Letter to the Editor

History article brings back memories

What a pleasant surprise I had when opening the latest *Water Wheel* to find an article on the Riviersonderend/Berg River Water Scheme ('Blood, sweat and tears at Riviersonderend', *the Water Wheel* May/June 2011).

I had the absolute privilege of being the first operator to operate this truly remarkable scheme from 1981, through commissioning until 1988. Reading all about it and seeing some pictures after twenty two years really brought back fond memories. On page 24 the top picture Mr Peter Hume, the Resident Engineer, can be seen on the right. The guys that planned, designed and built this scheme truly deserve to have their names displayed on a plaque somewhere.

Your last sentence mentions the Assagaaibos Dam being built a few years later. As far as I am aware this dam was never built. The Skuifraam or Berg River Dam was, however, built a few kilometres below the site of the Assegaaibos.

Thanks again for a great article and a great magazine.

Maurice Durrheim, Amatola Water

Ensuring the future of SA's frogs

The new Red List and strategy document for planning the future of research in South Africa's diverse amphibian fauna is now available from the South African National Biodiversity Institute (SANBI).

Across the globe, amphibian numbers have been in fast decline since first reported in 1990. Habitat change due to anthropogenic reasons is a leading factor, but even in pristine habitats reductions in populations are occurring due to ultraviolet light, climate change and infectious diseases.

The SANBI publication, *Ensuring a Future for South Africa's Frogs: a Strategy for Conservation Research*, includes an updated Red List of the country's amphibians. It also acts as a policy document to guide researchers, policy makers and conservationists to prioritise research on threatened frogs for the next five years.

South Africa boasts at least 118 species of frogs, 43% of which are endemic. This includes the smallest (and critically endangered) micro frog in the lowland fynbos blackwater to the largest African Bullfrog in the temporary pans of the Free State, Gauteng, Mpumalanga and Limpopo. The new publication aims to ensure that the scarce resources available for the conservation of South Africa's frogs are most effectively utilised in understanding and reducing the threats to our extraordinary amphibian biodiversity.

For more information, Visit: www.sanbi.org.za

Source: SANBI

Tshwane now largest city in SA

The City of Tshwane has become the largest metropolitan municipality in South Africa.

This is after the Metsweding District Municipality, which includes the towns of Bronkhorstspruit and Cullinan, was incorporated into the metro. Tshwane now comprises an area of 6 368 km^2 and a population of just over 2,5 million.

In terms of land mass this makes Tshwane the third-largest city in the world, after New York and Yokohama. The reconfigured Tshwane now has seven regions and 105 wards.

Construction kicks off at KZN's Spring Grove Dam

Construction of Spring Grove Dam on the Mooi River in KwaZulu-Natal, part of phase two of the Mooi-uMgeni Transfer Scheme has officially started following a sod turning ceremony held in May.

The project, being undertaken by TCTA, will provide water to the uMgeni system which supplies water to people living in eThekwini, uMgungundlovu and uMsunduzi municipal districts. Other indirect beneficiaries include the Sisonke, Ugu and Ilembe district municipalities.

Spring Grove Dam will be located about 2 km south west of Rosetta. The dam will be about 1 035 ha in area when full, and will have a capacity of 141 million m^3. The dam wall will be about 38 m high with the dam site and dam basin area below the 1437 m above sea level contour.

The project, which is expected to deliver water by 2013, is being funded off-budget, and capital costs will be recovered from the revenue generated by the sale of water. Funding agreements have been signed with European development banks the European Investment Bank, Agence Française de Dévelopement and the German Development Bank along with the Development Bank of Southern Africa.

Sentencing of environmental consultant welcomed

The Department of Environmental Affairs (DEA) has welcomed the sentencing of environmental consultant, Stefan Frylinck as well as his firm, Mpofu Consulting, for contravening the Environmental Impact Assessment (EIA) regulations by providing incorrect and misleading information which led to the development of a construction site on a wetland.

The environmental consultant and his firm were sentenced in the Pretoria Regional Court in April to a cumulative fine of R160 000.

Authorisation for the Pan African Parliament in Midrand was issued in 2007. As part of the EIA process, Frylinck provided information to the DEA which specifically indicated that there was no wetland on the site. Once construction had commenced, the department was informed by provincial and local government that they were concerned that the PAP was being built on a wetland. The department then instituted enforcement action, which resulted, firstly, in a panel of specialists being employed by the Department of Public Works to confirm the existence of a wetland on the site and, secondly, in the cessation of construction activities.

Following criminal investigations, the consultant and related firm were charged and later sentenced in court. DEA spokesperson, Albi Modise, said: "The department views this ruling as a victory...it sends out a strong message to environmental consultants that the department will not hesitate to enforce the law where it is clear that such consultants have acted in contravention of their legal obligations."

