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Newsletter of the Water Research Commission

In This Edition

Ground rules!

When Mompati Nyebe Baiphethi studied towards a BSc degree through the University of Botswana, he intended pursuing a career as a veterinarian. Thanks to fate, he did not qualify for this course. He opted to study towards a BSC Agric, with the intention of qualifying as a veterinarian eventually.

However, he discovered that he enjoyed the agricultural economics and extension courses. Mompati did a study on the socio-economic factors affecting small-scale dairy farmers in Botswana. This burgeoning interest resulted in him obtaining a distinction in his dissertation. Fate intervened once again: Professor Herman van Schalkwyk of the University of the Free State was Mompati's external examiner and, upon the recommendation of Professor Panin, Mompati was accepted to study towards his MSc, specialising in agricultural economics. Since then, he has never looked back.

This 30-something young man has amassed many accolades: He scooped the Principal's prize for leadership and good academic performance in 2000; he was awarded the prize for best MSc Agric student for 2004; Mompati was seconded to the ARC in August 2004 to assist with the consolidation of community-based water harvesting interest groups and the ultimate formation of a municipality-based water harvesting interest group.

Mompati is proud of his outstanding achievements and acknowledges that WRC support formed the backbone of his research and success: "I hold the WRC in high regard in terms of the work that it funds and the ultimate results that emanate from such work. I was amazed at how WRC research helped an impoverished community in Thaba Nchu: the water harvesting project helped small-scale farmers to produce crops from harvested water. The landscape has been transformed radically: where crops were barely visible owing to water shortage, they are now growing in abundance. The parallel is that the grim faces have been replaced by smiling ones!"

The adage "behind every successful man is a woman" seems to apply aptly to Mompati. He attributes his success and determination to the strong women in his life: his late grandmother, Ms Tebogo Baiphethi, the matriarch of the family, his aunts, Ms Ogomoditse Matsila and Banyenyi Davids, his mother, his sisters and his fiancée, Tshidi. He also attributes his accomplishments to fine mentors and exceptional role-models: Prof MF Viljoen, Dr G Kundhlande, Dr Backeberg (WRC), Dr Sanewe (WRC) and Dr Sizwe Mkhize (Ex-WRC).

Mompati enjoys the feeling that he is making a difference to people in South Africa: "I really enjoy making a meaningful contribution to the development of small-scale resource poor farmers in South Africa and I hope to broaden my scope to include farmers in Southern Africa as well. There is still a lot to be done and I urge more students, especially from historically disadvantaged backgrounds, to join South Africa's vibrant water sector. The challenges from such communities are enormous and will remain so unless our youth get involved. There is no greater reward than seeing the smile on the face of a child or an elder after he has received help with something as basic as feeding himself sustainably. It does wonders for restoration of one's dignity and will certainly have a bearing on poverty alleviation- a Presidential and a national imperative."

Dr Andrew Sanewe, a Research Manager at the WRC and head of the Cross-Cutting Domain: Water and Society, says, "Mompati, the WRC thanks you for your contribution to uplifting the lives of an impoverished people in South Africa. We wish you well in realising your dream of extending your efforts in Southern Africa".

WRC Research Project Wins Award

The water services franchising research won the SAICE Award for Meritorious Research for 2005. This was announced at the SAICE Presidential inauguration on 24 February.

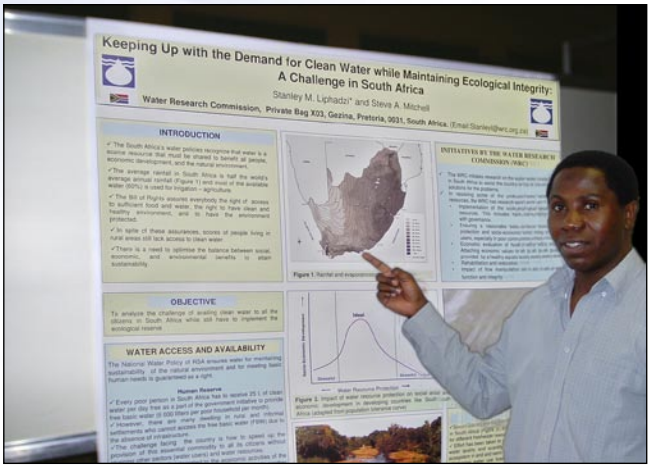
Kevin Wall, of the CSIR, made these comments when the award was announced:
"I have pleasure in thanking CSIR and the Water Research Commission for their funding of the research, and Pretoria Branch of SAICE, for their support of the award motivation.

