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

CWRR Newsletter September 2020

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The CWRR Research on Tap Seminar series is back - Online

Monday 28 September 2020

The CWRR is pleased to announce that our first Research on Tap Webinar is coming up shortly! We welcome you to join in via Zoom to take part of the exciting and highly relevant webinar titled "A journey in water research: from disciplinary to transdisciplinary perspectives". The seminar will be presented by CWRR Associate, Prof. Tafadzwa Mabhaudi, Co-Director of the newly established Centre for Transformative Agricultural and Food System at UKZN.

Prof. Mabhaudhi will focus the webinar on sharing the different projects he is working on, and to also extend an invitation to colleagues at CWRR, UKZN and the wider network, to collaborate in the ongoing and planned research. Briefly, Tafadzwa's research projects straddle a broad range of topics related to crop responses to abiotic and biotic stresses, water use and crop-climate modelling to multi- and transdisciplinary research areas research areas covering sustainable food systems, global environmental change and the water-energy-food nexus. This research is organised into several thematic areas, which include (i) Resilient Agricultural Systems, (ii) Sustainable and Healthy Food Systems, (iii) Digitalisation in Agriculture, (iv) the Water-Energy-Food Nexus, and (v) the science-policy-practitioner interface. Tafadzwa will be sharing his personal journey through these research projects with a focus to creating opportunities for collaboration.

We are looking forward to seeing you all online:

- **Wednesday the 7th October at 10-11am, SAST.** Click here to register in advance for the webinar. After registering, you will receive a confirmation email containing information about joining the meeting.

The CWRR Newsletter

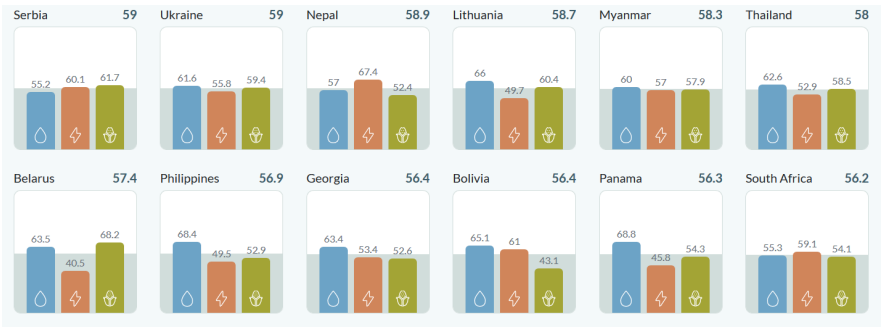
Welcome to the fourth issue of the CWRR Newsletter 2020. The Newsletter carries news and updates of the achievements and endeavors of CWRR's members, staff, associates and students.

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

Two new Doctors at the CWRR

The CWRR congratulates Dr. Stefanie Schutte and Dr. Gareth Simpson for successfully completing their PhDs. Dr. Schutte, now with a PhD in Bioresources Systems, completed her thesis titled "Effects of soil carbon and ambient carbon dioxide concentrations on hydrological processes - a modelling study", supervised by Prof. Roland Schulze and Prof. Mary Scholes. Schutte explored the impacts of changes in the carbon cycle on hydrological responses within South Africa (SA), and impacts of soil organic carbon (SOC), as well as quantified the impacts of elevated ambient carbon dioxide levels (eCO_2). Detailed SOC maps at terrain unit resolution for SA were first produced. Increases (decreases) in SOC content via changes to soil's water retention constants may result in increased (decreased) transpiration and reduced (increased) runoff. Sensitivities of hydrological response to eCO_2-induced reductions in maximum transpiration through the soil-plant-atmosphere continuum were simulated, resulting in a reduction in actual transpiration and an increase of accumulated runoff. Schutte is now appointed as a postdoc at the CWRR, working on a number of projects. Dr. Simpson's thesis titled "The development of the Water-Energy-Food Nexus Index and its application to the Southern African Development Community" awarded him a PhD in Agricultural Engineering, supervised by Prof. Graham Jewitt. Next article in this newsletter describes the WEF Nexus index developed. Gareth, employed at Jones & Wagener, will build on his PhD reserarch in a WEF-Tools project through IHE Delft Institute for Water Education.

