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Newsletter of the Water Research Commission

In This Edition

Generosity Personified

As a microbiologist, Nozibele (meaning a generous person) Mjoli has been through various echelons in her field: teaching, lecturing, researcher, research manager and, finally, consultant. Don't let her diminutive size fool you- she has made gigantic strides, especially in the field of sanitation.

When Nozi completed her B.Sc. degree and a University Education Diploma (UED) at the University of Fort hare in 1977, she opted to teach Biology at high school level. But, she found that she was stagnating and teaching was not her proverbial cup of tea. She decided to return to university where she completed a B.Sc. (Hons) in Zoology with the support of a CSIR bursary. After serving a short stint at the newly established University of Bophuthatswana, Nozi studied towards her M.Sc. (Microbiology) at the University of Notre Dame, USA, which was funded by a Fullbright scholarship. After the completion of her M.Sc., the University of Notre Dame offered to fund her to study towards her PhD which she completed in 1987.

Upon her return, she went back to the University of Bophuthatswana for a few months until she was recruited by Prof Dave Woods to join his research team in the Department of Microbiology at University of Cape Town (UCT). After three years, Mjoli "needed to apply my (her) knowledge to solve real life problems. The CSIR – Division of Water Technology offered me an opportunity to work in the Water and Health Programme under the leadership of Dr Rivka Kfir (the current WRC CEO) in 1991. After a year at the CSIR, I felt that I still wanted to teach at university level; fortunately, I was appointed as a Senior Lecturer at the University of Durban-Westville – Department of Microbiology in 1992. The two years that I spent there were worthwhile because a number of my students went on to obtain PhD degrees in Microbiology due to the motivation they got from the Seminar programme that I introduced for the final year Microbiology students."

With the advent of South Africa's democracy in 1994, an excited Nozi wanted to be part of the new order and she decided to move to Pretoria in order to make a contribution to the development of new water and sanitation policies. "I accepted a position as a Research Manager for water supply and sanitation at the Water Research Commission in 1995. In 1996, the Minister of Water Affairs & Forestry appointed me to be the Deputy Chairperson of the newly established National Water Advisory Council. I worked for the WRC until 2002. My association with the WRC provided me with many opportunities to participate in several international water sector organizations such as the Global Water Partnership, World Bank, Water Supply and Sanitation Collaborative Council and World Humanity Action Trust (WHAT) Water Commission. The exposure to these international organizations accelerated my capacity building in the water sector within a short time. The WRC is doing an excellent job in its role as a water knowledge hub and its research is used nationally and internationally in addressing water resource management and water services delivery problems. It is making a meaningful contribution in the training of water sector professionals in South Africa."

"After managing Water Supply and Sanitation research for seven years, I felt an urge to get hands-on experience in finding solutions to the problems of delivery of water and sanitation services to the poor communities. I have a special interest in this area because I grew up in a rural village, without access to clean water and adequate sanitation. I established my own consulting company, Hlathi Development Services in 2003. So far I am happy with the choice that I have made."

Nozi has achieved several milestones during her illustrious career: She organized a UNESCO workshop on Gender and Water Supply and Sanitation for Eastern and Southern Africa in 1997; she was a Member of the Global Water Partnership- Southern Africa Technical Advisory Committee responsible for the development of 2025 Water Vision for Southern Africa and presentation of the vision to the 2nd World Water Forum in the Hague in 2000; Nozi was a member of an WHAT Water Commission responsible for the preparation of a report on 'Water Governance for a sustainable future' under the leadership of Dr John Rodda – former Director of UNESCO-Division of Water in 1998-2000; she was a member of the Organizing Committee for Africa Sanitation Summit held in South Africa in 2002; in 2002 Nozi facilitated the launch of the South African Chapter of WSSC; Nozi received the accolade: Winner of the Policy category for the Women in Water Awards in 2003.

Like most successful people, Nozi draws inspiration from impressionable role models. "My parents have influenced the choices that I have made in my life. Both of them came from very poor backgrounds, but they worked very hard to ensure that their nine children obtained University degrees. They have also made a significant contribution to the development of the communities in Umzimkulu, my hometown."

Nozi has made it her mission to contribute to improving the lives of South Africans, especially the rural women. "I would like to do more research on the contribution of women to development and poverty reduction in South Africa because I strongly believe that the empowerment of women is the key to poverty eradication. This eminent researcher believes in spending time optimally on pursuing tasks that inspire her. It is her personal philiosophy that once one sets clear goals, the universe provides opportunities to assist one in achieving one's goals.

