THE WATER WHEEL
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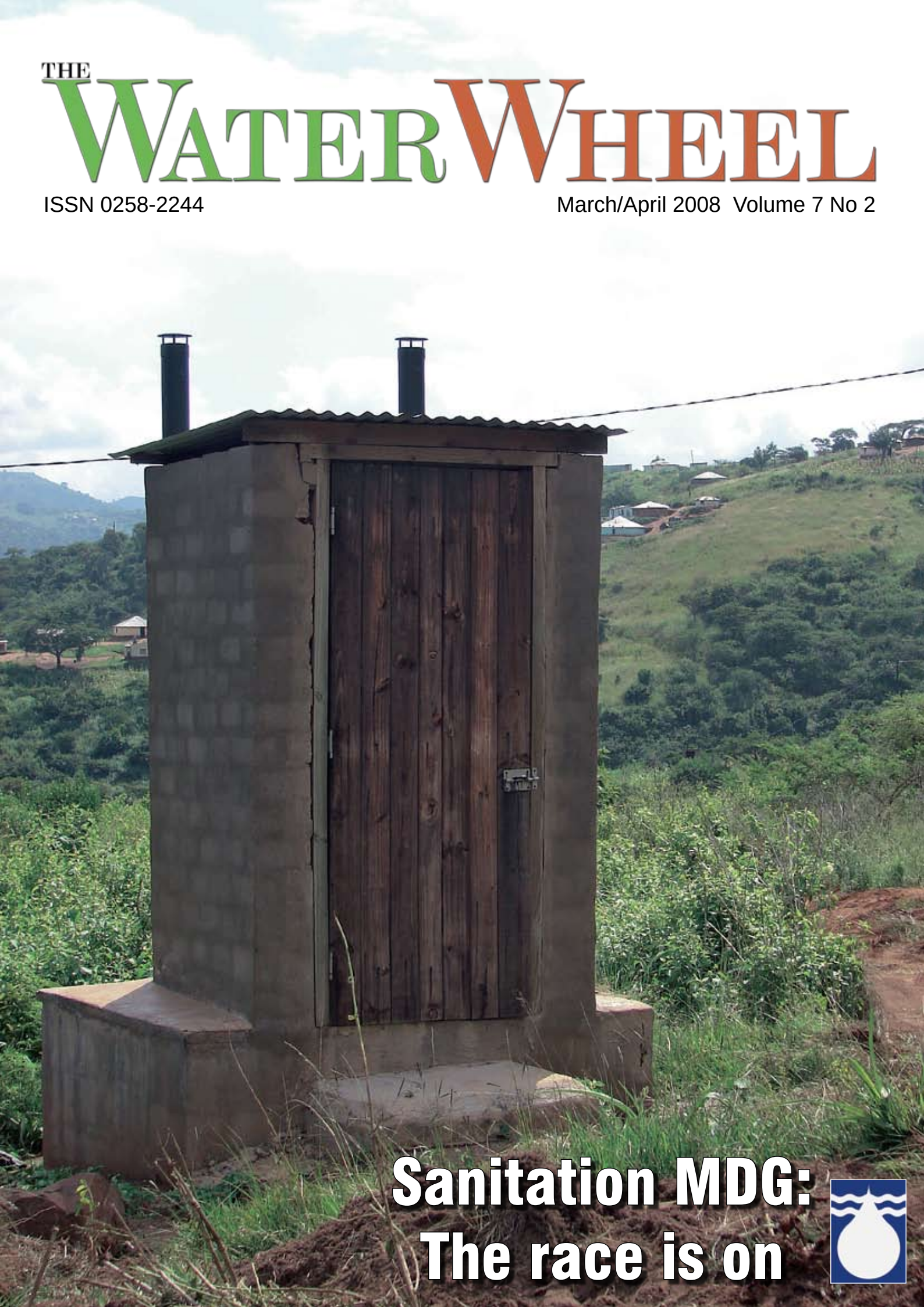

Sanitation MDG: The race is on

UNIVERSITY OF PRETORIA, DEPARTMENT OF CHEMICAL ENGINEERING:

WATER UTILISATION DIVISION

2008 SHORT COURSES

LECTURERS:
Prof. E.M.N. Chirwa, Prof. J.J. Schoeman, Prof. C.F. Schutte (Invited lecturers from industry)

ENQUIRIES:
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REGISTRATION:
Elsje Spies Telephone: (012) 420 - 4829 E-mail: elsje.ce@up.ac.za

INDUSTRIAL WASTE MANAGEMENT

Course date: 15 - 16 May 2008

The course is aimed at scientists and technologists involved in waste management and aims to equip them to:

- evaluate technical and legal aspects of waste handling and disposal
- take informed decisions about waste handling and disposal

Course fees:

R3 300 per person. (For three or more participants from the same company, the fee is reduced to R3 000 per person)

OPERATION OF WATER AND WASTEWATER TREATMENT PLANTS

Course dates: 23 - 27 June 2008

The course is aimed at scientists and technologists involved in the operation of water and wastewater treatment plants and aims to equip them to:

- understand the functioning, operation and application of water and wastewater treatment processes
- take informed decisions about treatment processes
- optimise the operation and control of water and wastewater treatment plants

Course fees:

R6 250 per person.
(For three or more participants from the same company, the fee is reduced to R5 250 per person.)

WATER QUALITY MANAGEMENT AND EFFLUENT TREATMENT

Course dates: 18 - 22 August 2008

The course is aimed at scientists and technologists involved in water quality management and aims to equip them to:

- evaluate technical aspects of effluent treatment and disposal
- take informed decisions about effluent control and catchment management

Course fees:

R6 250 per person.
(For three or more participants from the same company, the fee is reduced to R5 250 per person.)

MEMBRANE PROCESSES

Course date: 20 - 22 October 2008

The course is aimed at scientists and technologists involved in the operation of membrane processes and aims to equip them to:

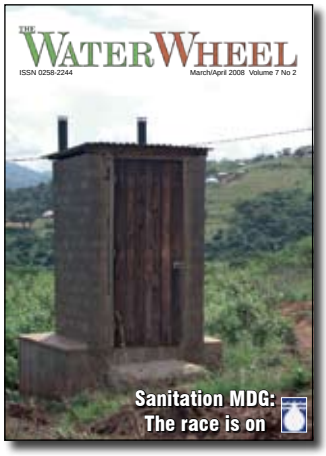
- understand the functioning, operation and application of membrane processes
- evaluate pretreatment requirements and brine disposal

Course fees:

R4 150 per person. (For 3 or more participants from the same company, the fee is reduced to R3 300 per person)

For more detailed information please got to:
http://www.up.ac.za/academic/water/



***Cover**: Africa's sanitation ministers gathered in Johannesburg to discuss ways of accelerating sanitation service delivery (See page 16).*

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LETTERS TO THE EDITOR

SA laws lagging behind

In view of the pending water crisis I find it strange that the use of grey water i.e. bath, washing and shower water to irrigate gardens is strictly forbidden by most municipalities in South Africa. On the other hand, in Melbourne, Australia, householders are encouraged to harvest grey water and rain water by means of a state subsidy of up to A$1 500 to assist in installing the necessary equipment and visually friendly storage tanks. Duel flush toilets are also mandatory.

In South Africa regulations stipulate that: all discharge from any sanitary fixture, which includes washing machines, showers, basins, etc., must be disposed of into the water-borne sewage disposal available. That is the municipal sewerage connection provided.

Although municipalities are aware of private use of grey water, its disposal or use for irrigation does not comply with national building regulations; therefore the discharge of grey water to a garden can not be specified for approval by the local municipalities' building department as the applications would be refused. Nor will building inspectors issue occupation certificates once building work is completed should they find out that the drainage installation does not comply with the SABS regulation.

One again we are caught napping. Our authorities warn us of a pending crisis, but they persist in hanging on to antiquated legislation. For heavens sake let's get our act together.

Furthermore I notice from TV coverage that at all meetings involving Eskom and various governmental authorities there is invariably a bottle of bottled water in front of every delegate. Is this because the authorities don't trust our municipal water or are they totally unaware of the electricity, raw materials and disposal costs of hundreds, if not thousands, of these unnecessary items?

Dennis Toens, Somerset West

Articles shows SA in poor light

The article on pages 24 to 27 of the January/February 2008 edition of *the Water Wheel* (SA Drinking Water Standards Under the Microscope) shows South Africa in a very poor light, particularly Rand Water. The maximum limits given in Tables 1 and 2 of this article are incorrect. The actual figures are shown in SANS241 Class II max. We should remember that in December 2005 South Africa effectively reduced our water standards with the issuing of SANS241: 2005 Edition Six.

This reduced our old very high (one of the highest in the world) standards of SABS 241 (2002) edition 5 by removing the class 'O' section. Rand Water continuously run auto analysis and maintain the old class 'O' standard.

No facts are given concerning the inorganic parameters such as calcium, magnesium, cadmium, cobalt and vanadium which are critical in South Africa and included in our standard. As an example cadmium, which is a worse toxin than lead, has a maximum of 10 micrograms per litre. However, some of the boreholes in Johannesburg are showing toxic levels of two milligrams per litre.

Chemical oxygen demand has fallen away and is not mentioned. Dissolved organic carbon has replaced this old parameter but it does not allow for non organic oxydisable parameters in the water, such as sulphides, sulphur, ferrous iron. These are continuously found in South Africa as a result of mine drainage.

The present standards for South Africa in terms of Tables 1 and 2, are tabulated and also show the old standard. All figures are the maximum for the given parameter. High levels of magnesium in drinking water have been shown to cause behavioural problems in humans. High levels of nitrates lead to conception and pregnancy problems in mammals, including humans.

Other problems relate to the absence of *Cryptosporidium* testing in the SANS 241. *Cryptosporidium* testing is compulsory in the USA. Several major outbreaks have occurred notably in the USA in 1993 when 100 people died and 300 000 were hospitalised. The latest outbreak in the west of Ireland affected 70 000 homes. The common reason given for not testing is the cost. Compare this with hospitalisation expenses.

Then, the article on page 23 of the January/February edition (Mercury Levels in SA Water Resources Probed) refers specifically to mercury. I am now retired but for over 20 years I have regularly had mercury determined in potable water by SANS approved laboratories for this element. At least three laboratories are capable of this evaluation in South Africa.

It is agreed that mercury is a major problem, but far more serious is cadmium, which is rising rapidly. It would appear that whenever old mine (rock) dumps are disturbed, mercury/lead/cadmium all rise rapidly.

It would be of far more use if the full spread of toxic elements were determined in this programme and local resources used instead of costly overseas laboratories.

Waterwatcher

Table 1:

Determined	Unit	NL max limit	SABS 241 2002 Class 'O' max	SANS241 Class 1 max	SANS 241 Class II Max	SA max as Given in report
Aluminium	µg/ℓ	200	150	300	500	300
Ammonia	µg/ℓ	200	200	1000	2000	1000
Antimony	µg/ℓ	5	5	10	50	10
Arsenic	µg/ℓ	10	10	10	50	10
Bromate	µg/ℓ	1	-	-	-	-
Chromium	µg/ℓ	50	250	100	500	100
Copper	mg/ℓ	2	0.5	1	2	1
Iron	µg/ℓ	200	10	200	2000	200
Lead	µg/ℓ	10	10	20	50	20
Manganese	µg/ℓ	50	50	100	1000	100
Mercury	µg/ℓ	1	1	1	5	1
Nickel	µg/ℓ	20	50	150	350	150
Sodium	mg/ℓ	150	100	200	400	200
Zinc	mg/ℓ	3	3	5	10	5
Chloride	mg/ℓ	150	100	200	600	200
Cyanide	µg/ℓ	50	30	50	70	50
Fluoride	mg/ℓ	1.1	0.7	1	1.5	1
Sulphate	mg/ℓ	150	200	400	600	400
Selenium	µg/ℓ	10	10	20	50	20
Nitrate	mg/ℓ	50	26	) 44	) 88	) 10
Nitrite	mg/ℓ	0.1		)	)	) 10
Magnesium	mg/ℓ	-	30	70	100	-
Cadmium	µg/ℓ	-	3	5	10	-
Cobalt	µg/ℓ	-	250	500	1000	-
Calcium	mg/ℓ	-	80	150	300	-
Vanadium	µg/ℓ	-	100	200	500	-

Table 2:

Trihalomethanes	µg/ℓ	25	100	200	330	200
DOC	mg/ℓ	-	5	10	20	10

Frogs leaping into distinction

Humanity is facing one of its biggest extinction crises of recent times, with up to half of the world's 6 000 amphibian species in danger of dying out.

The Year 2008 has been declared the Year of the Frog in a bid to raise awareness of the plight of the world's frogs and toads. In South Africa, more than 17% of 114 recorded species are considered critically endangered. Known as nature's indicators, amphibians are among the first species to respond to environmental changes. Habitat loss is a significant threat, as cities expand, streams, ponds and wetlands give way to the needs of farmers and forest lands are destroyed. Other threats include climate change, pesticides, pollution and climate change.

Another major cause for the extinction crisis is a parasitic fungus called *amphibian chytrid.* The fungus, which originated in Africa, attacks the skin of the frog and has a 100% mortality rate. In the last few decades the fungus has spread across the world, endangering whole colonies in the wild.

Pretoria Zoo's amphibian mascot, Fred the African bullfrog, undergoes testing for the chytrid fungus.

In a bid to save the world's amphibians the Amphibian Ark project has been initiated by a group of conservation organisations where zoos are being encouraged to, among others, maintain select species in captivity until they can be secured in the wild. The Pretoria Zoo is also part of this captive breeding programme, and has already tested several of its frog species for the chytrid fungus.

Drinking water experts meet in CT

More than 70 delegates from South Africa, Namibia and Botswana attended the third Techneau Regional Technology Platform (RTP) for safe drinking water held in Cape Town towards the end of last year.

Techneau is an integrated project funded by the European Commission looking at new and improved technologies for drinking water supply. The latest RTP provided some insight into the problems and challenges facing the drinking water sector in southern Africa and enabled an intensive exchange between local water experts and those from the European Union.

Delegates heard how the standard of the water supply and the quality of the drinking water varies significantly throughout the southern African region. In the larger metropolitan areas, the technologies and water quality are comparable with the developed world. However, nearly half of the region's population live in rural areas where villages are widely scattered, making the supply of drinking water difficult and expensive. Treatment plants in these areas are often inadequately maintained.

A range of technologies both high-end (e.g. robust ultrafiltration membrane systems, solar- or wave-powered reverse osmosis systems), and low-end (e.g. sand filtration, solar stills, simple ozonation systems) exist to improve potable water supply, especially in rural areas. However, adequate operation and maintenance remains crucial regardless of the technology selected.

The South African government is pursuing two approaches to operation and maintenance: firstly, treatment plants are monitored remotely and any problems are resolved by a 'roving technician' and, secondly, a national technical assistance centre is being investigated to support small water suppliers with information and practical hands-on assistance.

Other initiatives being initiated or implemented to improve drinking water quality include the municipal electronic drinking water quality management tool, a municipal drinking water quality management tool, and water safety plans, among others.

For more information, visit the techneau website: www.techneau.eu

Water by numbers

11 million – The number of people supplied with potable water by Rand Water.

