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Newsletter of the Water Research Commission
April 2003



WRC Hands Over Weather Radar to SAWS

The WRC officially handed over the Russian-made MRL-5 weather radar to the South African Weather Service (SAWS). The function took place at the radar site at Witbanksfontein, 25 km outside Bethlehem in the Free State Province on 10 March 2003.

Dr George Green, Deputy CEO of the WRC, handed over the radar to the newly-appointed CEO of the SAWS, Mr Jerry Lengoase. Other guests included members of the local authority, SAWS, the WRC and the media.

Dr Terblanche (SAWS, Bethlehem) thanked the WRC for its contribution and stated how the radar was used and will be used in the future. "The South African Weather Service will continue to use this facility and data from the facility to promote cooperation between meteorology and hydrology, expose a new generation of scientists to this exciting field and ensure that radar meteorology continues to play a central role in improving severe weather warnings, mitigating weather-related disasters and improving input into hydrological and stream flow models," said Dr Terblanche.

Dr George Green (WRC) officially hands over the MRL-5 weather radar to Jerry Lengoase, CEO of the SAWS

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(Group Assistant)

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KEY STRATEGIC AREA (KSA): Water Use and Waste Management

This KSA focuses on water use and waste management in the domestic, industrial and mining sectors, including particularly:

- water supply and treatment technology for these sectors of our economy; and
- waste and effluent management, treatment and reuse technologies that support environmentally-responsible growth in these sectors.

Primary Objective:

- To provide knowledge for advancing technology, science management and policies which are relevant to water supply, waste and effluent practices in these sectors so as to enhance quality of life, contribute to economic growth and improve public health.

Secondary Objectives:

- To contribute to the improved management and accelerated delivery of water services in rural and urban areas
- To contribute to the strengthening of local government capacity and competencies
- To develop appropriate technologies for improving the quality and quantity of our water supplies for domestic and industrial use
- To develop new approaches to manage and enhance hygiene and sanitation practices
- To provide appropriate, innovative and integrated solutions to water and waste management in the industrial and mining sectors
- To develop improved processes for the treatment of wastewater and effluent and, thereby enable increased reuse thereof
- To improve health, economic and environmental conditions while supporting the development of appropriate technologies and socially-focused management practices related to water and effluent management
- To contribute to improve public understanding of water services and technology.

Research Thrusts:

- Water services - Institutional and management issues
- Water supply and treatment technology
- Wastewater and effluent treatment and reuse technology
- Industrial and mine-water management.

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In This Edition

Estuaries Alive!

Mr Phumelele Gama's dream of pursuing his relentless passion for estuaries would not have been possible were it not for the support of the Water Research Commission (WRC). As part of a WRC research contract, Mr Gama is pursuing a three-year study programme which will earn him his Ph.D in April 2004.

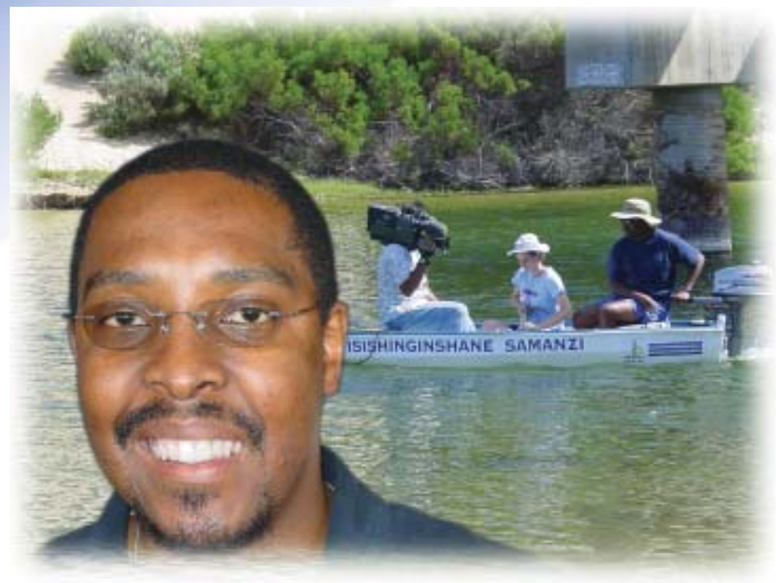
Mr Gama's story began in Springs, Gauteng. He then completed his schooling career at St Marks High School in Swaziland. In 1988 he received his BSc (Biology) at Shaw University (Raleigh, North Carolina, USA). In 1992 he completed his MSc (Botany) from North Carolina State University (Raleigh, North Carolina, USA). The title of his thesis was *Phytoplankton Response to a Sediment Loading Gradient in a Mesotrophic Reservoir*.

During his stint in the USA, he was involved in various research efforts focusing on water quality and ecosystem health of freshwater ecosystems, primarily the phytoplankton (algae)/ primary productivity component of lakes and reservoirs.

