

Carnegie Rise SSAWRN

Sub-Saharan Africa Water Resources Network

Denis Hughes
Institute for Water Research
Rhodes University

Components of SSAWRN:

- Makerere University, Uganda:
 - Faculty of Veterinary Sciences & Makerere Water Network (Prof Michael Ocaido).
- University of Botswana:
 - Okavango Research Institute (ORI – Prof Wellington Masamba).
- Eduardo Mondlane University, Mozambique:
 - Department of Geology (Prof Elonio Muiuane).
- Rhodes University, South Africa:
 - Institute for Water Research (Prof Denis Hughes).
 - Secretariat (Dr Sukhmani Mantel).

Primary Objectives of SSAWRN

- Build research capacity in water resources science within Sub-Saharan Africa.
- Focus on the development of post-graduate students.
- Retain research capacity within the region.
- Diverse disciplines related to water resources.
- Ultimately contribute to improved capacity for water management in the region.

Water Resources Science

- Diverse subject including:
 - Physical sciences.
 - Biological and Ecological sciences.
 - Human sciences.
 - Health sciences.
- Success of water resources management depends on trans-disciplinary understanding.

Current status of SSAWRN students:

Rhodes, IWR: Hydrology

Student	Start Year	Degree	Topic	Status
Raphael Tshimanga	2009	PhD	Uncertainty analysis and scenario-based stream flow modeling for the Congo River Basin.	Awarded 2012
Sithabile Tirivarombo	2009	PhD	Climate variability and change in water resources management of the Zambezi River Basin.	Under examination
Jane Tanner	2009	PhD	Assessment of the surface and ground water interaction components of the Pitman rainfall-runoff model.	Expected to submit Nov. 2012
Thabiso Mohobane	2011	PhD	Impacts of climate change on water resources.	Submit in 2013
Sbongiseni Mazibuko	2011	MSc	Application of remote sensing in hydrological modeling.	Nearing completion

Raphael Tshimanga is currently a Post-Doc Fellow acting as mentor to some of the other hydrology students and writing papers.

Rhodes, IWR: Environmental Water Quality

Student	Start Year	Degree	Topic	Status
Francis Arimoro	2009	Post-Doc	Developing a bioassessment protocol for Nigerian streams.	Returned to Nigeria 2010
Nelson Odume	2009	MSc	Chironomidae larval deformities as indicators of anthropogenic impacts in the Swartkops River.	Awarded 2011 (Distinction)
Nelson Odume	2011	PhD	Novel approaches to reducing the ecological risk associated with selected persistent organic pollutants in South African surface waters.	Expected to submit Nov. 2013
Paul Mensah	2009	PhD	Development of <i>Caridina nilotica</i> life-cycle toxicity test protocol in order to derive water quality guideline for Roundup herbicide in South Africa.	Under examination
Bolowaji Onabolu	2010	PhD	A risk assessment of drinking water quality deterioration from source to point of use, its public health impact and governance.	Under Examination

Okavango Research Institute

Student	Start Year	Degree	Topic	Status
Kondja Amutenya	2009	MPhil	The effects of water quality on fish growth rate in the Okavango Delta, Botswana.	Writing
Moseki Motsholapheko	2009	PhD	Rural Livelihoods and Household Adaptation to Flood Variability in The Okavango delta, Botswana.	Submitted?
Nqozibetha Siziba	2009	PhD	The dynamics of micro-invertebrates and their relevance to early life stages of fish in the temporary floodplains of the Okavango Delta, Botswana.	Under examination
Gaolatlhe Tsheboeng	2009	PhD	Responses of seasonal floodplain vegetation communities and soil nutrient status to flood variation in the Okavango Delta, Botswana.	Submitted to supervisors
Richard Mazebedi	2011	PhD	Water quality monitoring and development of a biomonitoring tool in Thamalakane river using aquatic macro-invertebrates.	Progressing
Kraposy	2011	PhD	An analysis of factors of water insecurity in the Okavango Delta: Case studies of Shorobe and Tubu.	Progressing
Kelebogile Cole-Mpho	2010	MPhil	Flooding and nutrient mineralization in a seasonal floodplain of the Okavango Delta, Botswana.	Progressing
Kudzana Chipiso	2011	MPhil	An investigation of trace metal pollution in water around the Okavango Delta: Water quality	Progressing
Gosaitse Tubatsi	2011	MPhil	Water quality and diarrhoeal diseases along the Thamalakane-Boteti River systems.	Progressing

Makarere University

Student	Start Year	Degree	Topic	Status
Irene Naigaga	2009	PhD	Use of bioindicators and biomarkers to assess aquatic environmental contamination.	Under Examination
Irene Naigaga	2011	Post-Doc	Assessment of endocrine disrupting compounds in Murchison Bay, Uganda.	Retained as staff member
Joseph Orume	2009	Post-Doc	Sources of water-borne disease microbes contaminating Lake Victoria, Uganda.	Retained as staff member
Justin Ekou	2009	MSc	Molecular epidemiology of <i>Entamoeba histolytica</i> as a contaminant of water.	?
Sehnte Celsus	2011	PhD	Eco-hydrological factors playing a role in the epidemiology of Anthrax in Queen Elizabeth Conservation Protected Area, Uganda.	Progressing
Elias Kaburuku	2011	MSc	Characterisation of water quality of river Rwiizi using biological indicators.	Progressing

Current status of SSAWRN students: Eduardo Mondlane University

Student	Start Year	Degree	Topic	Status
Agostinho Vilanculos	2009	PhD	Improving multireservoir system operation using hydrologic information in the Zambezi River Basin.	Some chapters completed
Pedro Timba	2009	MSc	Hydrogeological characterization and the problem of groundwater exploration in Mozambique	Submitted to Supervisor
Venancio Taimo	2009	MSc	Geohydrology	Uncertain
Alcino Nhacume	2011	MSc	Surface and groundwater interaction modelling.	Uncertain
Edigio Govate	2009	MSc	Hydrogeological characterization and vulnerability analysis of aquifers in the Zambezi Basin	Submitted to Supervisor

Agostinho Vilanculos is registered at Rhodes University and jointly supervised by Prof.'s Muiuane and Hughes.