Jay Bhagwan, an ex-colleague during her days at the WRC says, "Nozi is a good role model, since with all the constraints and challenges which she has been through, she has demonstrated that everything is possible, when given an opportunity and being empowered. She has played an important part in establishing the research agenda for water and sanitation in South Africa and continues to contribute to this knowledge base."

Nozi, keep up the good work and the WRC is proud to be associated with you and your achievements.

Water Research Commission

Minister Hendricks at the WRC

The Minister of Water Affairs and Forestry, Ms Lindiwe Benedicta Hendricks, visited the WRC on 5 December. Minister Hendricks was warmly welcomed by the WRC Executive and Board and she attended the WRC Board meeting. The Minister addressed the Board meeting, outlining the challenges that faced her Department and the water sector and she referred to how the WRC can play a role in supporting Government to address these challenges.

Minister Hendricks chats to Dr Khoza (left) and to WRC Executive (above)

The PRG Does it Again!

The Pollution Research Group (PRG, based at the University of KwaZulu-Natal (UKZN), under the able leadership of Professor Chris Buckley, has seen a surge in interest in textile wastewater treatment and cleaner production. Some examples include:

Dano Textiles (Hammarsdale) have requested the PRG to advise them on the selection of a wastewater treatment system in response to the requirements of the eThekwini Water and Sanitation effluent permit. They wish to incorporate Cleaner Production (CP) principles into the reuse schemes that are being planned.

Enviroserv have installed an effluent treatment system at the da Gama Textiles King Williamstown plant. They are experiencing incomplete biological degradation and bad fouling of the MF membranes and have requested the PRG to assist in overcoming these problems.

The effluent plant at Ramatex (Windhoek) is being taken over by the City and the Government will provide a grant of N$13 million to upgrade the effluent treatment plant and to effect some changes within the dyehouse. The PRG has been requested to assist the City in drawing up the terms of reference for consulting services and then to assist in the evaluation of the offers and technologies.

Offers have been made to the first two companies in conjunction with Susan Barclay cc as there is a lot of data gathering that would be more suited to a commercial company rather than a university research group. A visit to Windhoek is being planned so as to discuss a possible approach.

One of the PRG's funders, the WRC has been involved with the PRG since 1990, funding projects to the tune of R17 million.

Dr Liphadzi Appointed to ARC Board

Dr Stanley Liphadzi, Research Manager: Water-Linked Ecosystems, has recently been appointed as a Board member of the Agricultural Research Council (ARC) for a period of three years. Stanley worked at the ARC for 2 years. He joined the WRC in December 2005. He will form part of the ARC's Human Resources and Performance Committee.

The WRC – Immersed in Africa

The Inter-Ministerial Dialogue on Building an African Network of Centres of Excellence in Water Sciences and Technology was held jointly by the Bureaus of the African Ministerial Council on Science and Technology (AMCOST) and the African Ministerial Council on Water (AMCOW) on Wednesday, 22 November 2006, in Cairo, Egypt. The dialogue was attended by ministers from Lesotho, Senegal, South Africa and Zimbabwe, senior representatives from Algeria, Egypt, Ethiopia, and South Africa, and representatives from the Office of Science and Technology of the New Partnership for Africa's Development (NEPAD) and the African Union (AU) Commission. Delegates were engaged in issues relating to criteria and guidelines, financial mechanisms and governance for the network of centres of excellence in water science and technology (the network), before agreeing to its establishment.

The WRC's role at this event was to support the NEPAD office to develop a business plan; to convene meetings of the NEPAD Task Team on water sciences and technology (which took place on the 19th November 2006); to convene the inter-ministerial dialogue on water sciences and technology so as to develop guidelines for establishing the network of centres of excellence and to assist the NEPAD Office of Science & Technology to handle the necessary administrative and technical matters. The Dialogue was a huge success and brings the initiative closer to the shared goal of establishing centres of excellence.

For more information and photos visit http://www.iisd.ca/africa/amcost/

Africa Water Congress

The Africa Water Congress took place on 27-30 November at the Sandton Convention Centre. The aim of the conference was to debate the major developments in asset and infrastructure growth as well as opportunities in project bankability, decreasing the rate of non-revenue water, sanitation and water cycle management. One of the speakers is Mr Jay Bhagwan, a Director at the WRC. He discussed the concept of Franchising in the South African Water Services Sector.

