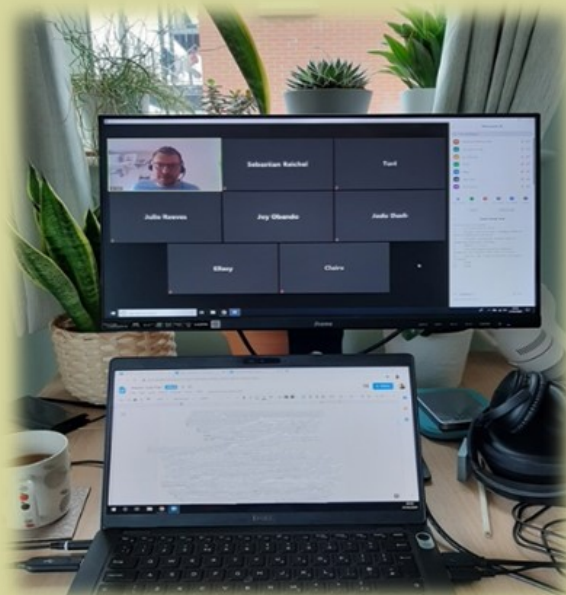
**Make sessions inclusive and diverse:** Familiarise participants/audience with tools and software, including back-up channels, from the outset. Plan short and highly interactive sessions where everyone is encouraged to participate; long presentations are boring for participants online. If participants have a range of backgrounds, include diverse content i.e. introductory levels, theoretical models, technical sessions, and practical experiences – assume nothing. Make use of the many interactive online tools to encourage feedback and inclusion.

**Sustain participant motivation:** A willingness and commitment to work online are particularly important. Whilst the nature of collaborative work requires continued communication and adaptability, participants will need to make every effort to realise tangible results online and may need to adjust their personal objectives to benefit the research and aims of the group.

**Actively overcome virtual fatigue:** Prolonged on-line meetings can be very tiring as they usually require additional effort to focus on verbal communication only. It may be difficult to rely on body language and facial expression as an additional means of communication – exacerbated by poor connectivity. Plan for multiple breaks and participants. Fun activities as games or round of video waves will help sustain motivation

activities to facilitate human and emotional contact between the participants (not only virtually).

Although the two-weeks period seemed awfully long and fatiguing to commit to from day one, some in-built personal motivation makes it worthwhile. Self-discipline, commitment to work and maintaining an open mind contributes positively. Covid-19 has clearly interrupted international research projects and presents a challenge, yet with new approaches and awareness, virtual collaborative working is not only possible – it can work!





# ZAMSECUR Project

## Field measurements to validate satellite based evaporation estimates in the Miombo Woodland

By Henry M. Zimba (Delft University of Technology)

Supervisors: Dr. Miriam Coenders-Gerrits<sup>1</sup> and Dr. Kawawa Banda<sup>2</sup>

<sup>1</sup>Delft University of Technology, <sup>2</sup>University of Zambia

Evaporation, which can loosely be defined as “loss” of water to the atmosphere from open water bodies, soil and vegetation, is one of the key components of the water balance needed for efficient management of water resources. Evaporation data is required to assess how much water is available for use by various competing needs including the environment, agriculture, energy production, industries and domestic consumption. In Africa there is scarcity of field information on evaporation which is a recipe for chaotic attempts at water resources management especially at catchment and regional level. Estimating evaporation from field data is a tedious, costly and complicated process with limited applicability. For instance, a number of point based approaches to estimate evaporation exists but their application at catchment and regional level is extremely limited. Although the point based field data can be extrapolated the process is marred by uncertainties and may result in either under or over estimation of evaporation values over space and time. The use of satellite based evaporation data is thus seen as a better alternative to the use of field data. Globally there is an increase in usage of evaporation data retrieved from satellites in hydrological models. This is because, unlike field based evaporation data, use of satellite data comes with the convenience of wide coverage, increased capture times and repetitiveness even in the remotest of areas. There also exists different algorithms to retrieve the evaporation information from the satellite data. However, like in field based approaches there is a challenge in ascertaining which of these models performs better for a given environment i.e. natural forests like the Miombo Woodland in Africa. In most cases, if not all, it is not known to what extent the information retrieved from satellite data reflects physical conditions on the ground. This makes it difficult to trust what satellite sensors “see” in terms of evaporation in relation to the actual physical dynamics on the earth more so in Africa where reliance on satellite data is growing by day due to lack of capacity for field observations.