Then seven individuals, for their encouragement, support and inspiration of the research for which this award is being made. Starting with Jay Bhagwan of the Water Research Commission....."

Stanley Attends Conference in Mexico

Dr Stanley Liphadzi, Research Manager of KSA: Water-linked ecosystems, attended the Ecology in an Era of Globalisation: Challenges and Opportunities for Environmental Scientists Conference which was held in Merida, Yucatan, Mexico on 8-12 January 2006.

He presented a poster paper on "Keeping up With the Demand for Water While Maintaining the Ecological Integrity: A challenge in South Africa". The poster generated great interest among the delegates present. The most interesting sessions were those that focused on problems and opportunities of migration and one on invasive species.



The WRC @ the Rainwater Harvesting Festival – Thaba Nchu

The WRC-funded project on rainwater harvesting was aimed at increasing food security among impoverished rural communities. The festival held in Thaba Nchu, Free State on 27-29 March, commemorated the resounding success of this project. Poor communities expressed jubilation at the fact they were able to produce maize, beans, spinach and fruit so that they could feed their families. They were also able to sell some of their crops to local markets and afford "luxuries" (as expressed by community members) such as school fees.

The festival, which was organised by the Agricultural Research Council – Institute for Soil, Climate and Water (ARC-ISCW), was preceded by a pre-harvest Farmers' Festival (22-24 March). This incorporated farmer-to-farmer training sessions as well as field visits.

The Festival included field visits of various villages. This was followed by traditional song and dance which coincided with tremendous success in terms of crop size as well as crop output. The final session was a workshop where participants shared ideas, exchanged suggestions, posed problems and offered solutions.

At present, the WRC is funding a three-year project to further understand the impacts of this technology. This includes the effects of up-scaling, the sustainability of the practice and its socio-economic benefits, the implications on flow regimes, the ecological and environmental impacts and legislative tools. It is expected that the findings and understanding to be gained through this research will provide a baseline for a comprehensive implementation of rainwater harvesting techniques at national level.

Jubilation after a successful crop

A workshop where ideas were shared

Harvesting spinach

Officials from the ARC and Dept of Agric sharing ideas

Maize from the project feeds families

WRC Commemorates World Water Day

The theme for World Water Day 2006 (22 March) was "Water and Culture". The WRC celebrated this day by hosting and organising two events: one in Pietermaritzburg and one in Pretoria. The programme involved getting learners to conduct a mini SASS (South African Scoring System) test which will determine the "health" of a river or a stream.

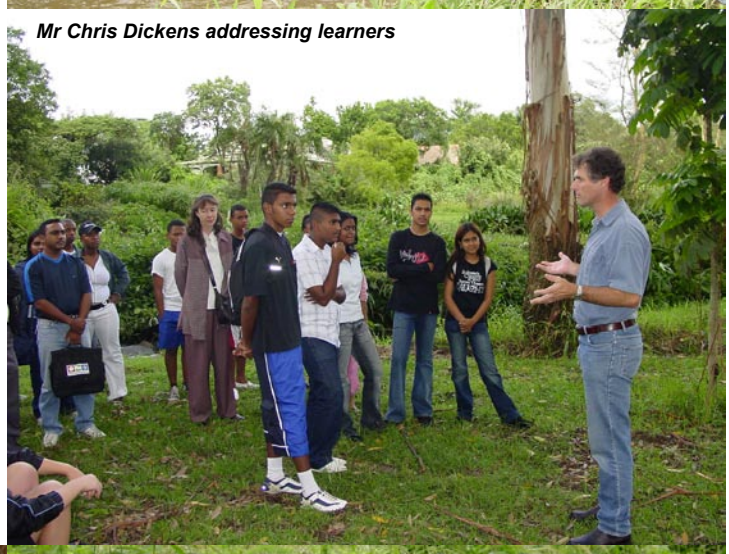
The objective of the exercise was two-fold: to make learners aware of environmental issues, especially river health as well as enlightening learners about the various careers that are possible in the South African water sector, especially as far as biomonitoring is concerned.