From 1996 to 1999 Phumelele functioned as a lecturer of Botany at the University of Zululand. During this time he worked on area coastal lakes, monitoring phytoplankton biomass and physico-chemical variables. He was also involved in a sampling programme on the Mhlatuze harbour/ estuary sanctuary from 1997- 1998, as part of an NRF-sponsored grant with members of CRUZ (Coastal Research Unit Zululand) until his departure to the University of Port Elizabeth (UPE). He presented part of his Mhlatuze work at the 4th International Ecohydraulics Symposium held in Cape Town in March 2002.

Mr Gama is currently a lecturer in Botany at UPE. His passion for estuaries still burns strong: their health, sustainability and pristine beauty are close to this young man's heart. "An understanding of phytoplankton is important in understanding the food chain in estuaries: They provide food for zooplankton which fish feed on. Birds then feed on the fish in this cyclic process. The importance of estuaries should never be underestimated," says this dedicated environmentalist. "What the country needs is the involvement of more young people in such crucial issues which hinge on the concept of sustainability. I must stress that I am most grateful to the WRC for realising my dream. More institutions should emulate the fine example set by the WRC so that we can build a formidable knowledge base in the country".

It is not surprising that this 37-year old researcher wants to remain at UPE and broaden his knowledge as far as estuarine research is concerned. "I want to act as a role model, especially to previously disadvantaged students and encourage them to get involved in study programmes such as this one. Hopefully, research can grow in stature in the near future, " says Mr Gama, his eyes bright with enthusiasm.



Phumelele Gama. Background: An SABC cameraman capturing Phumelele's work

When he is not on a boat testing water in our precious estuaries, Phumelele chills out by playing soccer and tennis or listening to contemporary jazz music.

Dr Steve Mitchell, Director: Water-Linked Ecosystems, says "Phumelele is doing fundamental research into the ecological processes in small temporarily open and closed estuaries. This is particularly relevant in South Africa as approximately 80% of our estuaries fall into this category and any changes to water quality or river flow in the catchment will be reflected in the estuary. The findings of Phumelele's research have been applied in a recent Department of Water Affairs and Forestry (DWAF) study to determine water quantity in the Tsitsikama Estuary. During his time at UPE he has effectively thrown his weight behind the Departmental drive to build capacity in previously disadvantaged individuals."

Mr Gama, South Africa needs such sober and refreshing enthusiasm and the WRC is there to support such a culture. We at the WRC wish you well in your final hurdle to success.

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The WRC @ the FAO Training Workshop

The Cooperative Programme of the Government of Italy is funding the Food and Agriculture (FAO) project of the United Nations on "Gender Analysis in Farmers' Water Management", as a direct support to the Special Programme for Food Security (SPFS). The project introduced, within the SPFS framework, a participatory training and extension programme that will increase its impact on the different socio-economic groups. The overall objective was to enhance the opportunities for rural women to improve household food security and to raise income through the introduction of low-cost and water-saving technologies for irrigated crop production.

The event was supported by the WRC and the National Department of Agriculture. It took place from 3-14 March 2003 in Polokwane, South Africa. Dr Sizwe Mkhize, Research Manager: Water Utilisation in Agriculture, organised the event.

The participants of the Regional Workshop were national experts involved directly in the implementation of the FAO SPFS Programme in the following countries: Angola, Cape Verde, Eritrea, Ethiopia, Lesotho, Malawi, Mozambique, South Africa, Sudan, Swaziland, Tanzania and Zambia. Each country was represented by two participants. Training sessions were facilitated by FAO specialists and resource persons during the morning sessions. In the afternoons small working groups and practical exercises were on the agenda. On the last day the participants presented a proposal for a detailed Training Plan.

Delegates at the FAO workshop

Agricultural Water Management: A Priority

During 2000 an initiative to assist farmers commenced. Discussion forums were planned for each province to assess farmers' needs and to address farmers' problems. On 26-27 February 2003 the eighth of nine planned discussions took place in Rustenburg. Farmers from the North-West farming community participated in this workshop.

In order to obtain representative participation, consultations took place with Agri North-West and the Department of Agriculture, Conservation and Environment in North-West Province. Mr Lucas Sentsho, a farmer who specialises in maize and sunflower production, said, "This workshop has provided me with valuable insight and it is encouraging to know that there is a resource base such as the Water Research Commission. I have benefited tremendously from these discussions."

The forum commenced with Dr Gerhard Backeberg, Director: Water Utilisation in Agriculture, addressing the participants on the WRC Strategic Research Plan. The participants were then divided into groups and they were tasked with identifying and discussing problems. The facilitator was Dr David de Waal (Afrosearch). Problems were categorised into 4 major areas:

- Soil
- Crops
- Engineering
- Economics

A group of farmers from the North-West Province at the WRC workshop

The proceedings of the forum will be published and incorporated into a broad framework document after the 9th forum takes place in Gauteng. This will give the WRC an idea of the common problems experienced by farmers in the country. Research will then be planned to address these issues, ensuring that WRC research in this area is relevant to the needs of the country.

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The WRC @ the 3rd World Water Forum

The World Water Council (WWC) Board of Governors decided to hold the 3rd World Water Forum in Japan from 16-23 March 2003. The Forum was held primarily in Kyoto.

