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

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## CWRR Graduates April 2020

The CWRR is proud to announce our hard working students who graduated during UKZN's COVID19-adapted Graduation in April 2020:

♦ Dr Joseph Masanganise (PhD Agrometeorology), supervised by Prof M Savage, Dr A Clulow, Dr T Mabhaudhi and R Kunz ♦ Dr Thomas Rowe (PhD Hydrology), supervised by Prof J Smithers and Dr D Clark ♦ Dr Thigesh Vather (PhD Hydrology), supervised by Prof C Everson.

Six students graduated with an MSc in Hydrology: ♦ Robyn Horan, supervised by Dr M Toucher ♦ Sameera Khan, supervised by T Chetty and Dr S Gokool ♦ Nkululeko Africa Mabila, supervised by Prof J Smithers ♦ Johann McDonald, supervised by Prof S Lorentz ♦ Jeremy Moonsamy, supervised by Dr M Toucher ♦ Kyle Reddy, supervised by R Kunz and Dr T Mabhaudhi.

Nine students graduated with a BSc Honours in Hydrology: ♦ Khodani Khakhu ♦ Nelisiwe Khusi ♦ Sanelisiwe Mncube ♦ Kivana Naidoo (Cum Laude) ♦ Zama Ndlovu ♦ Ashvir Ramchandra ♦ Yadir Ramnarayan ♦ Sayuri Srikissan ♦ Trisha Sukhdeo.

We congratulate you all and wish you well in your future careers!

## The CWRR Newsletter

Welcome to the third issue of the CWRR Newsletter 2020. 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

## National Flood Studies Programme (NFSP) Research Workshops

Several CWRR members and students attended a series of six WRC reference group meetings for projects related to the NFSP. The meetings were held at the Stellenbosch University 27-29 January 2020. Three of the projects are led by CWRR (Prof Jeff Smithers, Katelyn Johnson and Dr Thomas Rowe) and a number of CWRR students (JP Calitz, Keanu Singh, Nelisiwe Khusi, Dr Thomas Rowe, Udhav Maharaj, Ryshan Ramlall and Nkosinathi Dlamini) made presentations on their studies at the reference group meetings. The reference group meetings were followed by the 3rd annual NFSP workshop, which is part of a NFSP project funded by the Royal Academy of Engineering in the UK. The workshop, led by Prof Smithers, reviewed the draft plan and progress with the implementation of the NFSP and included presentations by six additional postgraduate students. These included three students from the CWRR (Katelyn Johnson, Jeremy Naidoo and Shaheil Khoosal). In total, 17 students presented on their flood related studies and all were well received with positive feedback by delegates. The review of the implementation plan for the NFSP indicated significant progress with activities in many of the projects which are currently being undertaken at UKZN, University of Pretoria, Stellenbosch University and Central University of Technology, with collaboration from the University of Bath in the UK. *By Jeff Smithers*

## Latest Publications

♦ Water use of an intermediate and a mature avocado orchard. *Acta Horticulturae, 2020*. E Mazhawu, AD Clulow, NJ Taylor and M Savage.

♦ Prospects of Improving Agricultural and Water Productivity through Unmanned Aerial Vehicles. *Agriculture, 2020*. L Nhamo, J Magidi, A Nyamugama, AD Clulow, M Sibanda, VGP Chimonyo and T Mabhaudhi.

♦ Preharvest illumination of cherry tomato reduces ripening period, enhances fruit carotenoid concentration and overall fruit quality. *The Journal of Horticultural Science and Biotechnology, 2020*. BL Ngcobo, I Bertling and AD Clulow.

♦ Re-balancing climate services to inform climate-resilient planning - A conceptual framework and illustrations from sub-Saharan Africa. *Climate Risk Management, 2020*. K Vincent, D Conway, AJ Dougill, J Pardoe, E Archer, AG Bhave, R Henriksson, N Mittal, D Mwambisi, E Rouhaud and D Tembo-Nhlema.

♦ Mapping soil organic carbon at a terrain unit resolution across South Africa. *Geoderma, 2020*. R Schulze and S Schütte.

♦ Hydrological modelling in data-scarce catchments: Black Volta basin in West Africa Black. *SN Applied Sciences, 2020*. SO Kwakye and A Bárdossy.

