LETTERS TO THE EDITOR

South Africa's water crisis – interdisciplinary focus needed

Mike Muller (former Director-General of the Department of Water Affairs and Forestry and currently a Visiting Adjunct Professor at Wits University) has in various media and forums robustly criticised the now well-known political scientist Anthony Turton's contribution to the water sector.

In a *Business Day* article (2 December 2008) Muller stated that Anthony Turton is not a water expert and at a public debate at the University of Johannesburg argued that Turton knows nothing about water. This criticism stems from and is symptomatic of the academic phenomenon of the gulf between the engineering, natural and the social (i.e. interpretive) sciences.

I contend that there is no such thing as a water expert. There are discipline experts who are active and making significant contributions within the water sector (e.g. economists, engineers, natural scientists, social scientists, political scientists, legal specialists, etc.). The context and foci of their contributions will however differ. The challenges in water resource management in South Africa require contributions from all scientific fields but within a holistic, interdisciplinary and systems thinking approach.

Mike Muller suggests that Anthony Turton's history and background in the previous regime's military and secret service has had an influence on Turton's research focus on water as a political and security issue. Anthony Turton's background has indeed shaped his research which focuses on the governance of water resources and the political dimension of water. Turton's CSIR report (*Three Strategic Water Quality Challenges that Decision-Makers Need to Know About*) which caused a furore at the CSIR is certainly alarmist but sought to raise the profile and awareness of water as a strategic resource that if not managed properly and equitably supplied has the potential to spark grassroots dispute and anger.

Linking water as a scarce resource that has the potential to spark dispute, anger and violence is a robust field of international study. For example, the acclaimed academic Prof. Thomas Homer-Dixon from the University of Toronto has a strong research focus on the causal role of environmental scarcity and conflict. In his CSIR paper, Turton makes a strong argument that South Africa's violent historical legacy is one of the three strategic drivers that decision-makers need to be cognisant of when trying to find viable solutions for the water scarcity crisis.

Turton's CSIR paper is in the format of a narrative which is built on analysis extracted from secondary sources and quantitative research from other scientists. He outlines a hypothesis based on the observable phenomena of social conflict (as a result of the lack of municipal service delivery) and predicts that failure to supply good quality water at an acceptable level of assurance could in all probability lead to extreme violence.

The analytical manner in which Turton makes a causal link between water scarcity and social conflict is debatable, especially when one uses the rigidly orthodox scientific approach to research. Using the argument of causality is rooted in the Newtonian world of cause and effect. In the water sector, there has been a significant departure from this world view, where natural and social systems are recognised as being highly complex and stochastic and where things happen only with a certain probability and rarely turn out as originally intended.

The CSIR management's criticisms against the content of Anthony Turton's paper and presentation should be contextualised and understood within the scientism paradigm. This orthodoxy stresses hypothesis testing and replication of results that is modelled after the natural sciences. The scientific validity of Turton's method of analysis is a matter for the normal scientific peer review process to address. However, the challenges of assurance of water supply, water pollution and water treatment is not in dispute, as there is broad agreement about these challenges among professionals in the water sector.

All professionals, experts and activists within the water sector operate in the interface between law, policy, politics, advocacy and science (whether they recognise it or not). It is imperative that a pluralistic and interdisciplinary scientific approach should be utilised to address the challenges in the quality, management and supply of South Africa's water resources.

The technical and social challenges in the water sector are not intractable. What is required from professionals in the field is the recognition that methodological pluralism (including both quantitative and qualitative analysis) is necessary to provide the fundamental inputs to understanding the various contexts of the complex water system (e.g. environmental, economic, political, social, institutional and technological).

Nigel Rossouw, Centurion

Inventory of small dams

I refer to the interesting article on Small Farm Dams in the July/August 2009 edition of *The Water Wheel*. The authors state that "*It is not known how many small farm reservoirs there are in South Africa…*" The South African National Committee on Large Dams (SANCOLD) has a Register of Large Dams in South Africa on its website www.sancold.org.za . The Register contains details of 1 082 dams. In addition reference is made to the Register of Dams of the former Department of Water Affairs and Forestry (DWAF) which contains details of 4 457 large and small dams with a safety risk. The DWAF Register can be downloaded from www.dwaf.gov.za by following the link to the Dam Safety Office (DSO) and publications. I trust that this information will assist the researchers in their study.