13 – The number of river basins worldwide that are shared by between five and eight riparian nations, according to UNESCO. Five basins, the Congo, Niger, Nile, Rhine and Zambezi, are shared between nine and eleven countries. The river that flows through the most nations is the Danube (18 countries).

97,9% – The percentage of Gauteng's population who have access to piped water, according to Statistics South Africa.

157 – The number of countries that have signed the Ramsar Convention on wetlands.

90 000 – The estimated number of households who qualify for free basic services in the City of Tshwane. The city is in the process of registering indigent households who will receive 12 Kℓ of water and 100 kW of electricity free a month.

50% – The estimated percentage of blockages in the City of Cape Town's sewers due to foreign objects and fat in the network. According to the city, carcasses, engine parts and even furniture are finding their way into the network.

150 000 – The estimated number of children in need of humanitarian assistance following recent flooding in Mozambique, Malawi, Zambia and other African countries, according to UNICEF.

US$202,5-billion – The funds required to protect to control wastewater pollution in the US for the next 20 years, according to a new report by the country's Environmental Protection Agency.

19 500 t – The amount of medicinal plant material provided annually by South Africa wetlands, according to the Department of Environmental Affairs & Tourism. These plants are used by an estimated 28 million people every year.

68 800 km² – The surface area of Lake Victoria, the world's second-largest freshwater lake and the largest in Africa. The lake is shared between Kenya, Tanzania and Uganda.

Building dams not a lasting solution – WWF

Nature organisation WWF has commended the Department of Water Affairs & Forestry on its programme to rehabilitate old dams, as opposed to building new ones.

The department initiated its dam safety rehabilitation programme in April 2005. National Treasury approved R1,25-billion over five years, starting from 1 April 2006, specifically to address the infrastructure maintenance needs of dams. A total of 42 projects are between the planning and construction phases at present.

"WWF believes that rehabilitating our existing dams will be far more cost effective and have lower social and ecological consequences," the organisation said in a statement. " However WWF also believes the Minister (Lindiwe) Hendricks' reasoning that dams are going to solve a looming water crisis is flawed, and that this thinking is analogous to saying that building batteries will solve the energy crisis we are currently experiencing."

According to Dr Deon Nel, manager of the WWF Sanlam Living Waters Partnership, electrical batteries could help one get through a few hours of a power break of load shedding, however, they add little to solving the problem of demand exceeding supply. He went on to explain that similar to the way batteries merely temporarily store electrical energy, dams are merely temporary storage facilities. Dams are only as effective as the amount of water flowing into them.

"Dams will help us get through temporary drought events, but they will not help increasing long-term water supply to match a growing demand. Ultimately, it all comes down to simply managing long-term supply and demand," said Dr Nel. "We need to invest in the management of our rainfall catchments and freshwater ecosystems, which are the ultimate source of our water supplies. Parallel to this we need to invest in technology and behavioural changes that lead to reducing the demands on our water supplies."

Raising the status of groundwater

The profile of groundwater in Africa has been raised significantly following the Sixth Ordinary Session of the African Ministerial Council on Water, held in Brazzaville, Congo last year.

The meeting saw the participation of a strong contingent of the UNEP & UNESCO led Africa groundwater network, which made presentations to ministers representing nearly 40 countries. According to Yongxin Xu, UNESCO Chair in Hydrogeology at the University of the Western Cape, several important resolutions were taken on the Africa Groundwater Initiative, including promoting the institutionalisation of groundwater management by river basin organisations to ensure regional ownership of the initiative.

Representatives from the Southern African Development Community (SADC) approached Xu whether a scoping study on the status of groundwater management could be undertaken in the region. The call was met with a positive response from the Water Research Commission.

The first funds that have been approved are being used to develop and test a protocol for this purpose in South Africa and feed it with whatever SADC information can be obtained. A website protocol will also be developed.

Water Diary

SANITATION
MAY 19-21
The International Water Association (IWA) is organising an international conference in Wageningen, the Netherlands, to discuss new sanitation concepts and techniques, models of governance and experiences. *Enquiries: Tel: +31 (0)31 7482 023; Fax: +31 (0)31 7482 108; E-mail: Leaf@wur.nl; Visit: www.sanitation-challenge.wur.nl*

MINE WATER
JUNE 2-5
The Tenth International Mine Water Association Congress will be held in Karlovy Vary, Czech Republic. Topics include water issues in underground & open-pit mining, mine closure, water engineering, and mine-water legal aspects. *E-mail: imwa2008@itctravel.cz or Visit: www.natur.cuni.cz/imwa2008/*

GROUNDWATER
MAY 25-27
The Third International Conference on Managing Shared Aquifer Resources in Africa will take place in Tripoli, Libya. *Enquiries: Ms Krystel Lepresle; E-mail: k.lepresle@unesco.org*

MEMBRANE TECHNOLOGY
JUNE 2-4
The IWA Regional Conference on Membrane Technologies in Water & Wastewater Treatment will take place in Moscow, Russia. *E-mail: alla@sibico.com; Visit: www.iwamembranes.ru*

GROUNDWATER
JUNE 25-28
An International Conference on Groundwater and Climate in Africa will be held in Kampala, Uganda. The conference, co-organised by the University College London, Directorate of Water Development (Uganda) and UNESCO-IHP, seeks to bring together water and climate scientists, government departments, the private sector and the donor community to share knowledge and expertise and thereby improve present understanding of the impact of climate variability and change on groundwater resources in Africa. *Enquiries: Richard Taylor; E-mail: r.taylor@geog.ucl.ac.uk; or E-mail: info@gwclim.org; Visit: www.gwclim.org*

New system to monitor R&D in SA

South Africa's science and technology infrastructure received a major boost following the launch of a Web-based tool to capture statistical information on research and development (R&D) activities at universities, science councils and other government R&D funding agencies.

The so-called Research Information Management System (RIMS) is a strategic tool that will be completely integrated with other existing systems at institutional level. It will provide real-time information on human resources for science, engineering and technology R&D capacity and technology improvement and innovation.

According to Minister of Science & Technology Mosibudi Mangena, who launched the system in Pretoria in February, RIMS will provide government with the necessary tools to obtain a detailed, holistic understanding of where its R&D funds are invested, and how much it is spending on each area of science and technology. "This will certainly enhance decisions in government and at the institutional level," he said.

Government has set aside more than R40-million to the development and implementation of the RIMS project. The initial testing of the system was undertaken at the universities of Witwatersrand, Pretoria and Stellenbosch. The Department of Science & Technology is now ready to pilot the system in the science councils.

Free services for registered poor households

The Tshwane Metropolitan Municipality has embarked on an indigent registration drive which will see poor households receiving free basic services.

According to government news agency BuaNews, indigent households which register for the services will qualify for 12 kℓ of free water and 100 kW of electricity per month. The Mayoral Committee member Sonto Thipe said she hoped to register 90 000 indigent households by the end of June. "We would like to address the plight of our poor residents and provide them with affordable and basic services. We therefore urge those who qualify to register and also to inform others of the registration process."

Households are considered indigent if the total gross monthly income of all the members of the household does not exceed R1 700 a month. According to Statistics SA, there are 98 000 households who qualify as indigents in the Tshwane metropolitan area and only half of these are registered.

In June last year the municipality introduced an overall rebate system on property rates for poorer households, those using residential property exclusively as homes and facilities such as old-age homes and those caring for the disabled. Registered indigents with property worth R10 000 and less do not pay property tax and if the property of such families is worth more, a 25% rebate applies.

SA-Romania collaboration seeks researchers

The first call for project proposals has gone out under the South Africa-Romania Joint Science and Technology Research initiative.

The two countries signed an inter-governmental bilateral agreement in 2004 on cooperation in the fields of science and technology. The initiative is jointly implemented and administered by the National Research Foundation in South Africa and the National Authority for Scientific Research of Romania.

South African researchers who are interested in research projects in the priority areas of biotechnology (including agriculture; the environment and food technology); information and communication technology; climate change and energy; applied physics (including laser technology); new materials and technologies (including nano-materials); social science and humanities (including health sciences); and space cooperation may apply.

All South African applications must be submitted by 28 March. For more information, contact Raven Jimmy at Tel: (012) 481-4069; Fax: (012) 481-4044; or E-mail: raven@nrf.ac.za

Water on the Web

www.acsnanotation.org
The American Chemical Society has launched a new nanoscience and nanotechnology community website. The site aims to become the premiere destination for nanoscience and nanotechnology news, highlights and community. Features include research highlights from ACS journals, career resources, podcasts and other multimedia resources, as well as interaction with other scientists.

www.knowwiththeflow.org
This website, hosted by Cap-Net and MetaMeta Communications offers water-related training and education communications materials. It is filled with useful tips for presentations, communication tools, tutorials for the use of common media, software and a picture gallery.

www.drinking-water-engineering-and-science.net
Launched by Delft University and UNESCO-IHE, *Drinking Water Engineering and Science* aims to be the leading scientific open access journal for the publication of original research in drinking water treatment. The focus is on fundamental and applied research in water sources, substances, drinking water treatment processes, distribution systems and residual management.

www.internationalwaterlaw.org
The International Water Law Project aims to serve as the premier resource on the Internet for international water law and policy issues. Its purpose is to educate and provide relevant resources to the public and to facilitate cooperation over the world's freshwater resources. The website also offers information on upcoming water events, courses, publications and general water news.

http://timecapsule.iah.org
The Hydrogeologist Time Capsule, launched earlier this year, is a website hosting a collection of interviews of eminent Hydrogeologists who have made a material difference to the profession.

Women more vulnerable to climate change – Minister

Climate change adaptation funds need to assist poor rural women who will be hardest hit by the changes to the planet due to global warming, according to Deputy Minister of Environmental Affairs & Tourism Rejoice Mabudafhasi.

She was addressing the United Nations Environment Programme's Tenth Special Session of the Governing Council in Monaco in February.

The Minister said women were responsible for food production in about 75% of households in sub-Saharan Africa. Because they were so dependent on, for example, agriculture and natural resources such as fishing, it was crucial that climate change adaptation funds target their plight.

The Global Network of Women Ministers and Leaders of the Environment drew the panel's attention to the fact that when poor women lose their livelihoods, they slip deeper into poverty, which, in turn worsens their inequality and marginalisation. As crop yields and resources become scarcer, women's workloads will expand, jeopardising their chances to work outside the home or attend school.

Mabudafhasi, said: "We need to make concerted efforts to prioritise women when opportunities arise for green jobs. We should actively encourage girls and young women to choose non-traditional career options such as science and engineering in the areas of mitigation and adaptation to climate change. Strategies should not focus on employing women only as workers, they should also be supported to be managers of companies that provide adaptation and mitigation services. In this way, women will be able to make a fundamental shift from being the victims of climate change to leaders and victors against climate change."

Water Affairs gets new DG

Former DG of the Department of Environmental Affairs & Tourism (DEAT), Pam Yako, has moved departments to become the new DG of the Department of Water Affairs & Forestry (DWAF).

Yako has a B.Comm, a post-graduate Diploma in Labour Law, a certificate in Human Resources Management, a certificate in Provincial and Local Government Law and a Masters Degree in Business Leadership. She was DG of DEAT from April 2005.

Making the announcement in February, DWAF Minister Lindiwe Hendricks expressed her excitement at the appointment of Yako. "Ms Yako joins the department at a very critical time in terms of meeting the service delivery targets, and the need for the department to clean up its act with regard to financial management."

Mini monitoring tool reviewed

The Water Research Commission has launched a project to assess the miniSASS (South African Scoring System) biomonitoring tool as a resource for environmental education in the River Health Programme and to cross-link with the National Curriculum Statement.

The miniSASS tool has been used as a low-cost technology tool for the last six years. Although various shortcomings and perceived limitations have emerged, the tool has provided a scientifically reliable and robust technique to monitor water quality in rivers and streams, having been developed as a simplified method of biomonitoring based on the SASS technique.

Changes and updates to the miniSASS are needed, however, to facilitate the integration of environmental education into the National Curriculum Statement. People who have previously used the miniSASS tool are invited to put forward their perceptions of the tool and suggestions for its revision. Contact Mark Graham at E-mail: admin@groundtruth.co.za or Clare Peddie at E-mail: sharenet@wessa.co.za

Save water through click of a mouse

For many years, authorities have been trying to establish the levels of wastage from water supply systems.

To support more effective auditing of water use, the Water Research Commission has developed an advanced software tool name Aqualite. This new generation software, developed by Dr Ronnie Mckenzie, is designed specifically to assist water suppliers in managing their non-revenue water. It is reportedly one of few models available worldwide not based on an Excel spreadsheet format. The program was developed in collaboration with numerous internationally recognised water loss experts.

The model incorporates a host of features, some of which are not available in other water audit models. These include, among others, a selection of seven different measurement units for use in various countries where metric units do not apply; user-defined confidence limits on al key variables; ability to differentiate between connections and customers in certain calculations; and detailed reporting forms which can be user-defined to provide either a summary report or a detailed report.

Aqualite is available free of charge and can be downloaded from the WRC website, www.wrc.org.za.

'Business Unusual' Gets Donor Nod

Minister of Water Affairs & Forestry Lindiwe Hendricks at the official launch of Masibambane III. "We need to build strong institutions to be able to handle future water challenges such as those brought on by the impact of climate change," she said.

The European Union (EU) has reconfirmed its commitment to assist the Department of Water Affairs & Forestry (DWAF) in achieving its development goals, with a support package of some €107-million (R1,25-billion) pledged to phase three of the Masibambane programme.

Masibambane III was officially launched by DWAF Minister Lindiwe Hendricks and EU Ambassador to South Africa Lodewijk Briët at the Third National Water Summit in Midrand, in March. In addition to its donor funding, South Africa will commit R69-billion of its own resources to the programme.

The nationwide programme, a partnership between DWAF, the Department of Provincial and Local Government and the South African Local Government Association, the EU and its member states, Irish Aid and the Swiss government, pools multi-donor funds for the purpose of supporting and strengthening the water and sanitation services sector in South Africa. The EU has been the largest contributor since the programme's inception, with €125-million donated between 2001 and 2007.

Through Masibambane the government has, among others, contributed to strengthening governance at local level; placed professionals at municipal level to support local government; driven the agenda of ensuring that cross-cutting issues (such as gender mainstreaming and HIV/AIDS) are included in service delivery and developed a learning sector through the establishment of the Water Information Network which is located at the Water Research Commission.

"Masibambane is a success story, a demonstration of what can be achieved through a sector-wide approach to development," reported Briët. "When the programme started it was all about bringing water and sanitation to impoverished communities, about the 'nuts and bolts' of service delivery. However, as time progressed we realised there were other 'softer' issues that needed attention," he explained. "Masibambane III looks beyond the nuts and bolts towards systematic and institutional issues."

The theme for the third phase is 'Water for Growth and Development'. "This theme is in recognition of water playing a key role in support of economic growth and social development, as well as strategic use of water infrastructure as a means to contribute to and stimulate growth and development," said Hendricks at the launch.

Over the next five years, Masibambane III will be focused on developing stronger inter-governmental relations; building the interface between water resources and water services; building local government capacity for economic growth and development; developing skills and knowledge sharing and addressing the needs of civil society and indigent communities.
It is foreseen that the programme will also be used to help DWAF overcome its final restructuring challenges. This includes establishing and rationalising catchment management agencies and making appropriate institutional arrangements for managing and development national water resources infrastructure; delegating management of government irrigation schemes to water user associations; transferring department-owned water schemes to water services authorities (WSAs) and ensuring effective service delivery by WSAs and institutions.