Site Visit: Fishways

Impassable fabricated barriers to migration, including weirs, dams, levees and embankments, have been cited as one of the main reasons for the decline in the number of red data species of aquatic organisms in southern Africa. Other factors include pollution and the introduction of alien species. To mitigate the situation, several fishways have been constructed in South Africa since the 1950s, some at great expense. However, of the estimated 57 fishways that currently exist in the country, many are non-functional.

The reason for this is that most of these structures were not conducive to South African fish species and local river conditions.

The fishway in the Kruger National Park

Economic considerations also influenced fishway design: in order to reduce costs, fishways were often shortened and made impossibly steep. Another mistake was the incorrect positioning of the fishway entrance. As these structures were non-functional, they proved to be a liability and, as far as fish migration was concerned, it left a lot to be desired. "It was only since 2000 that a significant research effort was undertaken to design functional fishways that were conducive to South African fish species and rivers. Almost all of this research was and is being funded by the Water Research Commission (WRC). Although fishways are important to ensure the migration of fish, the construction of these structures can add to the cost of the construction of a dam or weir. Therefore, it needs careful consideration, not only from an environmental point of view, but also from a financial and sustainability point of view," maintains Dr Steve Mitchell, Director: Water-linked Ecosystems at the WRC. "It is for this reason that we have launched this multi-disciplinary effort to provide guidelines to establishing fishways which are designed to meet the requirements of our indigenous aquatic species and to suit our environmental conditions." This collaborative effort encompasses input from hydraulic and design engineers, hydrologists and fish biologists.

Fishway specialist Dr Anton Bok, one of the researchers, reports that most countries in Europe, North America, as well as Australia appear to be at least a decade ahead of South Africa in terms of developing fishway designs suitable for their indigenous species and the hydrological conditions in their rivers. "These countries are also many years ahead of us in terms of implementing well-structured fishway monitoring programmes."

Unlike rivers in Europe and North America, many of South Africa's rivers are seasonal and flows fluctuate depending on the season as well as the dry and wet periods that characterise our country. In addition, initial data from monitoring existing fishways in South Africa show that both juvenile as well as adult fish migrate, with the small fish commonly migrating during low-flow conditions as well as high flow conditions.

Thus, fishways in South Africa need to operate effectively over a wide range of river flows, and must cater for a wide range of fish size, varying swimming abilities and behavioural preferences. It must also be remembered that it is not only fish which migrate: There are at least nine species of macrocrustacea (freshwater prawns and crabs) that are known to migrate between the sea or estuaries and freshwater reaches.

The three most common types of fishways found in South Africa are the pool-and-weir type, the vertical-slot type, and 'natural' type by-pass channels and fish ramps (the spillway of the Lower Sabie Dam in the Kruger National Park is the only example of this type of fishway in the country). "An assessment of all three types of fishways was undertaken to determine the suitability of each design for local conditions," reports Dr Ralph Heath, a senior Scientist at Golder Associates Africa, who is the project manager of this research consortium.

After the 'natural' type, the vertical slot design is the most favoured as, when correctly designed, it is effective over a wide range of flows. This design comprises a sloping, rectangular channel, which is divided into a series of pools by the construction of weir walls. However, each wall has a vertical slot running from top to bottom. The water flows between each pool through these slots at a velocity which the fish can swim against.

Refinements to the vertical-slot type fishway design for the country is being researched in ongoing WRC-sponsored fishway studies. "The fishway designs used in South Africa at present are only a few of the possibilities. Further investigations are in progress in laboratory conditions to determine the optimal fishway designs for South Africa," says Dr Heath.

It is anticipated that, once all the research has been completed, the results will be collected in a guideline book, outlining how to design, monitor and maintain fishways under South African conditions.

On 19 January 2007 the WRC formed part of a site visit at the Kruger National Park to view the model of a fishway that has been specifically designed for fish species that are indigenous to South Africa. The event was covered by SABC Radio and the television crew from *50/50* was also present.

A series of regional workshops will be held during 2007 to introduce the latest South African fishway designs and protocols to regulators, design engineers, scientists and interested members of the public. The dates of these workshops will be announced on the WRC website, www.wrc.org.za shortly.