Paul Roberts, SANCOLD

Pollutants in groundwater – much already done in SA

With reference to the article, *WRC Studies Shed Light on Groundwater Polluting Chemicals*, in your July/August 2009 issue, it may be of interest to you that SRK Consulting and Heartland Leasing (AECI) have been actively involved with DNAPL pollution problems in this country for the past 10-15 years, both investigating, characterising and remediating.

In line with international practice we are currently using in situ bio-remediation as the best option and have thus far had some very positive results. The relevant authorities are all fully informed of the work and much of it has been presented internationally at the appropriate conferences.

One other comment regarding your list of top ten sources of possible DNAPL groundwater contamination: generally underground storage tanks at petrol stations are associated with LNAPL contamination.

Ian Cameron-Clarke, SRK Consulting

Department skills shortage not a crisis

Thank you for a most informative magazine. However, I would like to point out a serious factual error in the article "Partnerships the lifeboat over troubled waters" on page 10 of *The Water Wheel* July/August issue. I am incorrectly reported to claim that "…the seven-fold loss of engineers and technologies (sic) within the Department of Water & Environmental Affairs since 1994..". This seven-fold loss has been from the Local Authorities, not from the Department of Water and Environmental Affairs. The error has arisen from incorrectly stringing together phrases from different sentences to create a false statement. The word "technologies" is also incorrect. It is "technologists" who have been lost. The Department is indeed seriously under-staffed, but not nearly to the extent implied by the article.

Chris Herold, Umfula Wempilo Consulting

Groundwater: Pushing the limits

Throughout the country – and the rest of the continent – groundwater is used for irrigation, domestic water supply and also by industries. It is estimated that 75% of the African population is reliant on groundwater for its main drinking water source.

This hidden part of the hydrological cycle is playing an increasingly important role for water supply and as an ingredient in the local and regional economy. In many areas on the continent groundwater is the sole source of water supply for communities or small towns. Groundwater connections to surface water are now recognised as essential to maintain aquatic and riparian ecosystems.

The groundwater fraternity in South Africa includes world renowned specialists and academics that have committed their lives to the management and protection of groundwater. The number of challenges in terms of management and protection grows daily and as adaptive management and integrated resources management are now accepted key approaches, the need for ongoing dialogue to discuss and share best practices, appropriate technologies and innovative solutions for growing concerns locally, are prioritised.

The biennial groundwater conference which will take place from 16-18 November 2009 at the Lord Charles Hotel in Somerset West near Cape Town, offers a perfect opportunity for groundwater professionals and students to share recent experiences, successes and mistakes or just to catch up with colleagues. This year's theme *Pushing the Limits* is challenging participants to view groundwater research challenges in a positive way.

Themes for the conference show the unlimited links between groundwater and society, the economy, land use activities and the environment:

- The brain drain
- Pollution and remediation
- Awareness and publicity
- Groundwater and the environment
- Sustainable development
- Hydrogeochemistry and isotopes.

Case studies not only cover the entire country, but also include lessons from as far afield as Mozambique, Nigeria, Botswana and Namibia and even the United Kingdom. Apart from scientific research results, groundwater practitioners will challenge some limits but also share some practical, local solutions. A poster session also provides for experience sharing. Various exhibitors will showcase their products, services and technologies related to the groundwater industry.

For more information, contact Kruger & Associates at +27 28 3162905 ; E-mail: kruger@kruger-associates.com or visit: www.groundwaterconference.com

WATER DIARY

MINE-WATER
OCTOBER 19-23
An International Conference on Mine-Water will be held at the CSIR Convention Centre, in Pretoria. *Enquiries: Conference Secretariat; Tel: (012) 667-3681; Fax: (012) 667-3680; E-mail: minewater2009@wisa.org.za; Visit: www.wisa.org.za/minewater2009*

IWRM
OCTOBER 28-30
The WaterNet/WARFSA/GWP-SA Symposium will be held in Entebbe, Uganda, this year, with a focus on integrated water resource management within the context of environmental sustainability, climate change and livelihoods. *Enquiries: E-mail: symposium10@waternetonline.org*

SANITATION & HYGIENE
NOVEMBER 10-12
The West Africa Regional Sanitation and Hygiene Symposium will take place in Accra, Ghana. The symposium is jointly organised by RCN Ghana, UNICEF, West Africa Water Initiative, WaterAid and IRC International Water and Sanitation Centre. *Visit: www.irc.nl/page/48900*