The only way evaporation data retrieved from satellite sensors can be applied with a given confidence level is through performing a validation process. However, validation is a tedious and expensive process prone to several biases. Furthermore, the existence of several field based approaches, expensive and relatively cheaper, to estimate evaporation makes it difficult to determine which one is appropriate for a given ecosystem. Each approach comes with its own level of uncertainties and likely to yield different results for the same environment. The field measurements requires setting up of flux station/observation tower on which to install the necessary equipment for data collection. There are very few observation stations/flux towers in Africa and none in the study area in the Luangwa Basin, Zambia. Furthermore, most remote areas in Africa are hard to reach due to poor road network, lacks electricity/power and have poor to no telecommunication network making it impossible to deploy certain innovative technologies to enable remote data downloads. The development of affordable and energy friendly integrated climate stations i.e. TAHMO stations, could change the way field data for estimating evaporation is collected in Africa. The ability to incorporate several sensors with minimal power requirement makes it suitable for collecting key variables for estimating evaporation in forests such as the Miombo. The weather station is very light making it possible for installation on simple towers which can be made from local forest material. Additional sensors to collect the net radiation and ground heat fluxes can easily be set up alongside. By installing two weather stations on different heights above the forest canopy necessary information to apply the Bowen Ratio energy balance method can be obtained. The sensors are set to collect data at desired intervals and can be left logging data for longer period i.e. months. This allows for collection of time series enough to monitor the dynamics for longer periods. In addition, this study also incorporates the use of the Distributed Temperature Sensing (DTS) system. The DTS is used to collect data along a continuous vertical profile several meters above the forest canopy to the forest floor. Unlike the integrated weather station the DTS measurements enables detailed measurements of the different vertical energy fluxes in the forest from which evaporation is also estimated.

Integrated weather stations can be installed on various land cover types, in this case the Miombo forest, in different locations to collect field data to verify satellite retrieved evaporation data. From the same data set several field data based algorithms i.e. energy residue approach based on the Bowen ratio and the Penman Monteith algorithm can be used to estimate evaporation making it possible for within data set verification of the approaches. The field measurements can then be compared to several satellite based evaporation and the model with the “best fit” can be selected for use as appropriate for a given environment i.e. the Miombo ecosystem.

To consolidate on the availability of field evaporation data the integrated weather stations can continue to be used as they are low maintenance and affordable to institutions tasked with data collection and analysis for water resources management. Low cost flux towers can also be easily constructed from local forest materials. This would ensure field data is continuously available and can be used to validate any new satellite data collected even if sensors and algorithms change. This will ensure hydrological modelling in Africa, in particular the Zambezi Basin, achieves a certain level of certainty especially with respect to evaporation as an input in hydrological models.

Data collection and processing from both the integrated weather stations and the DTS is ongoing. The study location is in the Miombo Woodland at Mpika, north western part of the Luangwa Basin in Zambia.



# ZAMSECUR Project

## Evaluation and improvement of Remote sensing-based methods for River flow Management

By Hubert Samboko (Delft University of Technology)

Supervisors: Prof Hessel Winsemius: (TU Delft)

Prof Hodson Makurira: (University of Zimbabwe)

Prof Savenije : (TU Delft)

It is incredible how the Zambezi basin is the source of life for millions of species including humans. The basin is part of the mighty Zambezi River and its biggest tributary ('the Luangwa'). There are a multitude of reasons why it is important to keep track of the health of this ecosystem. One of the ways to do this is measuring the amount of water flowing through the main tributaries. Unfortunately for the local water authorities this poses an enormous challenge. Wild animals, flooding, dirt roads and limited budgets are just a few of those challenges. My study is exploring ways in which '**low-cost Unmanned Aerial Vehicles**' (UAVs) can be used to determine the geometry and therefore flow of rivers. The study is also exploring how the affordable '**RTK-GPS**' equipment can be used to replace traditional expensive gadgets to achieve the same goal (accuracy).



