UNIVERSITY OF KWAZULU-NATAL
INYUVESI YAKWAZULU-NATALI
Centre for Water Resources Research
Making a difference - One drop at a time.

CWRR Newsletter July 2020
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Words from the CWRR Director

Friday 31 July 2020

I trust you are all well and coping as best you can in the circumstances we all find ourselves in as a result of the COVID-19 pandemic and subsequent lockdown. I know that some of you are working under difficult circumstances. My heart aches as we hear more and more of the impacts of the pandemic, particularly on hunger, and despair on loss of income and closure of businesses. Those of us who have continued to receive regular income are very fortunate and need to count our blessings.

UKZN has, as have all tertiary institutions in South Africa and internationally, gone from a fully contact delivery mode to a fully online/virtual delivery mode in less than three months. In my wildest dreams I would not have thought this was possible! This has required an enormous effort from the teaching staff and many adjustments for students who have generally become very adept with IT and have been thrust into the 4th Industrial Revolution.

The above reminds me that we need to look at taking whatever positives we can from the situation in which we find ourselves. For example, there has been an explosion in the number of online webinars and podcasts available with interesting topics and enlightening discussions - this can be overwhelming but is a huge learning opportunity as well. A number of conferences have been held online and, while this limits opportunity for face-to-face contact to build relationships with colleagues, the absence of travel and accommodation costs have made attendance to a much large audience possible. As researchers and innovators we need to view this as an opportunity to make a difference both in our work and professional environments, and in our communities where we live.

The CWRR has endeavored to continue providing an "online" service to support members during the lockdown period. I know some of the responses and document processing have been a bit slow, and there are still bottlenecks in the UKZN administration system, but we are nonetheless operating and the turnaround times in the system are generally improving. Thanks Marsha and Noluthando for all your administrative support!

While still adapting to operating in the online environment, we have continued with MANCO, research and members meetings – again I would not have dreamt that this was possible. We will be picking up on the Research on Tap presentations and CWRR Newsletters shortly. Similarly, we have had to adjust the timelines for the postgraduate literature reviews and research project proposals; these will be scheduled as online presentations in the coming months.

With the pandemic now peaking in many parts of South Africa, I urge you all to continue to take all precautions to stay safe.

Warm regards
Jeff Smithers

Source: Charlie Mackesy: "The Boy, the Mole, the Fox and the Horse"

The CWRR Newsletter

Welcome to the second issue of the CWRR Newsletter. The Newsletter carries news and updates of the achievements and endeavors of CWRR's members, staff, associates and students.

The Newsletter is also available online at CWRR.ukzn.ac.za For suggestions and queries, please email HenrikssonR@ukzn.ac.za

NEW CWRR PROJECTS

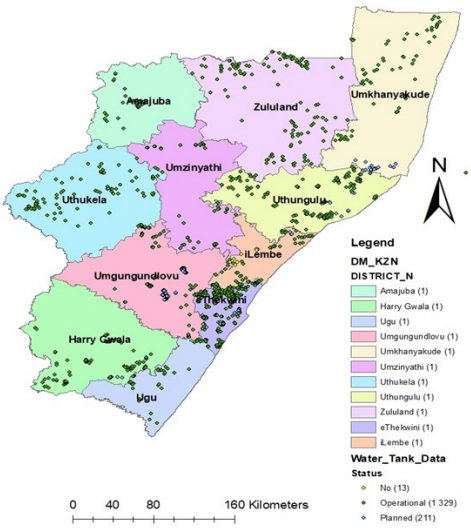
The Water Research Commission (WRC) has championed research on underutilised crops through its key strategic area on water utilisation in agriculture. In order to "elevate" such crops from subsistence agriculture to commercial agriculture, there is a need to support robust scientific research. Research has focused on three themes, namely, (a) drought and heat tolerance of food crops, (b) water use and nutritional value, and (c) nutritional water productivity. To date, UKZN has been involved in four projects on underutilised crops. In November 2019, UKZN was awarded a four-year project funded by the WRC titled **"Water use of indigenous root and tuber crops".** The project begun in April 2020 with Prof Tafadzwa Mabhaudhi and Mr Richard Kunz as principal investigators.

In order to strive towards the most beneficial use of the country's scarce water resources, there is a need to optimise the rainfed production of root and tuber crops (RTCs). This requires knowledge of production strategies (e.g. drought tolerance) and water use characteristics. Water use of RTCs ranges from 450 to 2500 mm, which needs to be validated, as high-water use renders such crops as unsuitable for production in South Africa. Hence, this project focusses on measuring and modelling the water use and yield of selected RTCs, as well as investigating their nutritional value and benefits. To help meet this objective, one PhD student and a Honours student have joined the project team.