"We are seeing water for growth and development as contributing towards bridging the gap between the first and second economies by bringing marginalised people into the mainstream economy," noted Hendricks. "It is not only having access to clean water and decent sanitation that will contribute to growth and development, but also involving communities in provision of some of the goods and services required by the water sector, such as brick making. We also see that through access to water a number of new enterprises and small-scale agricultural activities become possible."

In his 2008 State of the Nation address South African President said the country had to adopt a 'business unusual' approach to service delivery. "This business unusual approach must become business usual, in other words, this principal must guide our everyday actions," said Briët. "Globally, regionally and locally we know what the water challenges are and we know what to do to overcome them. We need to get on with it."

European Union Ambassador to South Africa Lodewijk Briët reconfirmed the commitment of the EU to assisting DWAF in meeting its growth and development goals.

UN Secretary-General pledges action on water resources

Courtesy of UN

United Nations Secretary-General Ban Ki-moon has told participants at the World Economic Forum that the UN would take action to address the challenge of shrinking world water resources in the context of reaching global anti-poverty targets.

"Our experiences tell us that environmental stress, due to lack of water, may lead to conflict, and would be greater in poor nations," Ban told participants. Population growth will make the problem worse. So will climate change. As the global economy grows, so will its thirst. Many more conflicts lie just over the horizon."

The Secretary-General emphasised that water resources must be protected. "There is still enough water for all of us – but only so long as we keep it clean, use it more wisely, and share it fairly," he said.

Groundwater used to pinpoint gold

So-called hydrogeochemical exploration, groundwater sampling to locate promising areas of mineralisation, is proving a cost-effective new technique able to detect metals such as gold, nickel, copper, zinc and uranium.

Scientists with the Minerals Down Under National Research Flagship are analysing groundwater samples from one of Australia's most prospective regions to help mineral explorers pinpoint areas for further investigation. The project is taking place over a vast area of northern Yilgarn Craton in the west of the country.

"The northern Yilgarn is an arid area with potable groundwater, so it is dotted with mindmills and bores used for agriculture. This gives us direct access to groundwater without the need for drilling," reports David Gray of CSIRO.

The project follows closely on the heels of a similar successful hydrogeochemical exploration project along the Leonora-Wiluna belt last year.


M Pirlo

David Gray of CSIRO and Patrice DeCaritat of Geoscience Australia conduct field measurements and filtration for a northern Yilgarn groundwater sample.

Micropollutants invade crops, water supply

Toxins produced by a common fungus are reportedly spreading beyond food crops and invading the environment, including water supplies, with unknown consequences, researchers in Switzerland report.

Their study, which reveals a need for stronger monitoring and control of these overlooked micropollutants was published in the American Chemical Society's *Journal of Agricultural and Food Chemistry*.

The contaminants are members of a large family of fungal-produced toxins called mycotoxins. In the report, Thomas Bucheli and colleagues note that scientists have studied two of the most common mycotoxins – deoxynivalenol and zearalenone – in food and animal feed products for decades. However, scientists know very little about the distribution of these toxins elsewhere in the environment.

In the new study, the researchers exposed a winter wheat field to Fusarium graminearum, a major fungal source of deoxynivalenol and zearalenone, and subsequently monitored these toxins in the field's drainage water before, during and after harvest. Using high-tech lab instruments, they found that levels of these toxins increased significantly after harvest. Levels of deoxynivalenol, for instance, rose by almost 4 000-fold. Traces of these toxins were also found in a number of Swiss rivers, they note.

Coated silica particles filter out toxins, pathogens

Tiny particles of pure silica coated with an active material could be used to remove pollutants such as chemicals, viruses and bacteria from water much more effectively and at lower cost than conventional water purification methods, according to Australian researchers.

Peter Majewski and Chiu Ping Chan of the Ian Wark Research Institute at the University of South Australia investigated how silica particles can be coated with a nanometre-thin

Global news snippets

- The Zambian government has fined a Mopani Copper Mines manager and three other employees for the pollution of the **Mufulira water system** in January. The company reportedly polluted the water supply system affecting 800 Mufulira residents.
- The **Mississippi**, North America's largest river, is being dramatically changed by farming practices that have increased its water volume and carbon levels, according to scientists from the Louisiana State University's Coastal Ecology Institute. Since the 1950s, there has been a 40% increase in carbon levels in the river as well as a 9% increase in the amount of water flowing from the Mississippi.
- Canadian city Montreal plans to be the first large metropolis in the world to disinfect all its wastewater using **ozonation**. The multimillion dollar plant will reportedly be the third-largest in the world, treating about 32 m^2/s of water.

layer of active material based on a hydrocarbon with a silicon-containing anchor. The coating is formed through a chemical self-assembly process so involves nothing more than stirring the ingredients to make the active particles.

These active particles, called surface engineered silica, were then tested to demonstrate that they could remove biological molecules, pathogens such as viruses, bacteria, and parasites. "The results show clearly that organic species can efficiently be removed at pH ranges of drinking water by stirring the coated particles in the contaminated water for up to one hour and filtering the powder," reported the researchers. They point out that the filtration process occurs through an electrostatic attraction between the pathogens and the surface engineered particles.

Key US lake could be dry by 2021

There is a 50% chance Lake Mead, a key source of water for million of people in the southwestern US, including Las Vegas, will be dry by 2021 if climate change as expected and future water usage is not curtailed.

So maintain researchers at Scripps Institutions of Oceanography at the University of California San Diego. Without Lake Mead and neighbouring Lake Powell, the Colorado River system has no buffer to sustain the population of the Southwest through an unusually dry year. In such an event, water deliveries would become highly unstable and variable, according to research marine physicist Tim Barnett and climate scientist David Pierce.

The two researchers concluded that human demand, natural forces such as evaporation, and human-induced climate change are creating a net deficit of millions of cubic metres of water per year from the Colorado River system. Their analysis indicates that the water system could run dry even if mitigation measures now being proposed are implemented.

"We were stunned at the magnitude of the problem and how fast it was coming at us," said Barnett. "This water problem is not a scientific abstraction, but rather one that will impact each and every one of us that live in the Southwest."

Better plant for soft drink maker

VWS Envig has completed a water treatment upgrade project for Coca-Cola Fortune in Nelspruit, Mpumalanga.

The project, awarded through tender, included the revamp and automation of the existing plant. According to John Heffill, manager: engineering at VWS Envig, the plant uses a municipal water source, and treats the incoming water according to specifications for use as process water. "The customer required a more modern plant, which was to be as automated as possible. We have not only delivered that, but also a plant which uses less water and chemicals, while operating more efficiently and is more user-friendly."

The old plant was operated manually and consisted of chemical dosing, a clarifier, sand and carbon filtration units, and a

polishing filter. The chemical dosing and clarification units were reworked. Automated valves were supplied for the filtration units while a backwash recovery system was added which feeds water into the cooling towers.

VWS Envig also supplied an additional pump as well as all process instrumentation, controls and cables. Training was supplied to operators during commissioning.

The project was completed on a tight schedule, said Heffill. "The client needed the plant to be commissioned to coincide with the end of the bottling plant shutdown. This presented a challenge in that we had to physically dismantle much of the existing equipment for us to complete the refurbishment. However, we completed the project on time, and even went as far as supplying a temporary water source to the bottling pant in the midst of the revamp."

News snippets

- **TCTA** chairman Malixole Gantsho died tragically at his farm outside East London, in the Eastern Cape, in January following a tractor accident. He was appointed chairman of the TCTA Board in 2006. Meanwhile, TCTA has appointed Londiwe Mthembu as new CEO to succeed Martie Janse van Rensburg, who resigned from the company. Mthembu will serve as CEO until the establishment of the National Water Resources Infrastructure Agency, which is currently awaiting legislation.
- Investment company, **Lonhro**, has announced that it has set up a new water company in South Africa to build a 800 000 ℓ/m bottling plant. The new company, Lonrho Springs, has reportedly bought the existing water use rights from Aquamine, which sources its water from a natural spring in the Cradle of Humankind, outside Johannesburg.
- Diana Duthe has been appointed as a Partner of **SRK Consulting**. Duthe holds an MSc (Hydrogeology) from the Centre de Hydrogeologie University de Neuchatel in Switzerland.
- Wayne Taljaard has been appointed to the position of General Manager: Engineered Systems at **VWS Envig**. Taljaard joined the company in 2005 and previously held the position of Manager: Tenders and Executions.

Mpumalanga refurb contract extended

Specialist consulting engineering and project managing group SSI has received an extension until July to a contract awarded in January last year by the Thaba Chweu Municipality in Mpumalanga. Funded by the Department of Water Affairs & Forestry (DWAF), the contract calls for the refurbishment of rural municipal water-related infrastructure.

This project is a key component of the Provincial Water Sector Plan, which comprises a schedule of interventions over the next five years to help achieve the objectives of the Mpumalanga Growth and Development Strategy, the National Water Resources Strategy and the Strategic Framework for Water Services. "DWAF is in the process of handing over the management and operation of provincial infrastructure to local municipalities and one of the requirements of this development is that the infrastructure must be handed over in its original operational condition," explained SSI's Theo Kleynhans.

From January to July 2007, the company was tasked with providing the professional services related to and management of the refurbishment exercise pertaining to infrastructure such as borehole pump stations, reservoirs and reticulation in three rural villages on the northern border of the municipal area – Leroro, Matibidi and Moremela. "This required assessing the status of the infrastructure, determination of the refurbishment requirements, drafting schedules of quantities and tender documents and project administration," said Kleynhans. "With the extension of our contract we will continue with further refurbishment in the area."

Soweto reservoir to be fixed

Johannesburg Water is refurbishing the Diepkloof reservoir in Soweto following supply difficulties due to numerous technical and infrastructure problems.

According to a statement, the company will be able to improve water supply services in the area once the reservoir has been upgraded. "Johannesburg Water is aware of the problems that have been caused by old and outdated municipal water infrastructure. That is why we have launched a comprehensive programme to upgrade and rehabilitate municipal water infrastructure throughout Soweto," said MD Gerald Dumas.

One of the main components to be replaced during the Diepkloof reservoir upgrade is the main water flow valve, which has not been functioning properly leading to low supplies in peak hours.

The project is due for completion in May.

New from the WRC

Report No: KV 202/07

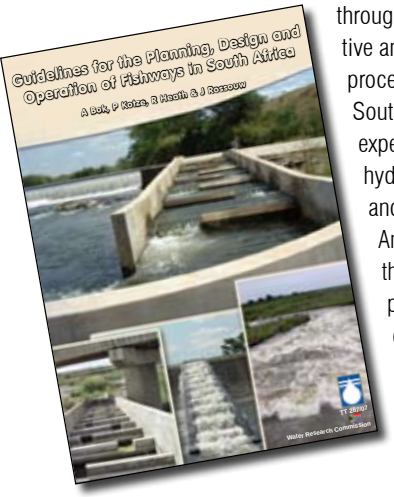
Guideline to Develop a Sustainable Urban River Management Plan (Nemai Consulting)

This study aimed to create a guideline document to aid in the compilation of a plan that addresses the impacts and management of specifically urban rivers. Salient themes surrounding urban rivers, such as pollution and impact sources and the concomitant effects, are discussed in the bulk of the document. The document culminates in a guideline which navigates the reader through steps required to prepare a sustainable urban river management plan.

Report No: TT 287/07

Guidelines for the Planning, Design and Operation of Fishways in South Africa (Ralph Heath; Anton Bok; Pieter Kotze; Paul Fouché; Hylton Lewis; Jan Rossouw and Matthew Ross)

Historically, there has been limited research funding available in South Africa to investigate fishway facilities designed to cater for indigenous species under local environmental conditions. However, in 2000, the Water Research Commission (WRC) started funding a fishway research programme to improve knowledge in this regard. A number of reports have been produced as part of the programme over the years, finally culminating in this publication. The guideline has been developed through a collaborative and consultative process with leading South African fish experts, ecologists, hydraulic engineers and hydrologists. Among others, the guideline provides ways of determining if a fishway should be built and how to determine the specific fishway design for South African conditions. The guideline also includes a detailed inventory of the fishways to be found in the country – one of the most important outcomes of the fishway research programme. Other important issues, such as the construction, operation, maintenance and monitoring of fishways are also included.



Report No: 1528/1/07

Polyeletrolyte Determination in Drinking Water (S Majam and P Thompson)

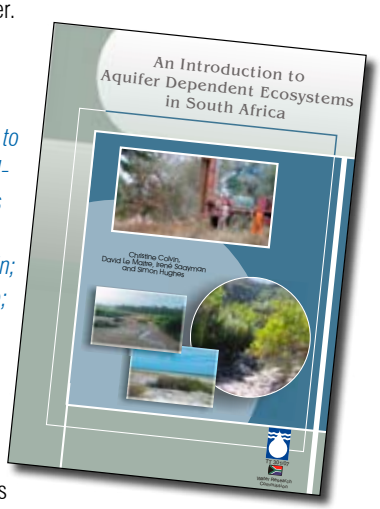
Polyelectrolytes are water soluble organic polymers used as primary coagulants in the treatment of drinking water. Although it is desirable to remove traces of polyelectrolytes added during the treatment process, residual amounts of these substances may persist in solution after the filtration stage. Evidence suggests that several of these contaminants could have an adverse effect on the health of water consumers if ingested in sufficient quantity over time. Consequently, water treatment plant operators are required to know the residual concentration of polyelectrolytes at various stages in the treatment process and the eventual quality of the treated water.

The study investigated several techniques to determine polyelectrolytes in drinking water. Two simple and practical analysis methods were developed. Application of either or both of these methods is recommended for monitoring purposes and for ensuring the safety of final, treated drinking water.

Report No: 1510/1/08

Application Procedure for the Development and Use of Groundwater (R Parsons; L Eichstadt; J Crowther and J Blood)

The lack of clear guidance from responsible authorities in matters relating to the authorisation of development and use of groundwater, in as far as compliance with legislation is concerned, necessitated a multi-disciplinary study to develop this report, which is essentially a groundwater licensing guide. The key purpose of the guide is to help officials make decisions in an efficient and consistent manner on the process that has to be followed when applying for approval to develop and use groundwater.



Report No: TT 301/07

An Introduction to Aquifer Dependent Ecosystems in South Africa (Christine Colvin; David Le Maitre; Irené Saayman and Simon Hughes)

Aquifer dependent ecosystems (ADEs) occur throughout the South African landscape in areas where aquifer flows and discharge influence ecological patterns and processes. They are ecosystems which require groundwater from aquifers for all or part of their lifecycle, to maintain a habitat with a water budget or water quality that contrasts with the surrounding ecosystems. Examples of known South African ADEs include in-aquifer ecosystems in the dolomites (North West); springs and seeps in the Table Mountain Group sandstone (Western Cape); terrestrial keystone species such as *Acacia erioloba* in the Kalahari; lakes and punctuated estuaries on the shallow sand aquifers of the east coast in KwaZulu-Natal, and seeps on the Karoo dolerite sills. The main objectives of this project were to produce a summary of known and probable groundwater dependent ecosystems; to guide decision-makers in assessing the importance and vulnerability of ADEs; to test the application of the tools identified for measuring groundwater use and dependency; and to identify significant knowledge gaps and to recommend a strategy for further research to address key issues relating to ADEs.