Fishing

The camera crew at the fishways site

SHAREing Knowledge

SHARE is one of the **European Space Agency's DUE Tiger** projects. SHARE aims at enabling an operational soil moisture monitoring service for the region of the Southern African Development Community (SADC). With this service, SHARE will address one of today's most severe obstacles in water resource management which is the lack of availability of reliable soil moisture information on a dynamic basis at a frequency of a week and less.

The soil moisture information system is based on the newest radar satellite technology. The service will use data delivered by ENVISAT's ASAR sensor operated in global mode and the METOP scatterometer sensors. The synergistic use of both systems will allow frequent, high resolution monitoring of regional soil moisture dynamics.

The long-term vision of SHARE is to supply soil moisture information for the entire African continent, at a resolution of 1 km, posted on the web, freely accessible to all.

The WRC funds the project: WRC Contract K5/1683: *Soil moisture from satellites: Daily maps over RSA*. This project exploits a geo-stationary satellite (METEOSAT-8) to determine early morning surface temperature changes on each 1km square pixel on the African continent south of the equator every day. From this information we can determine the soil wetness of each pixel. This information is useful for real-time hydrological modelling (for example, flood forecasting) and crop demand for water (an agricultural application). The University of KwaZulu-Natal (UKZN) is the South African partner in SHARE have brought this WRC project to the table to collaborate meaningfully with their partners at the Vienna University of Technology. The WRC hosted students and other role players during November.

The group at the SHARE workshop

CPSI Award

The WRC and the Water Information Network-South Africa (WIN-SA) celebrated the Centre of Public Service Innovation's (CPSI) Awards in the category of Innovative Service Delivery Institutions that was given to the Masibambane programme. The event honoured everyone who has worked hard to make this award a possibility.

Translated from isiZulu, Masibambane means "let's work together" – certainly a tenet that it seemed to have lived by in achieving this prestigious award. The key focus area of this innovative programme is primarily to address the issue of water services delivery as stipulated by the Strategic Framework for Water Services.

Legally Speaking

The International Development Law Organization (IDLO), in cooperation with the Food and Agriculture Organization (FAO) and the South African Water Research Commission (WRC), organized a five-day capacity-building programme on "Improving Legal & Regulatory Efficiency for Water Resource Management in Southern Africa" on 22-26 January 2007 at the WRC.

The programme examined the key components of IWRDM: an effective legal and regulatory framework, and solid institutions at both the national and local levels, which are held accountable to end-users. It also analyzed how integrated institutional structures, regulatory mechanisms and market-oriented incentives contribute to the sustainable use of water resources, as well as public-private partnerships (PPPs) and the role of private sector in water rights. This training seminar will provide technical tools to review the current legislative frameworks for both water services and water resources according to economic and social development.

The capacity-building component will be addressed to legal professionals and high-level policy advisors working for national or local Governments of the Republic of South Africa, and four more Southern African countries; legislative drafters; representatives from regulatory authorities; in-house lawyers and law firm practitioners advising private suppliers; NGO lawyers and user/consumer association representatives.

The drivers of this event are Darren Thorne and Claude Sauveplane.

From left to right: Claude Sauveplane, Barbara Schreiner and Darren Thorne

What's New

Report No 774/1/00 (Contractor: MBB Consulting Engineers)

Developing sustainable small-scale farmer irrigation in poor rural communities: Guidelines and checklists for trainers and development facilitators

This report contains checklists that are meant to guide the facilitator/trainer in ensuring that all the role-players develop adequate skills and awareness of the circumstances under which the development will have to remain sustainable. The study emanated as a result of frustrations as expressed to the authors by developers, extension officers, operators and farmers involved in smallholder irrigation. Formal training is inaccessible and not a practical solution. "Learning-by-doing" is increasingly recognized as a powerful adult learning method and this guide is based on this tenet. The guideline document is a synthesis of practical South African experience drawn from written material, videos, interviews, analysis and debate. Comments were sourced from practitioners country wide, academics, and members of the WRC Steering Committee.