By Richard Kunz

Hydrators mapping water tanks

To support vulnerable communities during times of COVID19, the CWRR Student club, the Hydrators, assisted in a volunteer project, a joint effort between the Department of Water and Sanitation, the Water Institute of Southern Africa, and the Department of Cooperative Governance and Traditional Affairs. The project distributed and mapped static water tanks across KZN for improved water and sanitation. The pilot phase for the Hydrators, which is now complete, involved mapping the coordinates of each static water tank deployed and included attribute data such as tank status. Using GIS methods, district (DM) and local (LM) municipality and ward data was assigned to each tank. Resulting functional status were presented in tables, graphs and digital maps, as well as kml files for an interactive map accessible via Google Earth online. The pilot working group consisted of Joss Cahi, Letisha Govender, Nalin Singh, Susan Risko and Tanisha Curtis. The map shows the status of water tanks across the DMs in KZN. *By Nalin Singh*



Latest Publications

- Spatial and temporal ^{2}H and ^{18}O isotope variation of contemporary precipitation in the Bale Mountains, Ethiopia. *Isotopes in Environmental and Health Studies, 2020*. B Lemma, S Kebede Gurmessa, S Nemomissa, I Otte, B Glaser and M Zech.

- Use of ^{222}Rn and $\delta^{18}O$-$\delta^{2}H$ isotopes in detecting the origin of water and in quantifying groundwater inflow rates in an alarmingly growing lake, Ethiopia. *Water, 2019*. S Kebede and S Zewdu.

- Drinking water quality from rural handpump-boreholes in Africa. *Environmental Research Letters, 2020*. DJ Lapworth, AM MacDonald, S Kebede, M Owor, G Chavula, H Fallas, P Wilson, JST Ward, M Lark, J Okullo, E Mwathunga, S Banda, G Gwengweya, D Nedaw and S Jumbo.

- Comparative performance of rural water supplies during drought. *Nature Communications, 2020*. DJ MacAllister, AM MacDonald, S Kebede, S Godfrey and R Calow.

- Lake Malawi's threshold behaviour: A stakeholder-informed model to simulate sensitivity to climate change. *Journal of Hydrology, 2020*. AG Bhave, L Bulcock, S Dessai, D Conway, G Jewitt, AJ Dougill, SR Kolusu and D Mkwambisi.

- The southern African inland fish tracking programme (FISHTRAC): An evaluation of the approach for monitoring ecological consequences of multiple water resource stressors, remotely and in real-time. *Ecological Indicators, 2020*. MJ Burnett, GC O'Brien, FJ Jacobs, F Botha, G Jewitt and CT Downs.

- Long-term trends and variability in the microclimates of the uMngeni Catchment, KwaZulu-Natal, South Africa and potential impacts on water resources. *Theoretical and Applied Climatology, 2020*. S Strydom, GPW Jewitt, MJ Savage and AD Clulow.

- Soil water dynamics under Moistube irrigation. *Physics and Chemistry of the Earth, 2020*. EK Kanda, A Senzanje and T Mabhaudhi.

- Effects of cowpea-amaranth intercropping and fertiliser application on soil phosphatase activities, available soil phosphorus, and crop growth response. *Agronomy, 2020*. B Mndzebele, B Ncube, M Fessehazion, T Mabhaudhi, S Amoo, C du Plooy, S Venter and A Modi.

- Moistube irrigation technology: A review. *Agricultural Research, 2020*. EK Kanda, W Niu, T Mabhaudhi and A Senzanje.

- Calibration and evaluation of AquaCrop for groundnut (*Arachis hypogaea*) under water deficit conditions. *Agricultural and Forest Meteorology, 2020*. TP Chibarabada, AT Modi and T Mabhaudhi.

- Water productivity of selected sorghum genotypes under rainfed conditions. *International Journal of Plant Production, 2020*. ST Hadebe, T Mabhaudhi and AT Modi.

- An assessment of groundwater use in irrigated agriculture using multi-spectral remote sensing. *Physics and Chemistry of the Earth, 2020*. L Nhamo, GY Ebrahim, T Mabhaudhi, S Mpandeli, M Magombeyi, M Chitakira, J Magidi and M Sibanda.

- Options for improving water productivity: a case study of bambara groundnut and groundnut. *Physics and Chemistry of the Earth, 2020*. TP Chibarabada, AT Modi and T Mabhaudhi.

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