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International Year of Sanitation

Editor's note: Toilet is not a dirty word

It is one of the most basic human acts – going to the toilet – and yet an astounding two out of every five people in the world do not have access to safe sanitation.

Safe sanitation, which includes ventilated improved pit (VIP) toilets, ecological sanitation (such as urine diversion toilets), pour-flush and flush toilets, are about offering people the basic right to dignity and health. Without it, people (mostly children) suffer from incidence of disease and death, women and children remain at risk of attack, school days and work days are lost to the economy, and the environment is increasingly polluted with human waste.

Recognising the importance of sanitation to the overall achievement of the Millennium Development Goals, the United Nations General Assembly declared 2008 as the International Year of Sanitation (IYS). The main objective is to raise awareness and accelerate progress for the 2,6 billion people who still do not enjoy the right to basic sanitation facilities.

The South African government has committed itself to erasing the existing sanitation backlogs (at last count about 19 million people still lacked access to adequate toilet facilities). Yet, there remain many challenges for this target to be achieved. While the funds exist, skills, at especially local government level, remain sorely lacking, while the increasing urban population growth – and subsequent rise in informal settlements – makes for a 'moving target' that is difficult to reach. In addition, sanitation often remains the 'orphan' of government departments, with the departments of water, health, public works and education, often having to share responsibility for sanitation service delivery.

Still, it can be done. A collaborated effort, led by the Department of Water Affairs & Forestry, has resulted in the virtual eradication of bucket toilets in the country in less than two years, from 252 254 households in February 2005 to 49 010 households in December 2007. While it remains to be seen whether the alternative sanitation options provided will be sustainable it is a step in the right direction.

At the recent AfricaSan 2008 conference, held in Durban,

Only 22% of Africans have reached the top of the sanitation ladder, i.e. they have access to a flush toilet connect to a sewerage system.

(see article on page 16), sanitation ministers from several African countries, including South Africa, signed a Ministerial Declaration committing themselves to stepping up actions to wipe out existing backlogs in their respective countries. With political will established, the rest of the water and sanitation sector needs to step up its support in ensuring the momentum is maintained, and even increased. 'Toilet' is not a dirty word, we need to keep talking about it if we want to raise the dignity and health of our people.

To make sure sanitation remains in the minds of the sector, *the Water Wheel* has dedicated pages in each edition for the remainder of the year to articles related to sanitation. We will bring you news of progress, new developments and research support from across the world.

To contribute to these pages, write to The Editor at laniv@wrc.org.za or Fax: (012) 331-2565.

Swelling shacks pose a sanitation challenge

North West Premier Edna Molewa has raised concerns that the increasing shacks and buckets will pose challenges to her government's commitment to get rid of the bucket system.

BuaNews reports that, delivering her State of the Province address in February she said that for every shack removed, another one or more seemed to spring up in its place. "For instance, by the end of November, 16 500 buckets were eradicated across the Maquassi and Matlosana municipalities, yet another large number has mushroomed in the same municipalities," she said.

Molewa added that it was encouraging, however, that according to recent statistics released by Statistics South Africa, there had been huge improvements in households gaining access to piped water, electricity, safe sanitation and refuse removal.

Last buckets removed in KZN

The last bucket toilets have been removed in KwaZulu-Natal, according to Premier Sibusiso Ndebele.

Delivering his State of the Province address in February, the Premier said the last four bucket units were to be eradicated in the Umzimkhulu Local Municipality that month. "We have progressively eradicated the bucket toilet system in the province. In 2003, we had 13 605 households using the bucket sanitation system. We progressively eradicated the system to 3 226 in 2004 and 101 in 2007."

Despite the huge strides made in KwaZulu-Natal, more remains to be done. Ndebele reported that a million people in the province still did not have basic sanitation, while 31% of households were still without close access to potable water. The municipalities with the most backlogs of water and sanitation are Zululand, Ugu, Uthungulu, Umzinyathi, Umgungundlovu and Umkhanyakude.

New African sanitation network formed

A new African network of professionals and academics in the sanitation field has been launched.

The African Sanitation Knowledge Network (ASKNet) was officially launched at the AfricaSan 2008 conference, held in Durban, in February. The network emanated from a meeting of leading African and European academics and practitioners in the field of sustainable sanitation held in Uganda last year, at which an unanimous need was expressed to enhance the profile of African academia in this field, and to increase the output of young professionals with the necessary skills to manage implementation projects on the ground.

According to founder member Dr Nicola Rodda of the School of Biological and Conservation Studies at the University of KwaZulu-Natal, the objectives of the network are three-fold: to increase the numbers of African professionals skilled in sustainable sanitation; to enhance the relevance, quality and profile of sustainable sanitation research in Africa; and to promote sustainable sanitation and its implementation in Africa.

A networking conference will take place in Maputo, Mozambique, in December. For more information, contact Dr Rodda at Tel: (031) 260-3015; E-mail: roddan@ukzn.ac.za or Visit: www.asknet-office.net.

Cholera still burdens developing countries

Researchers estimating cholera incidence in endemic areas have found that the disease has a substantial burden, with the highest impact on young children.

Such estimates are important, they say, in deciding where interventions – such as water supply and sanitation improvement, should be targeted. The study was carried out in three sites: Kolkata in India, Jakarta in Indonesia and Beira in Mozambique.

The international team tested for cholera among people of all age groups who presented with diarrhoea at health centres in these areas. They found that the lowest overall cholera rate was in Jakarta, with 0,5 cases per 1 000 people per year. The incidence was three times higher in Kolkata (1,6 per 1 000 people per year) and eight times higher in Beira (four per 1 000 people per year).

In all sites, children were the most affected, with rates highest in those children under five years of age. "The study implies that cholera is still a major problem in developing countries," said Dipika Sur, Deputy Director at the National Institute of Cholera and Enteric Diseases in Kolkata. According to Sur, children tend to have the disease more in endemic areas because adults develop immunity.

Dr Jo Barnes of the Faculty of Health Sciences at the University of Stellenbosch reported that Mozambique is at high risk from cholera due to ongoing flooding and poor infrastructure. "People have been displaced and are living in refugee-like accommodation."

The disease can remain dormant in the environment for years, she warned, and resurface as soon as conditions were right. "What is needed urgently are pit latrines, clean drinking water and education about hygiene," Dr Barnes concluded.

Source: SciDev.Net

Tackling AIDS challenges through proper services

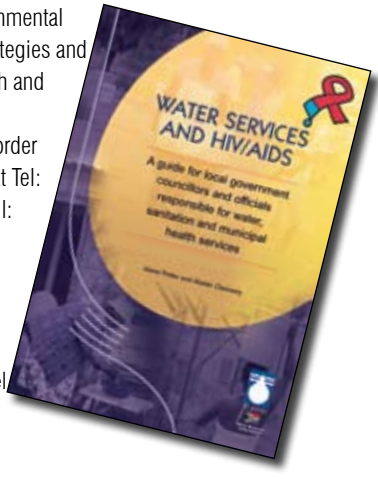
The hygienic use of appropriate water and sanitation facilities is essential, particularly for people living with HIV/AIDS.

Municipalities have an important role to play in ensuring that water and environmental health services address the implications of HIV/AIDS. The provision of water and sanitation services that are affordable, accessible, reliable and used with appropriate health and hygiene practices can help people with HIV to stay healthy longer; increase the effectiveness of home-based care for people with HIV/AIDS; support people's livelihoods and are vital for community growth and development.

The Water Research Commission (WRC) has published a new guide on water and sanitation services and HIV/AIDS for local government councillors and officials responsible for water, sanitation and municipal health services.

The report, based on a project undertaken by Mvula Trust and funded by the WRC, is intended to assist local government water services and environmental health officials with planning and implementing water and sanitation services, together with health and hygiene education, to reduce the impact of HIV/AIDS. It sets out a framework for municipal responses to the disease and highlights ways in which HIV/AIDS can be mainstreamed into water and sanitation planning, regulation, implementation and provision. In order to clarify the institutional complexities in water and environmental health services, the report provides a model, strategies and indicators for implementing project-related health and hygiene education in the context of HIV/AIDS.

A complementary DVD is also available. To order the report and/or the DVD, contact Publications at Tel: (012) 330-0340; Fax: (012) 331-2565; or E-mail: orders@wrc.org.za



African Ministers Unite in Fight Against Backlogs

Lani van Vuuren

For hundreds of years conflict and strife have plagued different parts of the African continent. Now countries face a new war – the struggle against death and disease suffered by millions of Africans as a result of a lack of access to safe sanitation. Lani van Vuuren reports.

More than 30 of Africa's sanitation ministers pledged their allegiance to the war against open defecation and poor toilet facilities when they signed the Ministerial Declaration at the AfricaSan 2008 conference, which took place in Durban in February. The event followed the first AfricaSan conference, held in Johannesburg in 2002, where a United Nations Millennium Development Goal (MDG) specifically for sanitation was created. This MDG aims to reduce, by half, the number of people without access to basic sanitation and hygiene by 2015.

The Durban conference focused the attention of Africa's sanitation leaders and technical experts on exploring ways of accelerating achievement of national and MDG targets for sanitation. Sanitation, or the lack of it, remains one of the most pressing development issues around the world. About 2,6 billion people do not have safe toilet facilities – almost 980 million are children under the age of 18.

The result is not surprising: millions of people die each year from preventable diseases. Diarrhoea, mostly as a result of poor hygiene and a lack of safe sanitation and potable water, is the cause of 17% of deaths among children under the age of five. More than 4 100 children under five die every day due to diarrhoeal diseases – that is five times more than the number of children dying from HIV/AIDS.

But it is not just about health and dignity. According to UNICEF, there is compelling evidence that sanitation brings the single greatest return on investment of any development intervention (roughly US$9 for every US$1 spent). In the developing world, the costs of not investing in sanitation is huge – lost work days and

missed schools days are estimated to have an economic cost of around US$38-billion per year, with sanitation accounting for 92% of this value.

AFRICA'S STAGGERING STATISTICS

In Africa, the situation is particularly grim. The continent has the lowest access figures in the world – about 600 million people currently do not have access to safe sanitation. The Joint Monitoring Programme (JMP) for Water Supply & Sanitation, coordinated by the World Health Organisation and UNICEF, estimates that only 38% of Africa's population have access to improved sanitation (2006 figures). Improved sanitation facilities are defined as flush or pour-flush toilets connected to sewerage systems or septic tanks, ventilated improved pits (VIPs), pit latrines with a slab and urine diversion toilets (shared toilet facilities are not regarded as 'improved sanitation').

People in rural and peri-urban areas seem worse off than their urban counterparts: less than a third of the African rural population use improved sanitation compared to just over half of the urban population. In 16 of the 54 African countries, less than 25% of the population uses an improved sanitation facility.

The continent as a whole is not on track to meet the MDGs, although it is recognised that there is great variation across countries. In fact, some countries have succeeded in sustaining expansions of sanitation coverage to more than 2% of their population each year. These include Senegal, Burkina Faso, Rwanda, Benin, Ethiopia and Mozambique.

"With eight years to go it is clear that most African countries are unlikely to reach their sanitation MDG targets unless approaches to sanitation change," said African Development Bank Director of Water and Sanitation Kordjé Bedoumra. "For Africa to meet the MDGs for water and sanitation, the number of persons served would have to double from 350 million to 700 million by 2015. Even that would still leave 200 million people without services. Investments in the sector would also have to be doubled to some US$26-billion," he said. According to Bedoumra, the inadequate progress in the attainment of the sanitation MDG was due, in part, to the strategy adopted. He added that the greater burden for the attainment of the goal lay with local authorities who did not have the funding to ensure the success of the programmes.

"It is heartening to note, however, that most countries have taken an active approach to improving access. The continent is a global leader in finding innovative ways to provide sanitation services to the very poor. Examples include sanitation marketing approaches being implemented in Benin, Tanzania, Uganda and Malawi."

"The provision of sanitation is a key development intervention – without it, ill health dominates a life without dignity. Simply having access to sanitation increases health, well-being and economic productivity. Inadequate sanitation impacts individuals, households, communities and countries."

AMCOW President Bruno Jean-Richard Itoua

TOILETS A PHYSICAL DANGER TO WOMEN, GIRLS

Outdated sensitivity to privacy and delicacy resulting in toilets being hidden from view are putting women and girls at greater risk of being violated.

According to crime prevention expert Barbara Holtmann of the CSIR more than 50 000 rapes were recorded in the country in 2006/07. Of these more than 40% were girls under the age of 18. "Rape and/or sexual abuse in toilets is a real risk," she told delegates at the AfricaSan conference, held in Durban, in February. "Despite this, toilets are still being constructed away from mainstream activity with poor lighting and entrances hidden from sight. Poor girls are at real risk as they are unlikely to have safe toilets at home."

Even in urban environments, for instance, in shopping centres, women's toilets are often next to – and past the entrance of – men's toilets, providing a reason for men to loiter near to women's toilets.

According to Holtmann, toilets needed to be integrated into the mainstream areas of public places, including schools. Safety needed to be prioritised over delicacy. "Toilets need to be designed in such a way so that it is possible to see from the outside if there is someone inside (e.g. walls not reaching to the floor), and the entrance needs to be brightly lit," she said.

ETHIOPIA – WHERE POLITICAL WILL FOUND A WAY

Ethiopia, one of Africa's largest countries (total population 80 million), is a prime example of what can be done with political will and commitment.

The country used to be on the lower end of country league tables on health and sanitation. However, in the last few years significant strides have been made to substantially improve the situation. The driving force for change is the country's health services extension programme with its emphasis on provision of preventative healthcare at household level. Through the programme, female health extension workers are employed to deliver key health messages about hygiene and sanitation, disease prevention and control, family health services and health education and communication. Communities are encouraged to build their own toilets and improve their health through simple acts such as regular hand washing. To date, more than 24 500 health workers have been trained.

The country has managed to move more than 20% of its population from practising open defecation. By last year, 50,8% of Ethiopia's people had access to at least minimum sanitation facilities (a traditional pit latrine). This is up from 11,5% in 2003. The country's child mortality rate has also decreased significantly as a result.

"In Ethiopia we have realised the importance of sanitation and hygiene not only to the health of our people, but to our general economy. We cannot build our country without healthy citizens," reported State Minister of Health Dr Shiferaw Teklemariam. "The process is driven by the Prime Minister, with integration of all the ministries responsible for hygiene and sanitation, namely Health, Water Resources and Education."

CONTRIBUTING FACTORS

While Africa is by no means 'one place', explained Bedoumra, the country profiles showed some similarities in the issues faced by the majority of countries. One of the biggest problems is the overwhelming weight of on-site sanitation, which places the emphasis for sanitation on households rather than service or utility providers. As a result improved facilities remain out of reach for many families – statistics reveal that building a VIP would cost twice the monthly budget of the average African household.

Other issues arise from the pace of demographic growth. Populations in peri-urban settlements and slums are growing up to two times faster than in planned areas. "The sector has to run hard just to stay still in terms of the proportion of people it covers," noted Bedoumra.