The Japanese Government hosted a Ministerial Conference concurrent with the Forum. His Imperial Highness the Crown Prince of Japan was the Honorary President.

The United Nations has designated 2003 as International Fresh Water Year. The UN's water-related organs carried out the "World Water Assessment Programme" with UNESCO as the administrative head. The results of this project were included in the first issue of the "World Water Development Report" which was presented at the Forum.

The WRC was represented by:

Dr Rivka Kfir, CEO of the WRC
Dr George Green, Deputy CEO of the WRC
Mr Jay Bhagwan, Director: Water Use and Waste Management
Mr Kevin Pietersen, Director: Water Resource Management
Dr Sizwe Mkhize: Research Manager: Water Utilisation in Agriculture & Head: Cross-Cutting Domain: Water & Society

Dr Kfir presented a talk on "Reaching WSSCC (Water Supply and Sanitation Collaborative Council) WASH (Water, Sanitation and Hygiene) Goals and Attaining Vision 21 Targets".

Dr Kfir (CEO:WRC) (second from left) presented a talk and participated as a panellist at the World Water Forum, Kyoto

What's New

Report No TT 181/02
Quality of Domestic Water Supplies Vol. 4: Treatment Guide

This guide provides general information on the treatment of water for domestic use. The objective is not to go into technical details of the different treatment methods, but to provide general information on aspects such as suitability of processes for different types of water and the limitations and relative costs of different processes.
The guide seeks to empower people in developing and rural areas to make informed decisions about the selection of treatment processes and the management of treatment plants under their control in order to ensure sustainability of their water supplies. It is also helpful in providing a better understanding of individual treatment processes and combinations of processes for treatment plant operators and managers.

Report No TT 162/01
Quality of Domestic Water Supplies Vol. 5: Management Guide

The purpose of this guide is to provide guidance on domestic water supply with regard to the planning of a new domestic water supply scheme; operation and management of a domestic water supply scheme; actions that can or should be taken if something goes wrong at selected points in the domestic water supply system and the identification of the responsible authority at selected points within the water supply scheme.

Report No 1083/1/02
Assessment and Application of Imported Biomass for the Bioremediation of Heavy Metal Effluents

Conventional treatment technologies for the removal of toxic heavy metals from industrial wastewaters is either too expensive or not effective in removing metals from the environment. This report investigates cost-effective alternative technologies for treatment of metal contaminated waste streams. The report is divided into three parts: the first part reports on batch testing of the acquired biomass technologies performance; the second part reports on the behaviour of the immobolised biomass in a continuous packed bed laboratory scale reactor and the third part consists of an on-site pilot scale study to determine field operating conditions and efficiencies.

Report No 903/1/02
Development of Statistical Forecast Models of Summer Climate and Hydrological Resources over Southern Africa

This report seeks to develop improved prediction models for water, climate and related resources. The research explored predictors other than sea surface temperature, considering that tropical wind circulations and air pressure play important roles in forcing the tropical ocean into an anomalous state, and in transmitting these effects to wider areas via slowly evolving "waves". Key indices that distinguish the linearly predictable component of climate around southern Africa have been uncovered. The research is aimed at developing climatic inputs to hydrological models at regional level.

Report No KV 138/02
Spatial and temporal Heterogeneity in Lotic Systems: Implications for Defining Reference Conditions for Macroinvertebrates

This report is based on data collected in the Western Cape during two previous WRC-funded projects. During these projects, research into and development of the key bioassessment tool used in South Africa, namely SASSS4 (South African Scoring System), was undertaken. A subsequent DWAF (Department of Water Affairs and Forestry)-funded project focused on the "derivation of ecological reference conditions for riverine macroinvertebrates". This report represents an amalgamation and analysis of data from the WRC and DWAF projects, addressing objectives related to aquatic bioassessment and defining ecological reference conditions for riverine macroinvertebrates.

Report No 956/1/02
Development of Numerical Methods for Predicting Relationships Between Stream Flow, Water Quality and Biotic Responses in Rivers

This report presents the results of WRC project K5/956: "Development of Numerical methods for Assessing Water Quality in Rivers, with Particular Reference to the Instream Flow Assessment Process." The numerical methods which have been developed enable predictions of stream flow concentration relationships to be made for some key water quality variables in rivers. Techniques have also been developed to predict the effect that changes in water quality may potentially have on the aquatic biota. Another output is a survey of the literature that is pertinent to the study. In addition, a training manual is in press (TT 202/02) to guide managers and consultants in the field of water resource management.

Report No 956/2/02
Linking Discharge, Water Quality and Biotic Response in Rivers: A Literature Review

This report represents a review of the literature for the WRC project K5/956 (refer also to Report No 956/1/02). The survey covers issues concerned with water quality and quantity as well as tolerance ranges of riverine organisms with regard to the various water quality constituents. It considers links between streamflow and water quality. The project considers predictions in the context of environmental flow assessments. The effect of changes in the concentration of chemical constituents and values of physical variables on the biota is considered. Methods to predict such effects are also discussed.

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