Report No TT 276/06 (Contractor: CSIR)

Cross-sector policy objectives for conserving South Africa's inland water biodiversity

In South Africa the responsibility for conserving inland water ecosystems is shared between several segments of society and departments of Government, resulting in considerable overlap of mandates. This project focuses on facilitating cross-sector engagement to address this issue. The resultant paper focuses on supporting the development of shared policy objectives and guiding principles that will promote the practical conservation of inland water biodiversity across multiple sectors and spheres of Government. The paper contains discussions of both the policy and scientific contexts that underpin the conservation of freshwater biodiversity. Hopefully, there will be consensus on a common policy statement and a cooperative implementation plan for the conservation of inland water biodiversity in South Africa.

Report No TT277/06 (Contractor: DH Environmental Consulting cc)

A research strategy for the detection and management of algal toxins in water sources

Cyanobacteria in South Africa's surface water are a growing problem. Incidents of fatal Cyanobacterial poisonings in South Africa are not uncommon. There was consequently a need to plan a research strategy in order to address this growing problem. Such a strategy should ideally focus on South Africa's most competent extant capabilities in the field, and integrates the existing infrastructure and research programmes into a core research network. The report is also based on a comprehensive analysis of global trends in cyanobacterial research gleaned from conferences and symposia and the re-establishment of working contacts with the leading international specialists in the field.

Report No TT 266/06 (Contractor: University of Stellenbosch)

A desalination guide for South African municipal engineers

This guide provides comprehensive and succinct information regarding popular desalination technologies. It provides guidance in the process of evaluating potential augmentation of municipal water supply through desalination. The guidelines are based on considerations such as saline water source quality and location; desalination technology and peripheral process selection; operating and maintenance aspects; environmental and socio-economic implications and capital and operating cost estimates. The project sought to identify technologies that can be commercially implemented to treat saline water to drinking water standards, to identify typical pre-treatment requirements, and to identify the most common technical, operating and environmental problems experienced in the selection and use of these technologies. A further consideration was to furnish estimates for capital and operating costs. Of particular importance to the South African application was to identify the level of skills required for daily operation, technical back-up and advice and to identify and advise on the competencies, training needs and capacity building required at operator and management levels. Finally, the relevant local environmental legislation governing desalination was also identified.

Report No TT 279/06 (Contractor: Alewyn Burger)

A study of Roman water law, with specific reference to water allocations and prior appropriation

Considering that the South African legal system is based on Roman-Dutch and Roman law, the question arises: Can the Roman law provide guidance for water law and water allocations in South Africa. Because flowing water in Roman law could not be the subject of rights of ownership, a system of interdicts was developed by the praetors to enforce rights to perennial flowing water. This study traces the development of the prior appropriation principle by means of the interdicts in Roman law. The problems arising when the source of perennial flowing water becomes fully used are identified, and the Roman solutions to the problems are described. The rules regarding non-flowing water, underground water and stored water are also discussed. The Roman interdicts offer practical, tested guidance for resolving conflicts arising in water-stressed situations typical of arid and semi-arid areas. This makes the body of Roman water law worthy of attention and further study for application in South Africa.

Report No 1306/1/06 (Contractor: Rhodes University)

Assessment of the geomorphological reference condition- An application for resource directed measures and the river health programme

The project aimed to develop methods for determining the geomorphological reference condition, the present geomorphological state and to refine the geomorphological index for use in the river health programme. The approach used was a systems approach. A river is seen as a system, and relevant systems concepts are examined and defined. An important concept in this regard is that of self-organisation. This is a measure of the system's intrinsic adaptation to the current set of external drivers. It becomes necessary to understand the degree of self-organisation that a system exhibits, and from this the trajectory of self-organisation, permits prediction of the end point of change. It is proposed that the degree of self-organisation is a better measure of ecosystem health than a measure that compares the present condition to a historic reference condition. This thinking is in line with progressive thinking internationally and has been shown in this project to fit the South African rivers.

Report No 1258/1/06 (Contractor: University of the North)

A biophysical framework for the sustainable management of wetlands in the Limpopo Province with Nylsvley as a reference model

In 1996 it was estimated that 50% of South Africa's wetlands had been lost as a result of anthropogenic activities. However, wetlands provide a number of valuable goods and services amongst which are flood attenuation, improved water quality and agricultural potential to name a few. Nylsvley is no exception in that it is approximately 95% in private ownership although the nature reserve (approximately 5% of the total area) is a Ramsar Site. In addition, the Waterberg is registered as a Biosphere Reserve, making it an important international and national conservation area. This project aimed to develop draft water quality guidelines and potential biomonitoring indices for vlei areas, compile a draft sustainable management programme for Nylsvley and propose a strategic management plan for sustainable utilization of wetlands in the Waterberg region. Water quality was examined throughout Nylsvley, and it was found that the sewage works of Modimolle was the main source of organic pollutants. Pesticide pollution was also measured, and sediment quality was tested. Amongst the biota, plants, macroinvertebrates, amphibians and fish were examined as potential sources of biotic indices, and a method for assessing wetland health has been developed based on these indices. A framework for a management plan has been developed using one of the main issues identified through the project as an example.