In Pietermaritzburg, the Institute of Natural Resources (INR) assisted by providing a facilitator, Mr Ramogale Sekwele, who guided learners through the mini SASS test at a stream in the Botanical gardens, Pietermaritzburg. Dr Chris Dickens of the INR also addressed learners. Thereafter, Mr Mike Coke demonstrated how fish act as indicators of river health. Learners participated actively and thoroughly enjoyed both the learning experience as well as the social networking involved. There certainly was a healthy merging of both the water as well as the cultural components. Learners were tasked with compiling a report which will be presented to the head of the Botanical Gardens in Pietermaritzburg, Mr Brian Tarr. The event was publicised in *The Witness* and broadcast on SABC radio.

In Pretoria, learners used the Mini-SASS scoring system to assess the Moreletaspruit, a highly urbanised stream. Learners were guided by Mr Piet Muller of the Gauteng Department of Agriculture, Conservation and Environment, with the assistance of Ms Colleen Todd, Principal Scientist: Resource Quality Services at the Department of Water Affairs & Forestry.

The assessment, which concluded the fair to poor state of the stream, demonstrated the challenges faced by urban environmental managers with regard to increased stormwater runoff, sediment, and increased risk of pollution from industrial and domestic sewage as a result of increased development in the city.

Mr Mike Coke collecting fish samples



Mr Chris Dickens addressing learners

Mr Mike Coke assisting learners with the Mini SASS test

Mr Ramogale Sekwele demonstrating sample collection

Opportunity knocks

Tufts University (USA) and the University of Georgia (USA) with the support of the International Research Institute (IRI) and national collaborators received a 2-year grant to design, implement and test a seasonal streamflow forecasting system integrated with a reservoir operation decision support tool for SW Burkina Faso, West Africa. If you are interested and hold a Masters degree in Water Resources Engineering, have knowledge of hydrology and reservoir optimisation modeling and are adequately qualified to enroll for the PhD programme in Civil Engineering at Tufts, then visit www.tufts.edu/water. The person needs to speak/write English well.

WRC chairs SARIA meeting

The Southern African Regional Irrigation Association (SARIA) held its Annual Workshop and Steering Committee meeting from 30 January to 2 February at the Roodevallei Country Lodge in Pretoria. SARIA was launched during the International Commission on Irrigation and Drainage (ICID) 51st IEC meeting and the 6th International Micro-irrigation Congress in Cape Town on 24-26 October 2000. Its vision is to enhance communication, research, training and development of appropriate science and technologies in irrigation and drainage for gender-balanced poverty eradication and economic development to improve the livelihoods of the inhabitants of the sub-Saharan region of Africa. It comprises members from 11 SADC countries with additional countries such as Tanzania, Kenya and Madagascar. The WRC chaired the meeting and co-hosted the workshop together with the National Department of Agriculture (DoA) and the Agricultural Research Council (ARC). Read the detailed press release on the WRC website (www.wrc.org.za).

Delegates at the SARIA workshop

The site visit formed part of the SARIA workshop and meeting

Visitors at the WRC exhibition stand

WRC @ Okhombe and Mweni sites

Dr Terry Everson, project leader of the Okhombe catchment project, coordinated a site visit on 16 January. The WRC, represented by Dr Andrew Sanewe and Mr Yuven Gounden, attended the event. The WRC coordinated the media component of the event. Journalists from *Farmer's Weekly* and *50/50* were present at Okhombe, where members of the Okhombe Monitoring Group (OMG) explained the techniques involved in erosion monitoring as well as water management. The OMG, who offer their services on a voluntary basis, are also involved in training other communities, one being the Mweni community which is adjacent to Okhombe. The project was broadcast on 50/50 on 26 March.