Political will remains a problem in some countries. Financing for sanitation remains low in comparison to water and extremely low in comparison to other development sectors, such as health and education. Compounding this problem is the fact that the responsibility for providing sanitation has increasingly been devolved to lower tiers of government. However, this has often taken place without the necessary associated development of local capacity and technical support.

"The global sanitation crisis is driven by political neglect; the sector is plagued by a lack of political priority compared to other sectors such as health and education, compounded by a chronic lack of funding."
Oliver Cumming, WaterAid

Another challenge is the fragmentation of the sector, for example, few countries have a ministry or department solely responsible for sanitation. "Usually sanitation is split between water, health and education ministries who take responsibility for small pieces of the overall puzzle, but rarely there is a lead organisation coordinating the different roles," said Bedoumra.

SANITATION IN SOUTH AFRICA

How does South Africa compare with other African countries? A community

Lani van Vuuren

AMCOW President Bruno Jean-Richard Itoua and South African Minister of Water Affairs & Forestry Lindiwe Hendricks at AfricaSan 2008 in Durban.

survey undertaken by Statistics South Africa last year revealed that there has been steady progress in access to flush toilets and VIPs, and a related decrease in use of the bucket toilet system and those without any type of toilet facility. Most of the progress has been in the last five years.

At present, about 85% of households have access to improved and adequate sanitation facilities, compared to 80,4% in 2001. An estimated 60,4% of South African households have a flush toilet, 21,5% have unimproved pit latrines, 6,8% have VIPs, 4,1% use a urine diversion toilet, 2,3% have bucket toilets, 0,4% have a chemical toilet and 8,6% have no sanitation.

"As a government we have committed to creating a better life for our people, which has resulted in us driving massive programmes to provide not only sanitation to our people, but also clean water, electricity and housing," said Minister for Water Affairs & Forestry Lindiwe Hendricks. "In rolling out these programmes we have been confronted with new challenges; in the area of sanitation these include additional burden placed on wastewater treatment plants, the increased demand for waterborne sanitation even where there is inadequate water resources to accommodate such requests; a continuous moving target because of the growth of new informal settlements; and VIPs filling up."

Hendricks admitted that the lack of capacity – especially at local government level, was another hindrance in the delivery of sustainable sanitation. "Our skills are being divided among many infrastructure projects,

ETHEKWINI DECLARATION

At the AfricaSan 2008 conference around 30 sanitation ministers and heads of delegations pledged to:

- Bring the messages, outcomes and commitments made at AfricaSan to the attention of the African Union;
- Support the leadership of African Ministerial Council on Water (AMCOW) to track the implementation of the eThekwini Declaration;
- Establish, review, update and adopt national sanitation and hygiene policies within 12 months of AfricaSan 2008;
- Increase the profile of sanitation and hygiene in poverty reductions strategy plans;
- Ensure that one, principal, accountable institution takes clear leadership of the national sanitation portfolio, establishing one coordinating body with specific responsibility for sanitation and hygiene, involving all stakeholders, including those responsible for finance, health, water, education, gender and local government;
- Establish specific public sector budget allocations for sanitation and hygiene programmes;
- Use effective and sustainable approaches, such as households and community-led initiatives, marketing for behaviour change, educational programmes, and caring for the environment, which make a specific impact on the poor, women, children, youth and the unserved;
- Develop and implement sanitation information, monitoring systems and tools to track progress at local and national levels and to work with global and regional bodies to produce a regular regional report on Africa's sanitation status, the first of which to be published by mid-2010;
- Recognise the gender and youth aspects of sanitation and hygiene, and involve women in all decision-making levels;
- Build and strengthen capacity for S&H implementation, including R&D and support knowledge exchange and partnership development; and
- Give special attention to countries or areas which are emerging from conflict or natural disasters.

Kathy Eales

Around 0,4% of South African households still make use of chemical toilets.

including the Gautrain, the stadiums for the Soccer World Cup and basic housing, to name a few. Another cause for concern has been the escalating costs of implementing sanitation. We need to find ways of making it more affordable."

"More than 4 100 children under five die worldwide every day as a result of diarrhoea caused by a lack of basic sanitation and hygiene. These are not merely numbers and statistics, these are real children."
Thérèse Dooley, UNICEF

ACTION PLAN

Apart from the Ministerial Declaration, in which Africa sanitation ministers committed to intensifying their sanitation delivery efforts, the most important outcome of the AfricaSan 2008 conference was an action plan focusing on strategic areas, to improve monitoring of sanitation and hygiene in the region and accelerate sanitation and hygiene programmes regionally and in selected countries across the region.

The Ministerial Declaration and Action Plan will be presented at the African Union (AU) Water and Sanitation Summit to take place in Egypt in July at the next General Assembly of the AU in Sharm el Sheikh where the support of Heads of State will be sought.

"AfricaSan 2008 was never going to be another 'talk shop'. We wanted to review the present situation honestly and provide clear actions for the way forward, said Bruno Jean-Richard Itoua, President of the African Ministerial Council on Water. "The Ministerial Declaration and the Action Plan are a clear indication that sanitation is at last becoming a priority issue in African countries. This political commitment will provide a new dynamic in the fight to bring health and dignity to the people of Africa."

Lani van Vuuren

Access to basic sanitation remains a luxury for about 600 million people in Africa.

From Wetland to Waste Land – Human Activities Threaten Gauteng Treasure

Terence McCarthy

Stretching over 25 km, the Klip River wetland, south of Johannesburg, has proven one of Gauteng's most valuable natural assets through its ability to treat heavily polluted water. However, parts of the wetland have been severely degraded over the last few years, threatening the existence of this aqua-treasure. Lani van Vuuren reports.

Even during Johannesburg's early years, when prospectors gathered from all over the world on the dusty outcrops of the Witwatersrand to share in its metal and mineral riches, the importance of the Klip River wetland could not be denied. Its underlying groundwater resources provided the first reliable water supply to the growing towns of the Witwatersrand gold field. It was only when the Vaal Barrage was completed in 1923 that groundwater became a less important source of supply to the towns of the Witwatersrand.

In the early days the Klip River was also a significant agricultural area, with parts of the wetland being drained and irrigation canals and diagonal drains criss-crossing the wetland area. However, it is for its latest function that the wetland is most treasured, namely, for its ability to treat the polluted waters arising from the western section of the Witwatersrand urban-industrial-mining complex.

NATURAL WASTEWATER TREATMENT SYSTEM

Prof Terence McCarthy of the School of Geosciences at the University of the Witwatersrand started his research on the Klip River wetland five years ago. He reports that the wetland has been providing a water purifying function since the founding of Johannesburg.

The wetland receives water that has been contaminated by acid mine drainage, industrial sources and runoff from urban sources. Water from sewage treatment plants, which contain residual phosphates and nitrates also find their way into the wetland. "Polluted water arising from these sources has left clear symptoms in the chemistry of the wetland peat," explains Prof McCarthy. "Accumulated concentrations of metals such as copper, mercury, lead, nickel,

"The Klip River wetland is possibly one of the most economically important wetlands in Africa."

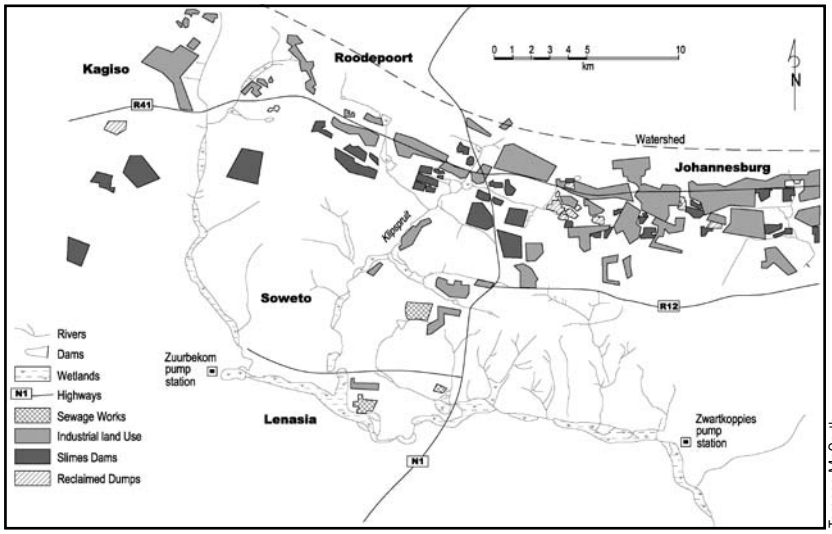
AUTHORITIES TO HELP KLIP RIVER WETLAND

A national multimillion Rand initiative to restore the Klip River wetland to its natural glory has kicked off following an announcement by Deputy Minister of Environmental Affairs & Tourism, Rejoice Mabudafhasi.

Speaking ahead of World Wetlands Day in Soweto in February, Mabudafhasi said the Klip River wetland had contributed indirectly to the South African economy and directly to the well-being of the country's citizens. This was because of the wetland's ability to trap pollutants and improve water quality coming out of catchments on the Witwatersrand that had been impacted by mining, industries and sewage treatment plants. The water purified by the wetland eventually finds its way to the Vaal River.

In the last few decades, however, the Klip River wetland has come under threat due to increased human activities. A multidisciplinary team was to be appointed under the leadership of Working for Wetlands to come up with a plan to rehabilitate the wetland. R2-million had already been secured from DEAT to initiate the process.

Mabudafhasi emphasised that it would require cooperation across government departments and tiers to ensure the success of the rehabilitation project. "It is only through such a combined approach that we can hope to tackle a problem of this magnitude, and it is our shared responsibility to bring the Klip River wetland back to health."



Terence McCarthy

Location of the Klip River wetland.

zinc, as well as uranium, nitrogen and phosphate have been found in the wetland material."

Interestingly, a student of Prof McCarthy, Jaco Venter, is currently undertaking an investigation into the extent of heavy metal accumulation in the wetland. The study should be completed later this year.

The purified water flowing out of the wetland eventually enters the Vaal River, one of the country's largest rivers and a premier source of water. "For this reason the Klip River wetland is possibly one of the most economically important wetlands in Africa," maintains Prof McCarthy.

RESOURCE UNDER THREAT

Despite burgeoning growth and development in the area the upper reaches of the Klip River wetland, found near Lenasia, have remained in reasonable condition. Here a 500 m wide, reed-covered swamp can be found and, although some sections have

Lani van Vuuren

The Klip River wetland, south of Johannesburg, has played a significant water treatment function for more than a hundred years, cleaning up much of the pollution from mine dumps in the area.

been affected by peat mining and the heavy metal concentrations in the remaining peat are high, the vegetation does not appear to be adversely affected.

It is the lower reaches of the Klip River wetland that are of most concern. Aerial photographs show that this section of the wetland is in a state of near collapse. Prof McCarthy explains that the main problem is the steady increase in treated sewage water that the wetland has received since the 1960s.

The large volume of water has resulted in channelling along the former irrigation ditches dug to support agriculture during the early 1900s. "The channels have undergone major widening and incision. In places, bedrock barriers have been encountered during incision, resulting in several waterfalls and rapids along the modern river," notes Prof McCarthy.

The incising channels have also exploited some of the diagonal head drains and thus the new, widened channels migrate from one side of the wetland to the other. These diversions across the wetland have had the effect of capturing progressively more of the dispersed flow and focusing it into a widening, single channel, thus further promoting incision and channel widening.

The channels are still flanked by reed beds, but these appear to experience only limited inundation. This seriously compromises the wetland's ability to sequester pollutants. "The success of a wetland to purify water lies in the slow movement of water through the wetland," reports Prof McCarthy. "In the upper reaches where the reed bed is still functioning the flow velocity of the water is in the region of 0,03 m/s and the contact area between aquatic vegetation is very large. "However, in the canalised section, the flow velocity is in the region of 0,5 m/s. This means the residence time of the water has been reduced in this section of the wetland from days to hours. It is therefore likely that the downstream reed bed has virtually ceased to sequester pollutants."

Terence McCarthy

Large volumes of water entering the wetland from nearby sewage treatment plants have resulted in deep incising channels.

Terence McCarthy

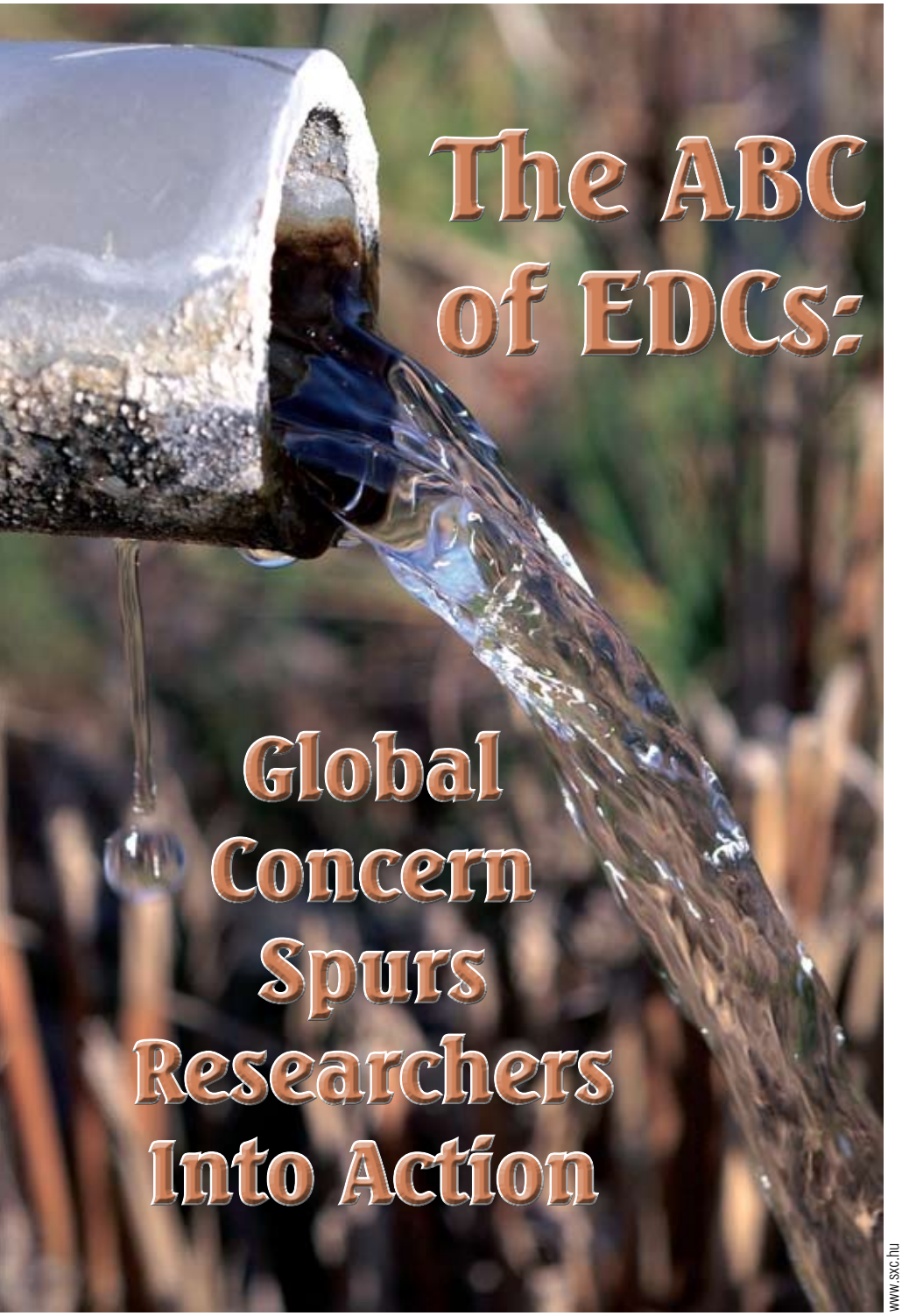
Drying up of the reed beds leads to the burning off of the peat layers, exposing the bedrock below.