Summary

Category	MSc/MPhil	PhD	Post-Doc
Awarded/Completed	1	1	2
Under Examination		6	
Expected end 2012	4	3	
Expected end 2013	7	5	
Totals	12	15	2

Conclusion is that we are 'more-or-less' on track:

There is a need to ensure that those that started in 2009 complete their programmes and submit their theses as soon as possible.

Key Achievements:

- Most student projects are progressing satisfactorily.
- Approx. 30% have completed.
- Some students have managed to attract co-funding from a variety of sources.
- Student attendance at recent conferences:
 - SANCIAHS, 2011:
 - WATERNET, 2012: Most students will be presenting papers at this major regional conference.
 - Participation in several other regional and international conferences.
- A number of scientific papers have been published.

Publications (several more in press):

- Ekou, J., J. Nakavuma, M. Ocaido and J. Erume (2012) Prevalence of *Entamoeba histolytica* among hospital patients in Soroti, Eastern Uganda. *African Journal of Animal and Biomedical Sciences* 7: 81-85.
- Erume, J. and M. Ocaido (2011) Potential risks, consumer perceptions and preferences of shallow ground water in urban and rural areas of Uganda. *Africa Journal of Animal and Biomedical Sciences* 6: 51-58.
- Mensah, P.K., W.J. Muller and C.G. Palmer (2011) Acute toxicity of Roundup® herbicide to three life stages of the freshwater shrimp *Caridina nilotica* (Decapoda: Atyidae). *Physics and Chemistry of the Earth* 36: 905-909.
- Mensah, P.K., C.G. Palmer and W.J. Muller (2012) Acetylcholinesterase activity in the freshwater shrimp *Caridina nilotica* (Decapoda: Atyidae) as a biomarker of the herbicide Roundup® pollution of freshwater systems in South Africa. *Water Science and Technology* 66: 402-408.
- Mensah, P.K., C.G. Palmer and W.J. Muller (2012) Lipid peroxidation in the freshwater shrimp *Caridina nilotica* as a biomarker of Roundup® herbicide pollution of freshwater systems in South Africa. *Water Science and Technology* 65: 1660-1666.
- Motsholapheko, M.R., D.L. Kgathi and C. Vanderpost (2011) Rural livelihoods and household adaptation to flooding in the Okavango Delta. *Physics and Chemistry of the Earth* 36: 984-995.
- Naigaga, I., H. Kaiser, W.J. Muller, L. Ojok, D. Mbabazi, G. Magezi and E. Muhumuza (2011) Fish as bioindicators in aquatic environmental pollution assessment: a case study in Lake Victoria wetlands, Uganda. *Physics and Chemistry of the Earth* 36: 918-928.
- Odume, O.N. and W.J. Muller (2011) Diversity and structure of Chironomidae communities in relation to water quality differences in the Swartkops River. *Physics and Chemistry of the Earth* 36: 929-938.

- Odume, O.N., W.J. Muller, F.O. Arimoro and C.G. Palmer (2012) The Impact of water quality deterioration on macroinvertebrate communities in the Swartkops River, South Africa: a multimetric approach. *African Journal of Aquatic Science* 37: 191-200.
- Onabolu, B., O.D. Jimoh, S.B. Igboro, M.K.C. Sridhar, G. Onyilo, A. Gege and R. Ilya (2011) Establishing an integrated drinking water quality monitoring system in Katsina State, Northern Nigeria. *Physics and Chemistry of the Earth* 36: 1189-1196.
- Siziba, N., Chimbari M.J., H. Masundire and Mosepele K. (2011) Spatial and temporal variations of macroinvertebrate communities across temporary floodplains of lower Okavango Delta, Botswana. *Physics and Chemistry of the Earth* 36: 939-948.
- Siziba, N., M.J. Chimbari, K. Mosepele and H. Masundire (2011) Spatial and temporal variations in densities of small fishes across different temporary floodplain types of the lower Okavango Delta, Botswana. *African Journal of Aquatic Sciences* 36: 309-320.
- Siziba, N., M.J. Chimbari, H. Masundire and K. Mosepele (2012) Spatial variations of microinvertebrates across different microhabitats of temporary floodplains of lower Okavango Delta, Botswana. *African Journal of Ecology* 50: 43-52.
- Tirivarombo, S. and D.A. Hughes (2010) Regional droughts and food security relationships for the Zambezi basin. *Physics and Chemistry of the Earth* 36: 977-983.
- Tshimanga, M.R., D.A. Hughes and E. Kapangaziwiri (2011). Initial calibration of a semi-distributed rainfall runoff model for the Congo River Basin. *Physics and Chemistry of the Earth* 36: 14-15.
- Tshimanga M.R. and D.A. Hughes (2012) Climate change and impacts on the hydrology of the Congo Basin: The case of the northern sub-basins of the Oubangui and Sangha Rivers. *Physics and Chemistry of the Earth*.

Future career paths:

- Objective was to retain some students as faculty members or research staff:
 - Several students have taken up academic positions.
 - Several will be advancing their careers in 2013.
 - Need to identify further funding opportunities for developing future careers of graduates.
 - Example of World Bank Project (Dr Tshimanga).
 - Need to assist the students to develop links with international partners.
 - Need exposure to, and participation in regional and international cooperative projects.