Data collection in the field



## WaterNet students participate in the 2020 Global Water Innovation Lab

Three WaterNet IRWM Masters students (Memory Sibande, Celso Muima and Lungile Dube) have been selected to participate in the 2020 Global Water Innovation Lab that is running online between June 11 and Nov 15, 2020. Waterlution's global Water Innovation Labs are front-running, immersive leadership development experiences designed to accelerate collaborative innovation, fast-track global knowledge sharing and devise new innovations that improve water security and support emerging leaders (18-35 yrs) to implement SDG targets connected to water in their organisations and projects. The Global Water Innovation Lab blends applied leadership skills training with opportunities for regional, national and global collaborations around water. This is paired with multiple funding & mentorship opportunities for collaborative water innovation projects. This will complement the WaterNet's IWRM Masters Programme in Integrated Water Resources Management that seeks to build capacity of future leaders to tackle Africa's water challenges in a sustainable and integrated manner. The WaterNet MSc students will have an opportunity to interact and collaborate with peers around the world, thereby increasing their networks.



Memory Sibande



Celso Muima

# HACKATHON



The Water Research Commission and WaterNet partnered to hold a Hackathon (10 – 11 July 2020), an innovative format of competing teams in developing digital solutions to pre-defined problems in a short timeframe. However, hackathons were not a goal in themselves but were embedded in a bigger process. The networking event reflected critically around hackathons as possible "problem solvers" for the water sector. The discussion aimed to tackle benefits and bottlenecks of the format "Hackathon" to identify suitable and demand-oriented digital solutions to complex development problems in the water sector.

In his opening remarks at the start of the Hackathon, the WRC Chief Executive Officer, Mr Dhesigen Naidoo, highlighted that the world at large and Africa in particular are currently facing challenging times due to the rapid spread of COVID-19 pandemic. In countries like South Africa cases are picking up at a very fast rate. This actually could be signalling the start of a new and positive age where digital solutions are needed as there is less and less human interaction. Mr Naidoo emphasised the centrality of the water agenda where capacity which emphasises on skills, jobs and livelihoods for the future are key. He highlighted that time has come for the world including the SADC region to put emphasis on innovation in the water and sanitation sector and to do things differently. "The hackathon, thus, opens up an avenue for the youth to come up with better ways of doing things differently", said Mr Naidoo. He finished his address by hailing the WRC and WaterNet partnership in different areas including the hosting of Hackathon.

Prof. Jean-Marie Kileshye Onema, the WaterNet Executive Manager, said WaterNet has a passion and mandate to build human capacity within the water sector in the region, and the hackathon is one such avenue. He highlighted that there is need for ensuring water, food and energy in the SADC region. As such, there is to transform the region into a low carbon and resilient society. For water to make a difference in the region, there is need to think for solutions outside the box and the Hackathon is one such avenue. As such, WaterNet really supports the concept of social innovation. "WaterNet is thus happy to be part of the Hackathon event and really looking forward to the kind of digital solutions that will be brought forward by the participating teams".

Prof Tshilidzi Marwala, the Vice-Chancellor of the University of Johannesburg delivered the keynote address during the official opening of the Hackathon. He underscored the need for artificial intelligence (AI) and machine learning in solving challenges being faced by humanity including water and sanitation. Artificial Intelligence has the capability to change the way we do things and the water sector has to embrace this technology. COVID-19 has particularly made it imperative for all sectors, including the water sector to embrace AI. Artificial Intelligence can facilitate the solving of challenges being experienced by the water and sanitation and agricultural sectors. This intelligence can be used in water quality monitoring, environmental flows, water supply and many other water related areas. Human capacity building is very key if goals of the 4<sup>th</sup> Industrial Revolution are to be attained.

## HACKATHON WATERNET CHALLENGE WINNERS

The WaterNet Challenge was for the teams to come up with human water foot print tracker to enhance communication and human behavior change. More than half of the water wasted globally is mainly because of human activities and there is need to make everyone aware of this using technology.

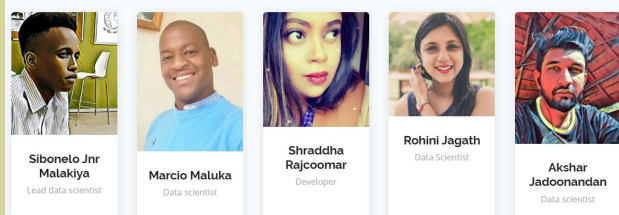
### The Tweet-a-Leak Project

Home About Dashboard Team FAQ Contact

Get Started

#### TEAM

The Project has 5 committed individuals that manage the system



The winning team was the Panda Pushers which comprised of 5 data science students from the Explore Data Science Academy (Sibonelo Jnr Malakiya, Marcio Maluka, Akshar Jadoonandan, Rohini Jagath, Shraddha Rajcoomar), who gathered virtually to brainstorm ideas that would best suit the water related challenges of the hackathon. After exploring at least 3 of these ideas, they had settled on one. Team Panda Pushers managed to navigate their way through the 48 hour challenge despite the load shedding. The tweet-a-leak system they designed, scrapes tweets, filters them, passes them through a database and then displays them on a dashboard on their website. These dashboards are intended to inform municipalities of leaks reported via twitter. The team plans to expand their system by allowing twitter users to