FROM REED BED TO GRAVEL BED

When the reed bed dries out, the peat starts to burn. The ash thus produced forms soil susceptible to erosion and several gullies have already formed in the lower reaches of the Klip River wetland. If this degradation is not halted, we could see the release of heavy metals, organic load and phosphates, which are bound in the peat into the Vaal River system over the coming years.

"If no immediate action is taken the lower Klip River and the Vaal downstream of its junction with the Klip will experience eutrophication problems similar to those experienced at the Hartbeespoort Dam. The wetland could be lost and replaced by a single channel, gravel-bed river, similar to the Jukskei to the north of Johannesburg," says Prof McCarthy.

It is believed that further degradation can be prevented by constructing a series of weirs to raise the water level back to what it used to be and to get the water back onto the floodplain and into the reeds that are left. Whichever action is taken, it is hoped that it will take place in the short term to prevent the complete disappearance of this strategic asset.



The ABC of EDCs: Global Concern Spurs Researchers Into Action

www.sxc.hu

In Part One of a series on endocrine disruptors, Lani van Vuuren looks at the increasing awareness of the potential risks of man-made chemicals to humans and wildlife as well as the start of South Africa's EDCs Research Programme.

Over the past two decades there has been growing concern, public debate and lack of scientific consensus about the potential effects of a number of chemicals that have the potential to alter the normal functioning of the endocrine system. The endocrine system is the set of glands and the hormones they produce, which help guide the development, growth, reproduction and behaviour of animals and humans.

So-called endocrine disruptors or endocrine disrupting chemicals (EDCs) – also called gender benders – can be natural or man-made substances, and interfere with the normal functioning of the endocrine system in three possible ways:

- By mimicking the action of a naturally-produced hormone, such as oestrogen or testosterone, and thereby setting off similar chemical reactions in the body;
- By blocking the receptors in cells receiving the hormones, thereby preventing the action of normal hormones; or
- By affecting the synthesis, transport, metabolism, and excretion of hormones, thus altering the concentrations of natural hormones.

The potential danger of these substances to humans and the environment first came to light in the 1960s, when the observed effects of wildlife exposure to chlorinated pesticides, such as dichlorodiphenyltrichloroethane (DDT), became known. Today, there are over 80 000 chemicals registered for commercial use, and it is unclear exactly how many are potential EDCs.

We are surrounded by chemicals in our everyday lives, and every person will probably be exposed to a cocktail of potential EDCs through various agents in their lifetime. Suspected endocrine disruptors can be found in pesticides, fertilizers, pharmaceuticals (e.g. birth control), personal care products (medicines, lotions,

cosmetics, sun block), and industrial substances (plasticisers, fabric softeners, fire retardants, cooling agents). They find their way into the environment and water resources. We are exposed to these chemicals through the water we drink and the food we eat, the air we inhale, and through contact with our skin.

Because the list of chemicals with possible endocrine disrupting effects is structurally so diverse, it is not possible to define a 'typical' EDC. Of specific concern, however, is the subgroup of EDCs known as persistent organic pollutants (POPs). These compounds do break down extremely slowly, and can remain in the environment for many years. They accumulate in fatty tissue, becoming more concentrated higher up in the food chain over time. For example, fish-eating birds might have higher concentrations of EDCs than the fish on which they feed, such as a study on bald eagles in Alaska showed. Infants can be exposed to their chemicals through the womb and through their mothers' breast milk.

The use of these compounds has generally been banned, but they are still present in the environment. Of equal concern are newer products, with short half-lifetimes to which we are exposed daily, such as pesticides used for domestic pest control and chemicals contained in plastic containers.

ENDOCRINE DISRUPTION IN NATURE

As Natalie Aneck-Hahn of the Department of Urology at the University of Pretoria pointed out in a paper presented at the 2006 Biennial Conference of the Water Institute of Southern Africa (WISA), most of the studies for endocrine disruption in wildlife has come from studies on species living in or closely associated with, the aquatic environment. "This is not surprising given the fact that our rivers and oceans act as repositories for the discharge of tens of thousands of chemicals in large volumes." These field and laboratory investigations indicate that exposure to certain EDCs could contribute to adverse effects in some wildlife populations.

The World Health Organisation (WHO), in its *Global Assessment of the State of the Science of Endocrine Disruptors*, reports that the health effects witnessed in wildlife species vary from subtle changes in the physiology and sexual behaviour of species to permanently altered sexual differentiation. For example, exposure to EDCs has been shown to adversely impact the reproductive and immune function in Baltic seals, resulting in marked population declines, while eggshell thinning and altered gonadal development have been observed in birds of prey exposed to pesticides such as DDT.

SOME EXAMPLES OF ENDOCRINE DISRUPTORS

Phthalates: Add flexibility to a large range of plastic goods. Also found in some paints, inks, adhesives and cosmetic products.
Bisphenol A: Used extensively in the production of polycarbonate and epoxy resins. It can also be found in adhesives, reinforced pipes, interior coatings of tins and drums, flooring, electronic goods, powder paints, lenses, crash helmets, thermal fax paper and some resistant plastic foods and drinks containers.
P-nonylphenol: Found in industrial and household detergents.
Polychlorinated biphenyls (PCBs): PCBs have historically been used as coolants and lubricants in transformers, capacitors, and other electrical equipment. (Production has stopped and these compounds have been banned in some countries, although they are still prevalent in the environment).
DES: Diethylstilbestrol was the first synthetic oestrogen to be developed. It has traditionally been used by pregnant women to prevent miscarriages.
Atrazine: Widely used in South Africa as a herbicide, especially in the maize producing areas.
Dioxin: Byproduct of industrial processes, including waste incineration, food containment.
Organochlorine pesticides: Still widely used in SA, especially in areas where malaria prevails (including DDT).
Estradiol: Form of oestrogen used to treat, for example, symptoms of menopause.
Organophosphate pesticides: Includes chlorpirifos, Azinfos-methyl and Parathion.

Lani van Vuuren

Plastics are one potential source of EDCs.

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PRISTINE WILDLIFE AREA AFFECTED BY EDCs

In 1999 the US Geological Society published the results of a study on bald eagles in the remote and pristine area of Aleutian Archipelago, in western Alaska.

The research indicated elevated levels of organochlorine pesticides, such as DDE (a metabolite of DDT) and the industrial compound PCB in the bald eagles leading to low reproduction levels due to eggshell thinning and embryo death.

Studies on sea otters in the same area found they contained almost twice as much PCB than otters from the central California coast, an area known to have agricultural and industrial contamination. While the researchers could not pinpoint the source of the pollutants, their distribution patterns yielded some clues. The PCBs may have come from former military activity on some of the islands, while the DDT could be windborne or waterborne contamination from agricultural use in Asia.

This proved that even remote and pristine areas could potentially be affected by endocrine disrupting chemicals due to the potential of these pollutants to be transported over long distances.

Another well publicised example is the decline of alligator populations at Lake Apopka, in Florida, in the US, following a DDT spill. A decrease in reproductive capability among panthers in the same area was linked to the same incident. In a more recent survey by the US Geological Survey (USGS), more than 80% of male smallmouth bass in the Potomac were found to be growing eggs in their testes (known as feminisation). A seven-year research effort by Canadian biologists found that synthetic oestrogen (such as those found in birth control pills), which were regularly discharged in municipal wastewater into surface waters, had similar feminising effects on wild fish populations living downstream.

WHAT ABOUT HUMAN HEALTH?

According to CSIR senior researcher Bettina Genthe, there is still much debate surrounding the significance of evidence that EDCs are affecting human health, especially since epidemiological studies are almost non-existent. It is assumed, however, that since these chemicals are affecting animals, they must be affecting humans too. A number of reproductive health effects in the human population have been observed in which EDCs could play a role.

Some studies in countries, such as Japan and the US, for example, have reported decreases in sperm numbers in males over the last 50 years as well as a decline in male births. In recent years there has also been an increase in the incidence of congenital malformations in children, such as hypospadias (abnormal positioning of the meatus, the opening from which urine passes) and cryptorchidism (undescended testes). In addition, there are more reports of testicular and prostate cancer in males and breast cancer and endometriosis in women. It is thought that EDCs could also potentially affect the immune system and neurological development.

"There are over 80 000 chemicals registered for commercial use, and it is unclear exactly how many are potential EDCs."

Why is it so difficult to unequivocally prove the human health effects of EDCs? "It is difficult to establish cause and effect relationships for human exposure of EDCs and incidence disease. We have no control, since everyone has been exposed to EDCs at some time or another," explained Genthe during her presentation at WISA 2006. "We encounter a broad range of environmental exposures throughout our lives and frequently to a mixture of chemicals at any one time." This makes it difficult to know which chemicals at what dosages are harmful.

Another challenge is the fact that more recent research suggests that endocrine disruptors have transgenerational capabilities. This means they do not only affect the people presently exposed to them, but could possibly elicit greater effects up to a second or third generation. Also, health effects due to prenatal exposure may not present themselves until later in life. It is generally believed that the earliest stages of life are the most sensitive to endocrine disruption.

THE SOUTH AFRICAN EDCs RESEARCH PROGRAMME

The best way to defend ourselves against this onslaught of chemical influences is to improve our knowledge of EDCs and their presence and effects on the environment. This information can be used by decision-makers to ensure these chemicals are controlled effectively through legislation to reduce risk of exposure.

In the early 1990s awareness grew of the need to conduct large-scale EDC research in South Africa. "Early investigations were very isolated and the country's EDC research capacity was limited," reports WRC research manager Annatjie Moolman. "A need existed for a coordinated programme involving all researchers and other role-players, including government departments, industry and water suppliers. This is especially necessary as EDCs research requires a multidisciplinary approach involving research in disciplines such as zoology, physiology, toxicology and analytical chemistry."

"Health effects witnessed in wildlife species vary from subtle changes in the physiology and sexual behaviour of species to permanently altered sexual differentiation."

Lani van Vuuren

Many EDCs are believed to be transgenerational, meaning they do not only effect one generation, but can elicit effects up to a second or third generation.

It is reported that little of the existing analytical data generated in South Africa at that stage was useful for EDC evaluation as most of the data at that time were collected with toxicity in mind. (EDCs have an effect at levels much lower than the toxic effect, and was thus not detected or reported.) Subsequently, the WRC launched an EDCs Research Programme to coordinate and extent present capacity to conduct research in this field and monitor studies being undertaken.

Drinie van Rensburg

Animals living in an aquatic environment are most at risk of EDC pollution.

The main objective of the programme was to monitor the occurrence and source of EDC pollution in South African water systems and determine the potential risks to the local population. The programme focused on a list of priority EDC compounds compiled in collaboration with stakeholders such as the Department of Water Affairs & Forestry and the Global Water Research Coalition.

The early years focused on building much needed capacity at the participating research facilities for activity testing and chemical analysis. Thanks to these efforts, South African EDC researchers and scientists now count among the best in the world.

*In **Part Two**: More on the South African EDCs Research Programme and what studies have shown thus far.*

New Guidebook Helps Find Better Treatment Solutions

Many peri-urban and rural communities in South Africa are dependent on small water treatment plants for their drinking water. Choosing the right type of technology for the application is one of the crucial steps in ensuring the sustainability of the service. To assist decision-makers in making the right choices, the Water Research Commission (WRC) has published a new guidebook on the selection of small water treatment systems for potable water supply to small communities.

Small water treatment plants are defined as water treatment systems (usually with a capacity of less than 2,5 Mℓ/day) installed in areas which are not adequately serviced and do not normally fall within the confines of urban areas. They are, therefore, mostly used in rural and peri-urban areas and include chlorination plants for water supplies from boreholes and springs, small treatment systems for rural communities, treatment plants of small municipalities and treatment plants for establishments such as rural hospitals, schools, clinics and forestry stations.

Today, there are many local and international technology designs to choose from. As the authors of the new WRC guidebook point out, however, very little may be known of these systems in terms of cost, efficiency and the applicability to the intended application, especially in the case of novel and emerging systems. Supplier information may be sketchy, or promising new technologies have not yet been fully evaluated under South African conditions.

According to the guidebook authors, the selection of suitable technologies for small communities is very important. “These systems are crucial in ensuring safe water to the communities on a sustainable basis.”

While some small water treatment systems have been evaluated during selected WRC projects, this guidebook offers a more comprehensive look at all the small water treatment choices available in South Africa. A database comprising 1 100 small water treatment plants has been

compiled. This database provides information on the applicability, efficiency, operational use and cost aspects of the water treatment technologies so that the user can make technical comparisons between different solutions that exist.

Use of the guidebook is not limited to the selection of treatment technologies for new treatment plants; it can also assist in assessing the appropriateness of present technology applications for achieving compliance with drinking water quality standards under the site-specific circumstances encountered by an existing plant.

It is recognised that socio-economic factors are just as important as technological considerations when selecting the most appropriate water treatment technology. Thus socio-economic guidelines, based on research community experience with such or similar water treatment technologies are provided to assist the guidebook user in determining the appropriateness of identified technologies for specific small community use.

According to the authors, another important aspect in ensuring the sustainability of a system is following the correct operation and maintenance procedures. "Although most suppliers of small water treatment plants provide their clients with some operation and maintenance guidelines, these may not be exhaustive, or certain important generic aspects may not be covered. Specific attention should be given to operation and maintenance aspects and, where the treated water is distributed in a pipe network or has to be stored, the presence of a disinfection residual is required in all circumstances."

STEP-BY-STEP

The guidebook comprises three sections. In Section 1, the scope and intended use of the guidebook is described, together with an emphasis on the important technological and socio-economic issues. This is followed by Section 2 in which the procedures to be followed for selecting appropriate technologies for specific applications are described, starting with establishment of the need for the small water treatment system and information on the water source to be treated.

"It is recognised that socio-economic factors are just as important as technological considerations when selecting the most appropriate water treatment technology."

The user then produces a shortlist of available technologies that will meet these raw water requirements. These technologies are then evaluated and compared with each other by means of the technology information database. Different evaluation criteria are used to determine which treatment system will be the best for the user's specific needs.

Section 3 provides the data that is necessary for performing the above evaluation and selection procedure. A list of relevant research and evaluation reports is also included to allow the user to obtain more detailed information on the technologies contained in the database.