Report No 1270/2/04 (Contractor: University of Stellenbosch)

Guidelines for the planning, design and operation of fishways in South Africa

There were two distinct parts to this project: The development of sound theory for rating natural controls in river such as rapids and rock barriers for accurate measurements, particularly of low flows; and the development of fishways to be used in combination with various types of gauging structures, without any negative impacts on the accuracy with which flows are to be gauged. The aim was to determine a system through which various types of natural controls could be calibrated, by establishing a relationship between the discharge coefficient

and the physical characteristics of each control type. Two types of critical controls were identified and investigated: step-pool controls and horizontal constriction controls as well as one type of uniform flow control: the plane bed control. Step-pool controls were found to be very robust controls which provided efficient critical controls for a wide range of flows. The second part of the project was to examine the possibility of developing fishways on gauging structures. The product of this project is considered to be `DRAFT' because it will be widely distributed and comment will be requested which will feed into the final product of the third and biggest of the three WRC-funded fishway projects. The product gives a number of protocols around the use of fishways. It examines the biological requirements for fishways, and then gives guidelines for the design and monitoring of the fishways.

Report No TT 275/06 (Contractor: CSIR)

Guidelines for the design, operation and maintenance of urine-diversion (UD) sanitation systems Volume 4

This Guide is Volume 4 of a four-volume series. Volume 1 is *Pathogen destruction in UD sanitation systems*; Volume 2 is *Use and acceptance of UD sanitation systems in South Africa*; Volume 3 is *Use of human excreta from UD toilets in food gardens: Agronomic and health aspects*. In this volume the background and content of the whole project is described to put this volume into context. The concept of urine diversion is introduced. This is followed by guidelines for constructing a UD toilet, with sections on building materials and methods for the superstructure, faeces vault, urine pipes, ventilation and fly control, and upgrading of VIP and bucket toilets. A number of illustrations accompany the text, including pictures of good and bad practice. Operation and maintenance aspects are covered, with sections on dehydration, odour and fly control, cleaning the pedestal, disposal of anal cleansing material, urine collection and disposal, clearing blockages in the urine pipes and faeces management. Suggestions for further reading are also included.

Report No 1333/1/06 (Contractor: University of Pretoria)

Research, development and verification of an operational and interactive system to forecast heavy rainfall (PROGRAIN)

This project deals with the development of heavy rainfall identification systems over South Africa. An ingredients-based approach is used and a heavy rainfall identification system combines atmospheric criteria, which must co-exist to identify areas of heavy rainfall. This project saw the identification and implementation of two heavy rainfall identification systems at the South African Weather Service (SAWS). Firstly, the Tropical Heavy rainfall Identification System (THERIS) identifies heavy rainfall from continental tropical weather systems. Secondly, the Coastal Zone Heavy Rainfall Identification System. Three different versions of the Coastal Zone Heavy rainfall were implemented along the South Coast and the East Coast. Statistical results reveal that the system works very well along the South West Coast, but the results are not favourable along the South and east Coasts. All the products developed in the PROGRAIN project have been disseminated to the forecasting offices of the SAWS and are available on the website of the SAWS. Additional forecasting products were also developed for the regional stations in South Africa.

Report No TT 261/06 & TT 262/06 (Contractor: Golder Associates)

Guidelines for the utilization and disposal of wastewater sludge.

Volume 1: Selection of Management Options (TT 261/06)

Volume 2: Requirements for the agricultural use of wastewater sludge (TT 262/06)

Previous sludge guidelines needed to be updated owing to changes in the South African regulatory environment during the last decade. These guidelines are aligned with updated South African laws and regulations pertaining to the environment, waste and water. These guidelines support the principle of sustainable use of resources and are in line with international trends and best practices. Each sludge management option was developed as a separate guideline document. This simplifies the Guidelines for users, as each guideline focuses on the management, technical and legislative aspects associated with a particular option.