***Left**: 50/50 camera man Don Guy capturing footage at the site visit*
***Right**: Members of the OMG explaining land rehabilitation techniques*

***Top**: Journalist Lloyd Philips of Farmer's Weekly taking photos at the site visit*
***Left**: Dr Everson explaining the stone pack techniques at Mweni to Dr Sanewe*

WRC Project Workshop – Student Focus

The Evaporation estimation winter school will take place on 17-21 July 2006 at the University of KwaZulu-Natal, Pietermaritzburg. This workshop is aimed at students.

The evaporation estimation workshop will take place on 21 July 2006. This workshop is aimed at water resource practitioners.

Students in need of financial assistance, please contact **Bernie Hoosen** on:
tel. 033 260 5510;
e-mail: HoosenB@ukzn.ac.za;
website: http://fred.csir.co.za/extra/project/avapmon

Report No 974/1/05 (Contractor: University of the Free State)
Cost estimating procedures for micro-, drip- and furrow-irrigation systems as well as economic analyses of the relevant irrigation systems for large- and small-scale farmers in the Onderberg/ Nkomazi region

This research project proposed methods to estimate costs for various combinations of irrigation systems in the Onderberg and Nkomazi areas of the Mpumalanga Province. The research further demonstrated methods to analyse the profitability and financial feasibility of the various irrigation systems on a whole farming level. The project focused on both large-scale and small-scale irrigation farming. The general result was that cash flow is the biggest problem for all the farmers to different degrees. For the small-scale farmers the challenge is to survive financially and for large-scale farmers, it is to finance expensive irrigation systems and long-term crops such as orchards. It is recommended that business plans of irrigation farming should include the effects of business and financial risks on survival. Reliable crop enterprise budgets for all the relevant crops under irrigation should be developed and maintained for small-scale irrigators. Policy-makers should ensure that sound financial incentives are adequately put in place to help small-scale farmers. New projects should take cognisance of the crucial financial effects of plot size and reliable product markets. A land tenure reform policy in tribal areas is needed to encourage investment and development on these farms. An efficient land market should be supported based on security of property rights and low transaction costs.

Report No 1221/1/05 (Contractor: Ninham Shand)
Streamflow reduction modelling in water resource analysis

This project investigated the existing stream flow reduction (SFR) estimation techniques in different local catchments, at various spatial and temporal scales. Weaknesses in the different SFR estimation approaches, especially in model inputs, model algorithm and outputs were identified and recommendations made to improve the accuracy and reliability of future SFR estimates. The SHELL model (a version of the Pitman Model which was modified by Ninham Shand to include afforestation and alien vegetation routines) and the ACRU model (which incorporates the SFR curves (after Scott and Smith, 1997; Gush et al, 2001)) were used to simulate the reduction in flows due to alien vegetation and aforestation. Field-based measurements and estimates of streamflow reduction were collated, analysed and used to validate model simulations. The outputs from the hydrological models were then applied to the Yield model (WRYM) to determine the impacts of the different streamflow reduction regimes on overall catchment yield. Findings on the impact of SFR activities on catchment yield were presented to stakeholders and documented. This study is expected to influence the selection and refinement of suitable SFR estimation techniques used for forestry licensing. The study also identified the urgent need to improve data by increasing the distribution of rainfall gauges at high altitudes. The absence of high altitude rainfall gauges introduced some errors in the modeling processes.

Report No TT 251/05 (Contractor: University of Pretoria)
Technology transfer of the Soil Water Balance (SWB) model

The SWB model follows a scientifically sound mechanistic approach and a user-friendly interface, making it accessible to irrigation farmers. Since its release in the late 1990s, it has been used by a few farmers. Certain shortcomings of the SWB needed to be addressed. Historically disadvantaged farmers do not have access to automatic weather station data and computer facilities. Changes to the SWB included changes to computer software and training of potential users on a national scale. Courses were presented and a multimedia CD titled *Irrigation Management* produced. Other activities included exhibitions, demonstrations and site visits. The SWB program can be downloaded from (www.nbsystems.co.za/swb) Since the completion of this project, the WRC has initiated a follow-up project to focus on the technology transfer and integrated implementation of water management models in irrigated agriculture.