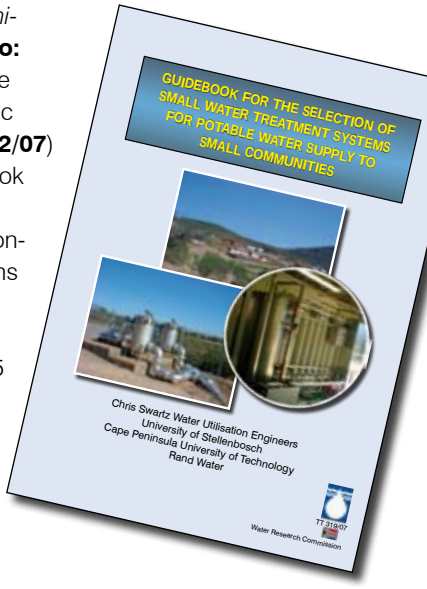
"When comparing costs of alternative technologies, the focus should be on cost-efficiency (i.e. the cost to achieve certain treatment goals) rather than on the absolute cost of the technology," the authors point out. "Lifecycle costing provides the most effective tool for cost-efficiency of alternative treatment technologies."

DEALING WITH MANAGEMENT

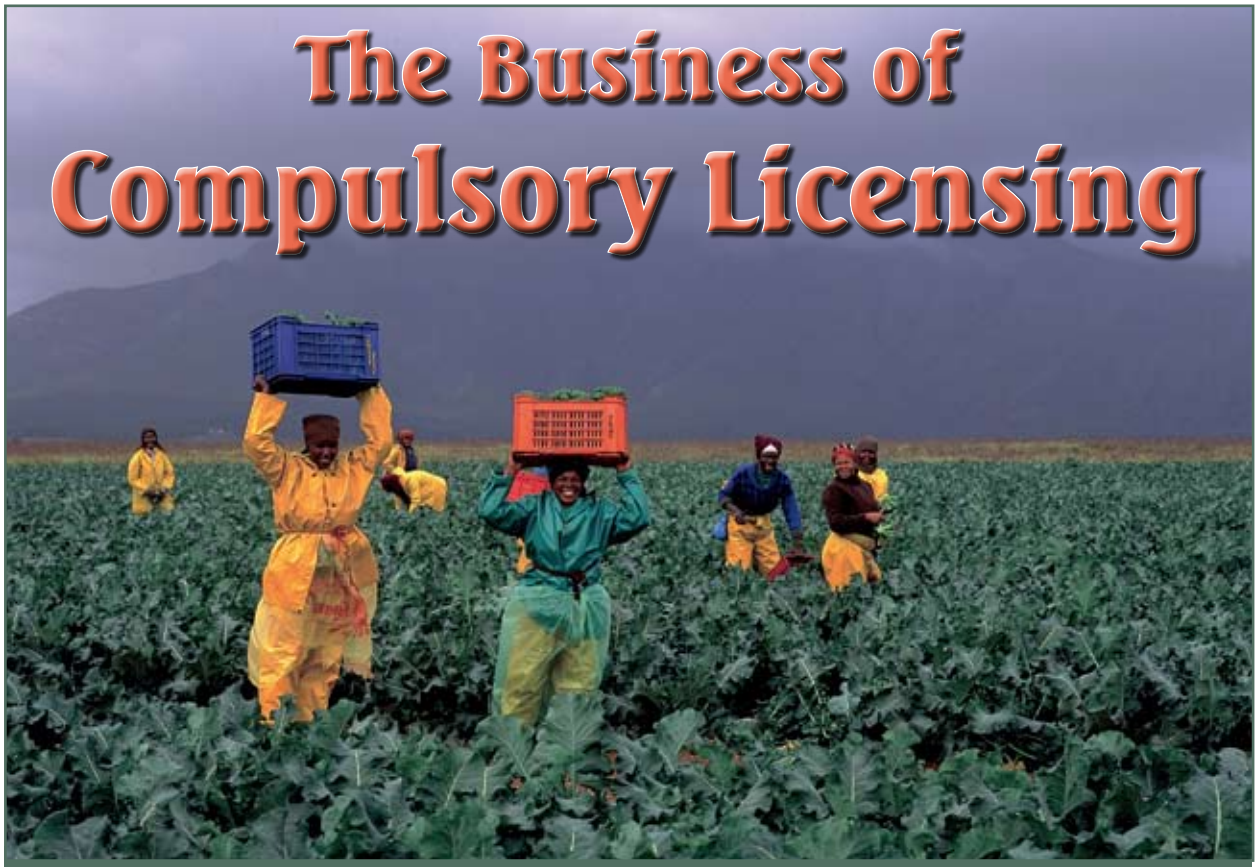
While the guidebook addresses the need for technical information on available and emerging small water treatment technologies, it is becoming more evident that a major problem with the sustainability of these plants lies with management aspects, the authors point out. "More applied research is needed on the identification and addressing of management issues that may result in poor performance of treatment plants, and ultimately, non-compliance with recognised local and international norms and standards."

The WRC has recognised the importance of improving management practices especially at small water treatment plants, and is funding two projects on addressing these issues at present. The one project is aimed at compiling a manual and training aid for such plants, while the other project is focusing on the compliance of non-metropolitan potable water providers as well as management guidelines and norms. A third project on the development of a management tool for the efficient operation and maintenance of small water treatment plants has also started.

To order the WRC Report, *Selection of Small Water Treatment Systems for Potable Water Supply to Small Communities* (**Report No: 1443/1/07**), the socio-economic report (**1443/12/07**) or the guidebook (**Report No: TT 319/08**), contact Publications at Tel: (012) 330-0340, Fax: (012) 331-2565 or E-mail: orders@wrc.org.za



The Business of Compulsory Licensing



Courtesy SA Tourism

The South African National Water Act makes provision for the equitable sharing of resources between water users in a catchment, from farmers, to industry to communities.

The National Water Act (NWA), Act 36 of 1998, has been widely hailed as one of the most progressive water resource acts in the world. It recognises that the environment should be allowed its rightful share, it placed into law South Africa's obligations to countries it shares its rivers with and it did away with the concept of 'riparian water law', Writes Peter van Niekerk.

Previous water legislation did not take into regard hydrological realities which nowadays are better understood, e.g. the connections between groundwater and surface water. Riparian rights were replaced by water licences to be allocated by a responsible authority, such as the Department of Water Affairs & Forestry (DWAF) or a catchment management agency. As a transitional measure the concept of 'existing lawful use entitlement' was introduced, with the aim of replacing all these entitlements with licences in due course.

Taking into regard South Africa's particular history, the NWA made provision for rebalancing equity in the allocation of water where there were unfair allocations in the past, or where waters of catchments were overallocated, i.e. where demands exceeded supplies and the water resource was under stress. A procedure called 'compulsory licensing' was introduced in section 43 of the NWA to deal with particular issue.

COMPLEX PROCESS

The compulsory licensing process is not an easy one. It requires a series of administrative steps, notices, advertisements, and publication of documentation such as allocation schedules. It is fraught with difficult and complex administrative decision-making that is quite likely to be challenged, even in court. Even a constitutional challenge regarding the compulsory licencing provisions in the NWA cannot be ruled out. Small wonder then that, in the ten years since the publication of the NWA, only the relatively minor area of the Jan Dissels River has successfully gone through the process.

Compulsory licensing can only be done once. While this gives certainty to all users of water in that area, it does mean that there is only one bite of the proverbial cherry – it has

to be correct and, therefore, has to be done with great care. That means, in all likelihood, that a comprehensive reserve determination has to be undertaken to ascertain the ecological water needs for the area in question. Such an exercise can easily take two years to complete.

The once-off nature of the existing compulsory licensing process is particularly problematic: the scientific basis on which the decisions have to be made is far from perfect. The meteorological and hydrological records on which the calculations are based to determine the available water are often flawed (sometimes even non-existent) and have to be corrected or approximated using sophisticated techniques. Past experience has demonstrated that more often than not with additional data or improved techniques, the calculations of the quantities of available water would differ significantly.

The processes to determine ecological water requirements are equally fraught with difficulty, as are the judgement calls that of necessity have to be made as to the likely economic and social impacts that will follow reduced allocations in a particular geographic area. These estimations will form the basis of decisions as to what would be reasonable to reallocate to the environment and to water users, from the power generation sector to the small farmer and all the water users in between. When one adds to this the uncertainty of the effects of global climate change on the future availability of our water resources one has to conclude than an incremental process, allowing for corrections and adjustments, would be much more desirable than the once-off process of compulsory licensing.

MARKET MECHANISMS AND WATER LICENSING

The mechanism of trade and the market can be used to cut out much of the administrative burden of compulsory licensing, provided certain conditions are right and certain elements are in place. These conditions and elements are:

- The water authorisations, including the lawful water use entitlements, must be tradable within a prescribed area, such as a specific catchment considered for compulsory licensing.
- A mechanism to allow trade must be established. This could be a market that may be subject to certain set rules set by the responsible authority and/or series of tenders and auctions of the tradable water authorisations in the area under consideration.
- A fund must be established under the auspices of the responsible authority to enter into the market and obtain water authorisations for reallocation. The fund must be specific to the area in question.
- The responsible authority must be enabled to charge a levy on all water use in the area considered for compulsory licensing and to keep the monies thus accumulated in the fund mentioned above.

With these elements in place the responsible authority charged with the task of reallocating water according to the same principles as those for compulsory licensing has the ability to obtain stocks of water authorisations within the geographic area in question. This it can do in a progressive manner at a rate that will suit its ability to reallocate the water. It will be able to do this with circumspection so as not to abruptly shock the social and economic fabric of the area, and will enable it to monitor the results and make adjustments as may be needed.

The process of reallocating the water thus obtained would be the same process as envisaged with the compulsory licensing mechanism, except that it would be done in gradual fashion, over a longer period.

Considerable work has been done on the issue of water trading, in South Africa as well as a number of other countries. Generally it is proposed that such a market has to be a managed one: it has to limit negative social consequences and take into regard the physical properties of the water system. The issue for South Africa is not IF a water market should be introduced, but WHAT exactly it should look like. Trading is in fact already taking place, and there is a need for a proper regulatory environment – the sooner the better.

From an economic perspective the use of a market mechanism has the benefit of reducing administrative costs and, more importantly, result in more efficient allocation of scarce resources (in this case, water). This can be understood by considering that the more inefficient users of water would be first inclined to sell their authorisations in the market.

No State funds will be needed to effect the reallocation procedure discussed here. The funding would be sourced from within the geographic area targeted for compulsory licensing – instead of forfeiting water; the users contribute their monies to the fund to buy the water.

CONCLUSION

Using a market mechanism to effect the equitable allocation of water holds great advantages over a purely administrative system. Lengthy (and expensive) preparatory work can be cut short, the most inefficient water use will be targeted automatically, and it can be implemented in a progressive manner. There is also room afterwards to monitor, evaluate and to adjust, which is not the case with the present once-off approach. Most importantly, lengthy court challenges can be limited, if not completely avoided, by adopting this process.

Survey Shows Good Progress in RDP Principles

Kathy Eales

The mobile nature of the South African population and constant influx into urban areas has resulted in a continuous 'moving target' for municipal service delivery.

While basic service delivery has increased in all of South Africa's provinces, some municipalities still have much work to do to improve the living conditions of their constituents. This is the message from Statistics South Africa (Stats SA) based on the municipal data from its Community Survey, released in March. Lani van Vuuren reports.

About 250 000 households participated in the survey, which was undertaken in February 2007. According to Statistician-General Pali Lehohla, the R600-million sample survey was the first of its kind undertaken in South Africa. Never before had data been delivered at such a low geographic (i.e. municipal) level. "There was a great need for relevant information to enable municipalities to undertake more accurate infrastructure development planning and monitoring," Lehohla told the media at the launch of the Community Survey municipal results at Gallagher Estate, in Midrand.

"This has been quite a learning experience for Stats SA, but I believe we have delivered a product that will enable municipalities to get a more accurate view of the present status of service delivery and provide a good basis on which to move forward to improve the lives of all South Africans. No longer can municipalities say they have no data available."

MOBILE POPULATION

The survey covered the basic service areas of housing, electricity, refuse removal, access to piped water and sanitation. The survey did not measure quality or sustainability of services, and only quantitative data has been supplied.

A critical factor influencing the rate and quality of service delivery in municipalities was the highly mobile nature of South African society, reported Stats SA Deputy DG Kefiloe Masiteng. The survey indicated changes in population numbers in most of the municipalities, with some losing and some gaining population numbers.

In line with international urbanisation trends, people are generally moving towards South Africa's metropolitan areas, with Gauteng and the Western Cape showing the highest annual growth. Gauteng, while the smallest province in terms of land area, has the largest population (about ten million). Interestingly, only 5,8 million of its residents were actually born in the province, with the remainder migrating from other provinces.

People migrate from one municipal area to another for a variety of reasons, such as the prospect of a better education, jobs and a better living environment. "The survey has shown that bigger is definitely better," explained Lehohla. "All of the municipalities which indicated a decline had populations of less than 124 000."

Another determinant is service delivery. "When people see better service delivery in another municipality they tend to want to move there," noted Masiteng. "Unfortunately, this means that underperforming municipalities are placing more pressure on those municipalities that are delivering the necessary services, notwithstanding existing capacity constraints."

This can be seen in provinces such as Gauteng which, despite the efforts of its municipalities still has one of the highest proportions of households living in informal areas (22,7%). The municipalities with the highest percentages of informal dwellings are Nokeng tsa Taemane (24,8%), Kungwini (19,5%), Mogale City (27%), Westonarea (41%), Ekurhuleni (26%) and the City of Tshwane (26,8%).

ACCESS TO PIPED WATER

As much as access to piped water has increased since the last census in 2001, this basic service remains relatively low compared to other services measured in the Community Survey, according to Stats SA. Nationally, the proportion of households obtaining water from piped water inside the dwelling rose from 32,3% in 2001 to 47% in 2007. There has also been a corresponding decrease in the proportion of households obtaining water from piped water inside the yard (from 29% to 22,2%) and obtaining piped water from an access point outside the yard (from 23,2% to 19,1%).

Looking at the provinces, the Western Cape had the highest proportion (98,95) of households with access to piped water (inside the dwelling, inside the yard or less than 200 m from the dwelling), followed by Gauteng and the Free State with 97,9% and 8,2% respectively.

However, the survey showed very disproportionate service delivery across most of the provinces. For example, in KwaZulu-Natal, the proportion of households with access to piped water within 200 m in the various municipalities ranged from 3% in Msinga to 88% in uMhlatuze.

THE SANITATION LADDER

Nationally, the percentage of households with a flush toilet connected to a sewerage system increased from 49,1% in 2001 to 55,1% in 2007. At the same time, the use of ventilated improved pit latrines declined from 22,8% to 20,6% as did the proportion of households without any toilet facility (from 13,6% to 8,2%). The percentage of households still using the bucket system also declined in all the provinces.

There is still concern over the large percentage of households that have no toilet facilities in provinces such as the Eastern Cape (23,5% in 2007). Most of these households are in municipalities located in the north-eastern part of the province. For example, in Mbhashe 74,2% of households have no toilet facilities, while in Intsike Yethu the figure is 56,5%.

Stats SA was to launch a roadshow between April and July to all the municipalities in the country to share the information and assist them in using the data to its full potential. To access the Community Survey results go to www.statssa.gov.za.

Kathy Eales

Much more needs to be done in South Africa to ensure communities have access to improved sanitation facilities.

Can SA Lay Claim to a 'Sanitary Revolution'?