The WEF nexus index



Since 2011, the water-energy-food (WEF) nexus has gained prominence as a lens for assessing integrated resource management and sustainable development. More recently, there has been a shift in focus from "nexus thinking" to "nexus action". In order to integrate resource sectors, which are measured in different units and time scales, a WEF nexus composite indicator was developed. The WEF Nexus Index was developed by Dr Gareth Simpson, as part of his recent PhD study, in collaboration with his supervisor Prof. Graham Jewitt. The basis of this indicator is a multi-centric WEF nexus framework that is equally represented by three resource sectors, i.e. water, energy and food. Following a review of 87 globally available indicators, 21 relevant indicators were selected to construct the WEF Nexus Index. Presently, there is sufficient data available for the WEF Nexus Index to be determined for 170 nations.

Latest Publications

- Pollution shapes the microbial communities in river water and sediments from the Olifants River catchment, South Africa. *Archives of Microbiology 2020*. A Valverde, ED Cason, A Gómez-Arias, D Bozkale, D Govender, E Riddell and D Cowan.
- Enhancing Water Security Through Restoration and Maintenance of Ecological Infrastructure: Lessons From The Umngeni Catchment, South Africa. *WRC Report No. TT 815/20 Water Research Commission Pretoria 2020*. G Jewitt, C Sutherland, M Browne, S Stuart-Hill, S Risko, P Martel, J Taylor and M Varghese.
- Optimizing traditional cropping systems under climate change: a case of maize landraces and bambara groundnut. *Frontiers in Sustainable Food Systems 2020*. VPG Chimonyo, EM Wimalasiri, R Kunz, AT Modi and T Mabhaudhi.
- Spatial clustering of food insecurity and its association with depression: A geospatial analysis of nationally representative South African data, 2008-2015. *Nature Scientific Reports 2020.* A Tomita, DF Cuadro, T Mabhaudhi, B Sartorius, BP Ncama, AD Dangour, F Tanser, AT Modi, R Slotow and JK Burns.
- A systems analysis and conceptual system dynamics model of the livestock-derived food system in South Africa: a tool for policy guidance. *Journal of Agriculture, Food Systems, and Community Development 2020.* K Queenan, N Sobratee, R Davids, T Mabhaudhi, M Chimonyo, R Slotow, B Shankar and B Häsler.
- Nutritional yield and nutritional water productivity of cowpea (*Vigna unguiculata* L. Walp) under varying irrigation water regimes. *Water SA 2020.* EK Kanda, A Senzanje, T Mabhaudhi and SH Mubanga.
- Modelling soil water distribution under Moistube irrigation for Cowpea (*Vigna unguiculata* (L.) Walp) crop. *Irrigation and Drainage 2020.* EK Kanda, A Senzanje and T Mabhaudhi.

Palmiet Enviro-Champs WhatsApp Training in English and isiZulu:

The Palmiet Enviro-Champs is a community based initiative designed to bring about sustainable catchment management - supported by eThekwini (Durban Metro) with training provided by GroundTruth. Due to COVID 19 restrictions, GroundTruth were unable to run the training programme for the Palmiet Enviro-Champs through face-to-face contact. It was therefore decided to offer the training through a virtual chat process using a WhatsApp Group. Although Zoom is more useful in many aspects, it quickly became clear that most participants did not have laptops, neither did they have Wifi. WhatsApp was therefore used as the learning platform and the organizers and users have found it amazingly effective - enabling a surprisingly practical training. Two key innovations that really strengthened the learning was the promotion of indigenous knowledge coupled with an action learning framework. The online learning was held in both English and isiZulu and was supported by a field-work session. Ayanda Lepheana at GroundTruth, with colleagues, are developing a detailed case study of this training programme, and they welcome anyone interested to get in touch (contact: jimtaylor835@gmail.com). *By Jim Taylor and Ayanda Lepheana*