Report No 1324/1/05 (Contractor: IUCN)
Situational analysis for the preparation of institutional arrangements for groundwater management in the Nwdwa

The North West Dolomitic aquifer (also known as the North West Dolomitic Water Area (NWDA)) is shared between three Water Management Areas (WMAs). These are Crocodile West-Marico, Middle Vaal and Lower Vaal WMAs. A study was conducted to identify and analyze resource management issues through a situational assessment. The situational assessment involved a description of the ecological as well as the social and institutional contexts. The ecological context primarily includes a geohydrological assessment. The social and institutional context includes a water demand/use assessment, institutional assessment and legal review. Four scenarios were developed, and from these a range of coping measures was identified. These coping measures allow for both interim and long-term options. An interim option is to appoint a NWDWA coordinator who can act in the interests of the aquifer, ensuring that it is represented in the plethora of organisations that exist and affect the management of and demand for this resource. In the long-term, the institutional arrangements that govern the resource may be a Dolomitic Water Management Committee, which will incorporate the various role-players into one committee and serve to centralise decision-making around the aquifer. However, for this approach to be effective, the participating organisations need to be strong and their strength will depend largely on how they are set up and to what extent stakeholders are capacitated to play a meaningful role in water management.

Report No TT 250/05 (Contractor: Sigma Beta Consulting)
Water poverty mapping: Development and introduction using a case study at the local municipal scale for the Eastern Cape

The project aimed to introduce the concept of Water Poverty Mapping (WPM) as a policy tool and to demonstrate its use via a case study. It has been achieved through a discussion of the theoretical underpinnings of WPM and the potential role that it can play as a water supply tool, by developing a strategic level water poverty map at local municipality scale for the Eastern Cape. WPM combines the strengths of the Water Poverty Index (WPI) as a composite measure of water poverty, with that of poverty mapping and geographic targeting. The potential uses of WPM are two-fold: at a national and strategic level, water poverty maps could be developed at local municipality level for the targeting of limited resources as well as tracking the general state of water poverty across the country. This study has shown that WPM has the potential to provide a useful policy tool and that the development of this concept should be furthered through a workshop to debate the issues and lay the foundation for the development of a national strategic level water poverty map at local municipality scale. Ongoing research and development including a pilot study to investigate the possibility of developing a finer resolution water poverty map for the targeting of the water supply implementation process, should also be encouraged.

Report No KV 167/05 (Contractor: Mbumba Development Services)
Gender mainstreaming within the water sector: Situational analysis

The project focused on the process of identifying key issues that hinder gender mainstreaming in the water resource and water services sectors in South Africa and to propose recommendations to deal effectively with these issues. Research demonstrates that many institutions have made rhetorical and paper commitments to the mainstreaming of gender, but little has translated into tangible benefits for both women and society. The study found that a gender policy was an essential component of a good organisational framework that will address gender issues. In terms of capacity of staff at project and programme levels, there is a serious lack of gender integration. There is a crucial need to develop a framework of gender competencies with the water sector and define clearly what the respective competencies are and at which organisational level they should be. Barriers to women's equal participation in the water sector relate to gender attitudes, stereotyping and discrimination. Therefore, a gender analysis needs to be done. Gender mainstreaming within water resources management needs to be accompanied by transformation both within other development sectors as well as within society as a whole.

Report No KV 166/05 (Contractor: JR Muller)
Approaches to abattoir effluent treatment

Previous WRC research has shown that abattoirs are known to use large quantities of potable water for continuous cleansing during the slaughter operation, for the cleaning of stock pens, for washing down of carcasses and for transportation of solid waste. Whilst larger abattoirs exercise good water management techniques, the smaller ones consume far more water. In evaluating the treatment methods and costs of managing abattoirs effluent, it was decided that environmentally friendly and cost effective methods would be the preferred treatment systems. It was further decided that naturally occurring bacteria would be used, rather than cultivated bacteria. A pilot plant in Kimberley was operated for approximately 12 months.

Reports can be ordered at orders@wrc.org.za