The South African government has committed itself to wiping out the country's water and sanitation backlogs. Much progress has been made since 1994, but can South Africa lay claim to a 'sanitary revolution'?, asks Prof Geoffrey Setswe of the Human Sciences Research Council and Dr Lindiwe Zungu of the School of Public Health at the University of Limpopo.

Access to safe sanitation remains one of the most fundamental challenges in the world. A staggering 2,6 billion people are still without safe toilets, leading to millions of deaths of mostly children from diarrhoeal diseases every year. To highlight their plight and place the issue in the spotlight, the United Nations (UN) has declared 2008 the International Year of Sanitation.

To underscore its importance sanitation has been hailed as the most important medical advance in the past 150 years, according to a poll conducted by the prestigious *British Medical Journal*. Dr Lee Jong-woo, Director-General of the World Health Organisation, names water and sanitation the primary drivers of public health. "Once we can secure access to clean water and to adequate sanitation facilities for all people, irrespective of their living conditions, a huge battle against all kinds of diseases will be won."

WATER, SANITATION AND HEALTH

Water provision cannot be separated from two other inter-related factors – sanitation and health. This is because one of the primary causes of water contamination is the inadequate or improper disposal of human (and animal) excreta. This often leads to a cycle of infection (resulting primarily in diarrhoeal diseases) and contamination which remains one of the leading causes of illness and death in the developing world.

In South Africa, poor communities in rural areas are most especially affected by a lack of clean water and safe sanitation. This leads to thousands of cases of water-related diseases being reported in the country each year. Diarrhoea remains one of the leading causes of death among children under five. People living with HIV/AIDS are particularly vulnerable to diseases related to poor sanitation. Seemingly less serious sanitation-related ailments like scabies and intestinal worms are also severely debilitating – the latter can stunt mental and physical growth in children and even result in death.

Apart from improved health, the benefits of access to safe water and sanitation are numerous. For example, women and girls can use their time in more productive ways, such as going to school, rather than carrying water. Water can be used for productive purposes, such as expanding small enterprises and growing household food gardens, thus increasing disposable household income. Sanitation facilities closer to home also improves the safety of especially women and girls.

PROGRESS IN ACHIEVING A SANITARY REVOLUTION

According to the United National Development Programme (UNDP), South Africa is one of the few countries in the world that spends less on its military budget than on water and sanitation. In his latest State of the Nation address, South African President Thabo Mbeki reiterated government's commitment towards eliminating remaining backlogs of basic services. "We will…speed up the development of sustainable human settlements, with intensified efforts, as a matter of urgent priority, to accelerate universal access to water, sanitation and electricity, so that by 2014, we should have decent human settlements and access by all households to these services."

As custodian of South Africa's water resources, the Department of Water Affairs & Forestry (DWAF) leads, supports and regulates the water and sanitation services sector. However, the main responsibility for implementing and managing water and sanitation services lies with local and provincial municipalities.

Good progress has been made in the provision of water services, and by 2005, the country had already achieved the UN Millennium Development Goal of halving the number of those without access to water. Between June 1994 and June 2006, approximately 12 million people were served with clean water. There has been a significant increase in the proportion of peri-urban and rural households with access to an improved water source. Still, the difference between urban and non-urban households remains significant – 98,2% of urban households have access to an improved water source, while only 59,6% of the non-urban households have the same access.

Since 1994 the European Union (EU), through its European Programme for Reconstruction and Development, has donated more than R1,6-billion to water and sanitation projects in South Africa. A further R1-billion has been committed between 2007 and 2013. Most of these funds are funnelled through DWAF's Masibambane programme. The first phase of this water and sanitation programme was implemented between 1994 and 2004, with the second phase nearing completion.

"We cannot lay claim to a sanitary revolution in South Africa…there is no sudden, momentous or sweeping change with regard to the provision of especially adequate sanitation."

At a recent media briefing, Minister of Water Affairs & Forestry Lindiwe Hendricks told journalists that, this year, the delivery programme would focus mainly on accelerating access to water. "About 90% of the total population will have access to basic water supply services by the end of this year." The Minister also reported that at least 73% of indigent households and 77% of all households in the country were currently benefiting from government's Free Basic Water Policy, which provides households 6 000 ℓ of free water every month.

But what of water's historically neglected cousin, sanitation? In comparison to water services, only 9 million people received access to safe sanitation between June 1994 and June 2006. According to DWAF, 15,3 million people still need to be reached. Access to the rural poor is especially challenging.

In 2007, Limpopo had the highest backlog, with more than 810 000 households lacking adequate sanitation. KwaZulu-Natal had the second-highest number at 714 000, and the Eastern Cape the third-highest (450 000). "To meet our 2010 target for sanitation, delivery in KwaZulu-Natal alone has to increase from the current delivery rate of around 50 000 structures per year to at least 180 000 structures per year," Hendricks said at the launch of National Sanitation Week last year.

DWAF has placed specific emphasis on the replacement of the bucket system. Within one year the country has been able to eliminate the bucket system with an improved form of sanitation by almost half. By the target date of December 2007, municipalities managed to replace 81% of bucket toilets. At the time of writing, the remaining 19% (49 010) were under construction. If only the same effort could be put into accelerating access to safe sanitation as a whole.

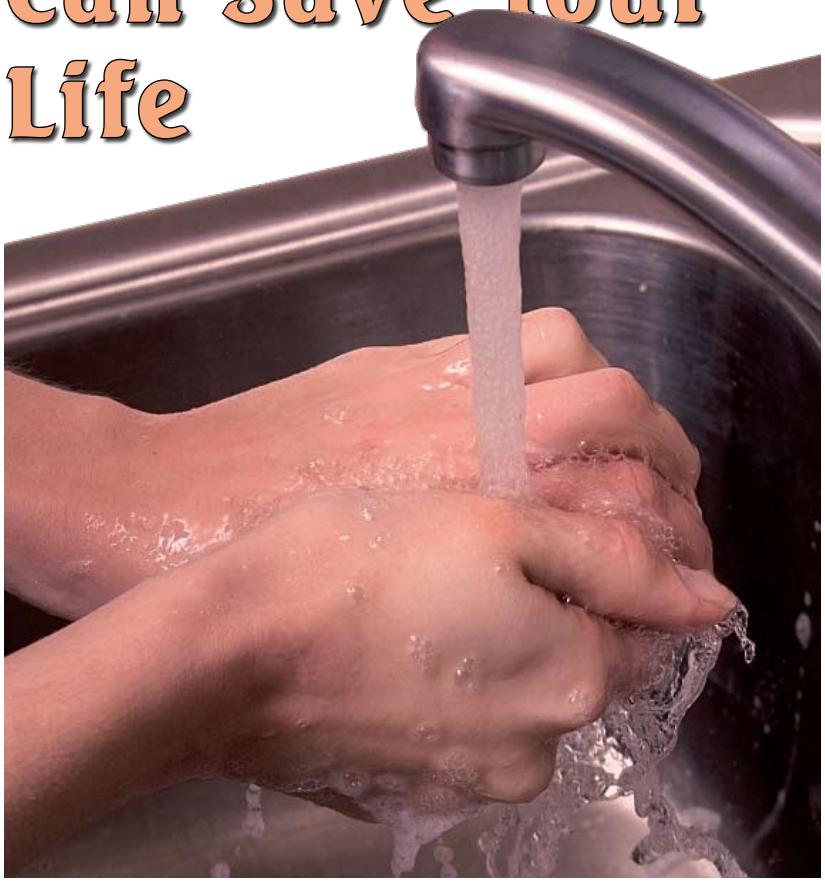
CONCLUSION

We cannot lay claim to a sanitary revolution in South Africa. Despite the President's State of the Nation targets on water and sanitation, white and green papers, policies and strategic frameworks and funding provided, there is no sudden, momentous or sweeping change with regard to the provision of especially adequate sanitation, and it seems that it is business as usual for many municipalities.

Sanitation has always been treated as a 'cinderella' subject. This statement rings true for millions of South Africans whose daily lives and dignity are still being impeded by the lack of this essential service. Many communities have run out of patience and demonstrations have been held across the country to demand better services. If the local authorities in whose areas of jurisdiction these marches had taken place had prioritised the provision of water and sanitation with urgency, their and other efforts might indeed have provided South Africans with the sanitary revolution needed and the rioting for the provision of basic services would have been averted.

WATER Kidz

Washing Hands Can Save Your Life



Millions of germs – bacteria and viruses – lurk everywhere.

These germs can be found in the bathroom, in the kitchen, in the garden, on our pets, even at work and at school. Germs can cause many different illnesses, such as colds and flu, eye and mouth infections and diarrhoea or even cholera and typhoid. Germs are transmitted in several different ways, especially by touching dirty hands or changing dirty nappies.

Other ways include through contaminated water and food, through droplets when someone coughs or sneezes, through contaminated surfaces and through a sick person's bodily fluids. If people pick up germs from one of these sources, they can unknowingly become infected simply by touching their eyes, nose or mouth.

The simple act of washing hands with soap and water is one of the best ways to keep ourselves and our families healthy. Research has shown that hand washing can significantly reduce the two leading causes of child deaths in the world – diarrhoeal disease and acute respitary infection (such as pneumonia). This makes hand washing more effective than any single vaccine or hygiene behaviour.

Unfortunately, many people in the country do not wash their hand regularly. An international hygiene survey conducted among a number of countries, including South Africa, found that nearly 70% of the country's people are at risk of transmitting dangerous infections because they do not wash their hands regularly. Almost half of the 1 000 people surveyed in the country believed that disinfecting surfaces, avoiding close contact with others and not letting animals in the house were more effective in preventing disease than hand washing. This is not true – hand washing remains the best way of preventing the spread of disease.

HOW DO YOU WASH YOUR HANDS PROPERLY?

Step 1:
Wash you hands in warm water.
Step 2:
Use soap (it does not need to be anti-bacterial soap) and lather up for 10 to 15 seconds (about as long as it takes for you to sing Happy Birthday). Make sure you get in-between the fingers and under the nails where uninvited germs like to hang out. Do not forget to wash your wrists!
Step 3:
Rinse and dry well with a clean towel.

You need to wash your hands: before eating and cooking; after using the toilet; after cleaning around the house; after touching your pets; before and after visiting or taking care of sick relatives or friends; after blowing your nose, coughing or sneezing; and after changing the baby's nappy.

DID YOU KNOW?

According to the Water Supply & Sanitation Collaborative Council, one gram of faeces can contain 10 million viruses, a million bacteria, a thousand parasite cysts and a hundred worm eggs.

HOW GERMS ARE SPREAD

Nose, mouth, or eyes to hands to others: Germs can spread to the hands by sneezing, coughing or rubbing the eyes and then can be transferred to other people. Simply washing your hands can help prevent such illnesses as the common cold or eye infections.

Hands to food: Usually germs are transmitted from unclean hands to food by an infected food preparer who didn't wash his or her hands after using the toilet. The germs are then passed to those who eat the food. That is why it is important to always wash your hands after using the toilet and before preparing food.

Food to hands to food: Germs are transmitted from raw foods, such as chicken, to hands while preparing a meal. The germs on the hands are then transferred to other uncooked foods, such as salad. Cooking the raw food kills the initial germs, but the salad remains contaminated.

Animals to people: Animals, such as dogs and cats, also carry germs. It is important to wash your hands after petting animals or touching any surfaces they come into contact with, such as their bedding.

Infected child to hands to other people: Germs are passed from a child with diarrhoea to the hands of the parent during nappy changing. If the parent doesn't immediately wash his or her hands, the germs that cause the diarrhoea are then passed on to others.

DIARRHOEA: WORLD KILLER

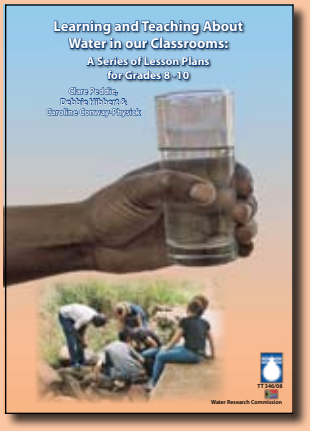
Diarrhoea remains a significant world health problem, with more than three million episodes occurring each year. Many people die from diarrhoea, and children under the age of five are particularly vulnerable.

Persistent diarrhoea can also contribute to malnutrition, reduced resistance to infections, and sometimes impaired growth and development. The organisms causing diarrhoea can be transmitted from infected faeces to people through food and water, person-to-person contact, or direct contact.

Hand washing after going to the toilet, and before preparing and eating food can reduce the risk of diarrhoea.

Carina Teichert

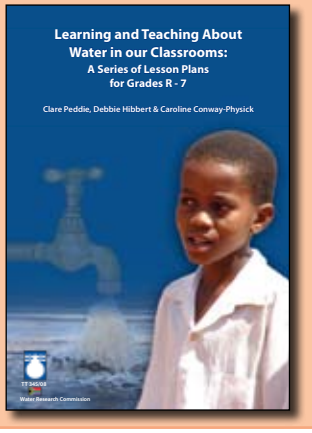
It is important that we wash our hands before preparing food.



WATER LEARNING PLANS FOR EDUCATORS

The Water Research Commission has published a series of lesson plans on water for grades R to 10. The lesson plans, developed with Share-Net, are linked to the South African Curriculum. Each lesson pack contains five lessons, with each lesson focusing on a different learning area – these can be used as they are, or adapted to suited the local context. Each lesson is concluded with a rubric of criteria to assess the learners. Learning Outcomes and Assessments Standards covered during each lesson are given in the summary at the beginning of the pack.

The lesson plans are available free of charge. Contact Publications at Tel: (012) 330-0340 or Fax: (012) 331-2565 or E-mail: orders@wrc.org.za. The lesson plans can also be downloaded from www.wrc.org.za/publications_education.htm



DWAF/WRC Alliance Strengthened

The alliance between the Department of Water Affairs & Forestry (DWAF) and the Water Research Commission (WRC) has been strengthened after the WRC hosted a successful Open Day custom-designed for DWAF personnel at its Rietfontein, Pretoria, offices in March. More than 60 DWAF personnel took up the organisation's invitation to learn more about the inner workings of South Africa's premier water knowledge hub. As Dr Heidi Snyman, WRC's Director for Water-Centred Knowledge explains, the main aim of the Open Day was to reinforce the partnership between the department and the WRC, and to share information on the organisation's activities which align strongly with DWAF's strategic objectives. "At the same time, the department had the opportunity to share its needs and challenges with the WRC."

Lani van Vuuren

Yuven Gounden

Above left: *Morake Malope, DWAF Geohydrology Technician thought the presentations were highly informative and he was especially interested in the work undertaken by the WRC Key Strategic Area for Water Resources Management.*

Above right: *DWAF personnel mostly technical staff and middle- and senior-management from all over the country attended the WRC Open Day.*

Lani van Vuuren

Thandi Thongwana, DWAF Chief Development Expert: WS Institutional Development thought the Open Day was informative and very stimulating. "I thought the WRC only focused on water resources. I was surprised to find that its scope is broader and much more encompassing," she said.

Yuven Gounden

Dr Heidi Snyman, WRC's Director for Water-Centred Knowledge, welcomed DWAF staff to the Open Day.

THE WATER WHEEL

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KSA 3
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