DAMS
NOVEMBER 4-6
The biannual South African National Committee on Large Dams (SANCOLD) conference with the theme 'Sustainable development of dams in Southern Africa' will be held at the Alpine Health Resort, Drakensberg. *Enquiries: Mrs Leana du Preez/ Marechia Basson; Tel: (021) 808-2100; E-mail: ldpreez@sun.ac.za or msb@aspt.co.za; Visit: www.sancold.org.za*

ORANGE RIVER BASIN
NOVEMBER 11-12
The Second Orange River Basin Symposium will be held at the University of the Free State with the theme 'The Orange River Basin – The Challenge'. *Enquiries: Sanet Neethling; Tel: (051) 401-2863; Fax: (051) 401-2629; Web: www.ufs.ac.za/orangeriver*

GROUNDWATER
NOVEMBER 16-18
The Groundwater 2009 Conference, organised by the Groundwater Division – Western Cape with the Geological Society of South Africa, the Water Research Commission and the International Association of Hydrogeologists, will be held in Somerset West, in the Western Cape. The theme for this year's conference is 'Pushing the Limits'. *Enquiries: Kruger & Associates; Tel: (028) 316-2905; E-mail: kruger@kruger-associates.com; Visit: www.kruger-associates.com/groundwaterconference2009/home/default.asp*

Recession 'good news' for water reuse technologies

The global economic slowdown has created huge opportunities for sustainable water and wastewater treatment technology, according to a report by international firm Frost & Sullivan.

These opportunities can be found in key areas such as energy efficiency, waste reduction, resource recovery as well as water reuse and recycling. The market is growing daily and promises to become a fully mainstream feature of the water market in years to come.

Frost & Sullivan Research Manager Frederick Harry Royan has no doubts that water is becoming the oil of the 21st century and sustainability will be a defining factor. "Sustainable water and wastewater treatment technologies and services are proving to be the 'green shoots' of strong growth for the global water market in 2009. These technologies have benefited hugely from the fact that the global financial meltdown has led to the drying up of funds for large water and wastewater treatment infrastructure projects. As a result, sustainable water and wastewater treatment technologies with strong green credentials are increasingly finding favour on account of key tangible benefits: higher levels of energy and treatment efficiency, protecting sensitive ecological habitats and wildlife, generating renewable energy and/or reducing the carbon footprint of treatment facilities."

There are some challenges that may hamper the market expansion, however. The biggest of these is cost. "The price of some sustainable solutions is still beyond the reach of a large section of the market," reports Royan. "Financing of large sustainable projects is one of the main issues that need to be considered."

Conference for young professionals to see and be seen

The First Regional Conference of the Southern African Young Water Professionals, to be held on 19 and 20 January at the CSIR International Convention Centre in Pretoria, promises to be a valuable platform for newcomers to the water sector to meet their peers and advance their careers.

The conference, which is organised by the Southern African Young Professionals Programme under the auspices of the International Water Association and the Water Institute of Southern Africa, has already attracted significant attention from potential presenters and sponsors alike, with sponsorship from Rhodes University, the University of Johannesburg and Rand Water confirmed at the time of writing.

This event will provide a forum for young researchers and professionals in water and wastewater science, research, engineering, technology, management and other areas of the water sector to network with both peers and prospective employers. Young professionals are regarded as those under the age of 35 or who received their qualifications less than five years ago.

"The first of its kind in South Africa this conference will provide a friendly platform for young professionals to present their work while offering them the opportunity to obtain career advice from distinguished water professionals, who will also be present," reports Young Professionals President Dr Jo Burgess. "We have also found a mismatch between institutions trying to recruit new staff and graduates who want employment – this event aims to breach this communication gap and bring the two parties together under one roof."

The best presenter at this regional conference will go on to represent South Africa at the Fifth Biennial IWA Young Water Professionals Conference in Sydney, Brisbane, from 5 to 7 July 2010.

The organisers hope that the conference will become a regular occurrence. "We eventually hope to have a young professionals event at least every two years," notes Dr Burgess.

For more information about the conference contact Cilla Taylor at Tel: (012) 667-3681 or E-mail: confplan@iafrica.com or Visit: www.wisa.org.za/YWP2010.htm

Vandalism, theft, diminish CT's upliftment efforts

The City of Cape Town has spent more than R80-million over the past year on repairing or replacing stolen or vandalised basic services in informal settlements.