♦ Understanding gender differences in availability, accessibility and use of climate information among smallholder farmers in Malawi. *Climate and Development, 2020*. R Henriksson, K Vincent, E Archer and G Jewitt.

## MiniSASS: A local innovation, with potential global application

In an exciting, recent development, the UN Environment Programme GEMS/Water Capacity Development Centre, who are tasked with developing indicators for Sustainable Development Goal 6, globally, are exploring the use of the Stream Assessment Scoring System, commonly known as miniSASS. miniSASS is a local, Pietermaritzburg developed innovation, which is a simple biomonitoring tool that can be used by anyone to monitor the health and water quality of a river. During a miniSASS evaluation, samples of macroinvertebrates (small animals) are collected from the water. Depending on which groups of macroinvertebrates are found, a scoring system which ranges across five categories, can then applied to provide a general measure of the health and water quality in that river. These results can then be up-loaded to the miniSASS website Google Earth layer (www.minisass.org). Since, community engagement and interaction is at the core of miniSASS, this enables people to learn and develop a greater appreciation of rivers within their communities, which may facilitate actions to be taken expeditiously to improve our precious water resources. For more information, please contact Dr Jim Taylor: jimtaylor835@gmail.com or Dr Mark Graham: mark@groundtruth.co.za. *By Jim Taylor*

## CWRR with ARUA Water CoE in Ethiopia

UKZN, through the CWRR, has been established as a node within the African Research Universities Alliance (ARUA) Water Centre of Excellence (CoE). The ARUA Water CoE Hub is led by Prof Tally Palmer and based at Rhodes University. Other partners include Addis Ababa University, Makerere University, University of Dar es Salaam, University of Rwanda, University of Lagos, Cheikh Anta Diop University and University of Cape Town. The first activity that CWRR (through Prof Seifu Kebede Gurmessa and Ntombi Nxumalo) took part of was a training on the theoretical foundations and principles of the Adaptive Systemic Approach (ASA) for Water Resources Management in Addis Ababa 11-13 February. The training was primarily on two of the tools used in implementing the ASA in real life situation, namely, Strategic Adaptive Management (SAM) and Adaptive Planning Processes (APP). *By Ntombi Nxumalo*

## Water Personality Prof Schulze

The CWRR would like to acknowledge and congratulate Prof Roland Schulze for being celebrated as the feature water personality in the July/August issue of the Water Wheel. Professor Schulze has dedicated a lifetime to water resources research and is one of the most celebrated hydrologists in the country, with a career steeped in success spanning over five decades. The article compiled by Tony Carnie provides a concise yet fascinating biography, documenting interesting facts about Prof Schulze's personal life, highlighting the glut of academic and professional successes as well as sharing some of his useful advice that we have all come to value so much over the years. The article is also available at the CWRR website.

## *NEW CWRR PROJECTS*

Assessments of water resources and crop production for the whole of South Africa are frequently based on estimates produced using deterministic hydrological and crop models, due to either insufficient measured data, or the need to determine the impact of future climate scenarios. Such large scale configurations of simulation models are in themselves data intensive and dependent on good quality data inputs. For many years, the Southern African Quinary Catchments Database (QnCDB) and its predecessor the Southern African Quaternary Catchments Database (QNDB) have, in conjunction with the models, provided a valuable assessment tool. The CWRR has been awarded a four-year WRC funded project titled **Development of Datasets for Multi-Scale Water Resource Assessments Towards a Water Secure South Africa**, lead by Dr David Clark. In this project, as a step towards updating and extending the QnCDB, the aims are to:

(1) Develop a collection of national datasets for application in water resource related modelling assessments and flood estimation (WRA Base Datasets): ♦ Quinary Catchment boundaries, ♦ updated Sub-Quaternary Altitudinal Zone boundary dataset, ♦ Quinary level river reach attributes, ♦ topographic characteristics for Quinaries and Altitude Zones, ♦ updated database of daily climate data (1950-2019), ♦ updated database of hydrological characteristics for various vegetation types and land cover/uses classes, ♦ a dataset of hydrological soil characteristics at terrain unit level, and ♦ datasets of catchment and river reach attributes, used in flood assessments.

(2) Develop or implement an online data portal system to store and provide access to the datasets (WRA Data Portal). *By David Clark*