Volume 1 (TT 261/06) addresses the major application and disposal options for sludge. This volume helps to select the appropriate management options for the sludge streams generated by a specific wastewater treatment plant. Once a suitable option has been selected, the user is referred to the relevant volume that deals with the selected management option.

Volume 2 (TT 262/06) describes the requirements and restrictions related to the safe use of sludge for the production of crops. The volume should be used when stabilized sludge is used as a nutrient source and/or soil conditioner. The volume may also use used to manage compost containing sludge that is not distributed to the general public for use.

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

WRC Hosts Renowned Meteorologist

Climate change is a buzz word among many different audiences, especially among the science community. The WRC was honoured to host a renowned meteorologist, Dr Mohamed Salim Mhita on 27 November. Dr Mhita is President of the RA1 "Africa" continent of the World Meteorology Organisation (WMO). He is a high profile person at WMO since he held the position of President of the Africa region for more than 20 years. Dr Mhita is about 60 years of age. He is also Chief Director of the Tanzanian Meteorology Agency.

Dr Mhita, as part of his programme, evaluated a Uganda and central Africa Weather Forecasting research project that is conducted by the University of Pretoria and Tabia Endelevu Africa. The project is currently funded by the British High Commission in South Africa, but the initial development of the forecasting system was done as a WRC project (2002-2005). The WRC is also currently paying for the licence of the numerical weather prediction model used as part of another current WRC project. The project also includes studies on climate change over central Africa.

The visit generated significant media interest. Interviews were screened on SABC Africa channel and on numerous radio stations as well as in many publications.

***Right**: Dr Mhita engaged in discussion*

*Dr Mhita (**above**) and Prof Rautenbach (**right**) being interviewed on SABC TV*

Monitoring Trees

The WRC was a part of the site at the Two Streams catchment in KwaZulu-Natal. The impact of tree water use on deeper soil layers has wide consequences, especially on the effective and efficient allocation and management of water resources. The catchment experiment has been used over the past seven years to study the impact of trees on soil hydrological processes. The project involved the use of a new technique which was developed in the Netherlands: Evaporation Monitoring Using Scintillometry. This technique is advantageous in that it provides spatially-averaged evaporation estimates over distances up to 5km and it also provides reliable and robust data because of the absence of moving parts and a relatively simple design. A Kipp and Zonen large Aperture Scintillometer was installed and mounted on scaffolding during August 2006. A workshop was also help in September 2006 where data were presented and discussed. This project will also see Mr Alistair Clulow obtaining his Masters degree. His Masters is based primarily on this project.

***Above**: Discussion time*

***Left:** Instruments at the site*

***Bottom:** Mr Clolow and Dr Dube examining instruments*

WRC Participates in Stander Evening

The WRC was one of the sponsors at the Biennial Stander Evening which was held on 24 October at the CSIR Conference Centre. The event commemorates the contributions of the late Dr Gert Johannes Stander, who was the first Director of the National Water Research Institute at the CSIR and first Executive Director of the WRC. Dr Stander was recognized internationally as one of the world's leading experts in the field of water research. As a founder member of the International Association of Water Pollution Research, he became its first President in 1969, and the first to hold this position for four consecutive terms of office until 1976.

The keynote speaker at the function was Professor Peter Rose, Director of Environmental Biotechnology at Rhodes University. His talk was titled *From Grootvlei to Witbank: A Decade of Global Leadership in the Remediation and Treatment of Mine Drainage Wastewaters*. It is traditional practice for young innovative researchers to share the stage with eminent researchers such as Professor Rose. This year was no exception:

Dr Jonathan Taylor: North-West University (Potchefstroom Campus) – *The Application of Diatoms for Biomonitoring of South African Rivers and Streams.*
Ms Jennifer Molwantwa: Rhodes University – *Sulphide Oxidation: The Missing Link in Sulphate Reduction.*
Mr Scott Sinclair: University of KwaZulu-Natal – *Flood Forecasting using Remote Sensing Data.*

This prestigious function was well attended and the audience was treated to presentations of a high calibre. Copies of these presentations are available from the WISA website (www.wisa.org.za).

Dr Jonathan Taylor, Prof Peter Rose, Ms Jennifer Molwantwa, Mr Scott Sinclair and the Master of Ceremonies, Prof Fred Otieno