"For every R3 that the City spends of its R125-million annual budget for water and sanitation facilities in informal settlements, R2 is spent on repairs and replacements," reports Alderman Clive Justus, Mayoral Committee Member for Utility Services. Addressing the annual convention of the SA Revenue Protection Association in Cape Town, Justus said that in the past financial year, the municipality had installed 422 water standpipes, but had to effect 5 482 repairs to sabotaged or stolen pipes and taps. In the same year, 2 458 toilets were installed, but 4 302 repairs were made to cisterns, pans, pipes and ablutions.

"This has continued in the current financial year. Although we have installed 2 840 toilets halfway through the year – nearly 400 more than the previous year – we have had to effect 1 028 repairs due to theft and vandalism. While we have installed 186 water stand pipes, we have had to repair 1 942," reported Justus. "For two years the City has been systematically upgrading all 222 informal settlements across the metro. We would be able to proceed at three times our current rate without this lawlessness."

To address the theft of copper cabling, brass valves, lead batteries, manhole covers and water meters, the municipality is now using only plastic or steel pipes and concrete for toilets. Underground electricity cables are now covered with concrete so that they cannot be dug out. Padlocks and chains are provided to community leaders to keep facilities secure at night and there have been crackdowns on dealers of stolen scrap metal. All kinds of materials are removed from blocked sewer drains, including car tyres, animal carcasses, suitcases and even substantial blocks of concrete.

Despite these measures vandalism continues. "A new pattern is emerging whereby plastic pipes are stolen despite their minimal re-sale value, concrete toilets are smashed with axes and even padlocks are taken," noted Justus. "In some cases concrete wall panels, wood and steel doors, and roofing from ablution and toilet blocks are stolen for use by residents to build their own structures. Most worrying of all are reports that residents purposefully vandalise facilities to secure more jobs in the subsequent repair programmes."

"The City does not have a bottomless pit of resources. We appeal to communities to assist us by reporting all incidents of theft and vandalism. If our request for cooperation from communities fails to improve matters, we may be forced to suspend service delivery programmes until communities take responsibility to protect these facilities," Justus said.

Encapsulating local knowledge

Indigenous rainwater harvesting and conservation practices are the product of accumulated knowledge, practices and traditions which have evolved over many generations of experimentation and adaptation. These practices have an inherent sustainability and present a sound platform on which to develop new practices aimed at maximising the benefits of 'runoff farming'.

A WRC-funded study documented and captured ten such practices in detail, both in a written format and on a DVD. The techniques that were documented covered scales varying from tens of thousands of hectares to micro-catchments of a few square metres in size.

The first technique covered is the practice of 'gelesha', which entails hoeing or tilling the soil after a crop harvest. The intention of the practice is to ensure that any falling rain or dew infiltrates the tilled soil. Historically, this practice was undertaking when a 'digging star' (the Orion constellation) *Isilimela* appeared in late autumn during and after the harvesting of the summer crops.

Stone terracing or the enclosure of specific portions of lands by boulders and stones is a historical practice that was largely geared towards water-flow management and soil preservation. The practice is still undertaken in some parts of South Africa, for example, Gogela Village in KwaZulu-Natal.

Saaidamme or 'planting dams' as well as contouring and homestead ponds are some of the other indigenous rainwater harvesting and conservation methods investigated. These practices have demonstrated the value of rainwater harvesting and conservation across the socio-economic and cultural spectrum of South Africa, including both emerging and commercial farmers.

To order the report and DVD, *Indigenous Water Harvesting and Conservation Practices: Historical Context, Cases and Implications* (WRC No: TT 392/09), contact Publications at Tel: (012) 330-0340 or E-mail: orders@wrc.org.za.

Also turn to page 28 for more on historical agricultural practices.

WATER ON THE WEB

www.c4w.org.za
The Climate for Water website was established as part of a Water Research Commission funded project and is a resource for climate and weather information available on the Internet. Users will be able to view Frequently Asked Questions on weather- and climate-related issues. The toolkit also provides valuable and easily searchable links for a number of weather- and climate-related resources available on the internet.

www.circleofblue.org
Circle of Blue is an international network of leading journalists, scientists and communications design experts that reports and presents information to respond to global freshwater challenges. It is a non-profit affiliate of the internationally recognised water, climate and policy think tank, the Pacific Institute.

www.1h20.org
This is a media website aimed at generating worldwide awareness about the provision of safe potable water. It enables journalists from around the world to tell stories about the challenges relating to water.