tweet pictures of leaks, these pictures will then be passed through a machine learning model that will classify the type of leak and display the relevant information on the respective municipal dashboard. The integration of existing short message systems (sms) for leak reporting, is also within the future plans of the team. The team is grateful to the mentorship received by mentors within the hackathon as well as to WaterNet for sponsorship of the prize. The team won ZAR15,000.00 cash and sponsorship for one of the team members to attend one WaterNet symposium.

The number 2 winning team came up with a Smart Water System which is a comprehensive solution for recording, analysing and managing water usage in households through the help of modern technology. Water is a need, and our goal is to ensure that this need is protected, accessible and sustained. The Smart Water System comprises of water measurement hardware for the kitchen, bathroom and outdoor use. This hardware feeds an information hub with real-time data to support the recording, analysis and management of water. The applicability of the system is limitless and will assist with decision making, resource allocation, as well as long-term planning. The system functions through a progressive web application called Every Drop. Every Drop is an application that serves households and corporations with tools that allow them to record their usage, analyse their habits and make improvements towards their water footprint. This system gives control to households, corporations as well as state entities so that they can take on an accountable role in protecting and sustaining water. The team had this to say "Our journey in the hackathon started off amidst challenges of electricity outages, but we were able to connect as a team and lean on each other's strengths in order to deliver to the best of our abilities. From our virtual initial meeting and throughout the hackathon, we allocated tasks and made use of collaborative tools to assist us in creating a presentation and demo of our solution to the proposed challenge. Gabriel Cassim who is a Full Stack JavaScript Developer focused on the development of the Every Drop application and Mbuso Mothiba focused on the business development and marketing of the solution". The team won ZAR7,000.00 cash.



WaterNet plans to support the top winners to develop products that can be up-scaled, commercialized and incorporated into WaterNet's trainings and outreach programmes.

A panel of judges assessed the projects that were presented and selected the top three. The panel comprised of Prof Jean-Marie Kileshye Onema (WaterNet), Ms Ntombi Radebe Tsotetsi (The Innovation Hub), Dr Sibusiwe Makanya (IBM Research Africa), Dr. Manjusha Sunil (WRC) and Prof Joseph Adelegan (University of Venda). See picture of the judges on the left

# PREVENT THE SPREAD OF COVID-19...



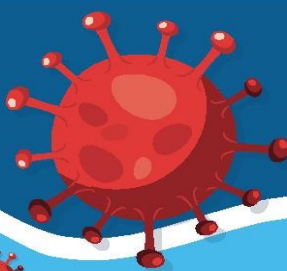



Human Settlements  
Water and Sanitation



**KEEP SAFE AND VISIT**  
[www.wrc.org.za](http://www.wrc.org.za) for more information

## ABOUT CORONAVIRUS DISEASE (COVID-19)

Coronavirus disease (COVID-19) has been declared a pandemic by the World Health Organisation.

**SYMPTOMS**

- SHORTNESS OF BREATH
- FEVER
- DRY COUGH

**HOW SOAP AND WATER HELPS AGAINST COVID-19:**

The coronavirus consists of RNA in a package of protein and FAT. Fats are very easily dissolved in SOAP! By washing your hands with soap, you are breaking down the virus.

**PREVENTATIVE MEASURES:**

- WEAR A MASK TO PREVENT SPREAD OF GERMS
- WASH HANDS WITH SOAP AND WATER (20sec)
- NO PHYSICAL CONTACT
- SNEEZE AND COUGH INTO A TISSUE OR YOUR ELBOW
- USE HAND SANITISER

**ENSURING SAFE WATER AND SANITATION**

To date, there is no evidence that the virus causes infection and can be transmitted through treated drinking water or groundwater. Here are a few ways we can keep water and sanitation safe.

- UNTREATED WATER
- FILTRATION
- BOIL WATER TO 100 °C
- DISINFECT WITH A SAFE AMOUNT OF BLEACH
- PROTECTIVE GEAR FOR SANITATION WORKERS
- KEEP LID CLOSED WHEN FLUSHING
- NO OPEN CONTAINMENT OF FAECAL MATTER