Minister calls for increased support for smallholder farmers

Minister of Agriculture, Forestry & Fisheries Tina Joemat-Pettersson has called for increased support for smallholder farmers.

Speaking at a conference on rural poverty hosted by the UN's International Fund for Agricultural Development (IFAD), she said that while Africa continues to face enormous challenges in reducing poverty, 'a vision of economic renaissance' led by smallholder farmers is beginning to take hold.

"There is a growing belief that Africa can produce enough food not only to feed its own citizens, but export a growing surplus to the rest of the world," she said, adding that South Africa is spearheading a rail system which links the entire continent and allows farmers to take goods from road to rail across Africa.

There are about 500 million smallholder farms worldwide and about two billion people depend on them for their livelihoods, according to IFAD. These farms produce 80% of food consumed in Asia and sub-Saharan Africa.

Joemat-Pettersson pointed out that 47% of Africa's arable land remains uncultivated. She cited a Harvard study, which revealed that the continent could increase its food production by 1,5% a year with more support.

She said agriculture could play a significant role in economic development and job creation – adding that the agricultural value-chain had been identified in the New Growth Path as one of the key sectors to grow the country's jobs.

Agriculture would also be placed on the agenda for the COP-17 conference, which takes place in Durban in November, noted Joemat-Pettersson.

Source: BuaNews

Lower water tariff rise following successful negotiations

Successful negotiations between Agri SA and the Department of Water Affairs (DWA) have led to the announcement of the maximum increase of only 10% in water resource management and water infrastructure tariffs this year.

This is after initial proposals regarding water resource management tariffs (management and maintenance of water resources) had made provision for increases up to 179%. In the case of water infrastructure at State water schemes and irrigation boards, the initial proposal provided for increases of up to 50%.

Agri SA President Johannes Möller expressed his satisfaction with the more realistic adjustments. "This breakthrough follows our negotiations with DWA since September last year."

The organisation had, in its economic presentation regarding the situation in agriculture, informed the department that the irrigation was particularly vulnerable in terms of sustained food production given rising input costs, such as water and electricity. Möller said that against this backdrop, Agri SA had asked that water tariffs be confined to a minimum.

Although actual cost savings will differ from scheme to scheme in light of the ceiling on tariff increases (10%) and the initially proposed dispensation, an overall annual saving of at least R100-million is envisaged for the irrigation sector based on the announced tariff dispensation.

Source: Agri SA

Water diary

DESALINATION
SEPTEMBER 4-9

The International Desalination Association World Congress 2011 on Desalination and Water Reuse will take place in Perth, Western Australia. *Visit: www.idadesal.org/t-worldcongress_start.aspx*

GROUNDWATER
SEPTEMBER 8-10

The IWA Specialist Conference on Groundwater will take place in Belgrade, Serbia. Proposed themes include the preparation and implementation of groundwater component of water management plans for large river basins; the importance of the aerobic state of groundwater; climate change and its impact on groundwater; and management of urban groundwater basins. *Enquiries: Miodrag Milovanovic; Tel: +381 11 390-8135; EmailL miodrag.milovanovic@jcerni.co.rs; Visit: www.jcerni.org/activities/conferences/iwa_specialist_groundwater_conference_2011*

MEMBRANES
SEPTEMBER 11-14

The Second International Conference of the WISA Membrane Technology Division will take place at the 1on1 Gateway conference centre at Umhlanga, KwaZulu-Natal. *Visit: www.wisamtc2011.co.za*

WATER
SEPTEMBER 13-15

The Biennial AfriWater Water and Waste Exhibition and Conference will take place at the MTN Expo Centre at Nasrec, Gauteng. The co-locating conferences are organised by WISA and the International Pump User Conference. *Enquiries: Zia Tomes (Exhibition Manager); Tel: (021) 790-1337; Email: ziat@specialised.com*

AQUACULTURE
SEPTEMBER 13-16

The 10th Biennial Aquaculture Conference of the Aquaculture Association of Southern Africa will take place in Malawi. The conference is hosted by the University of Malawi in collaboration with the NEPAD Regional Fish Node and the Fisheries Department of the Government of Malawi. *Enquiries: Email: info@aasa-aqua.co.za or Visit: www.aasa-aqua.co.za*

R25-m earmarked to save schemes

Government has set aside R25-million to revitalise three irrigation schemes in Mpumalanga's Bushbuckridge area.

The financial injection is expected to boost citrus and banana production in Hoxane, Champagne and Saringwa villages, said spokesperson for the provincial Department of Agriculture, Rural Development and Land Administration, Janine Julies. "Commitment from the community will ensure that the 3 000 ha is put back into production."

More funding was expected from private investors to help with the three projects. According to Julies, the first phase of the Champagne irrigation scheme was already completed, allowing for an additional 200 ha of citrus cultivation.

Presenting the department's R969,1 million budget for 2011/12 in the provincial legislature last week, MEC Candith Mashego-Dlamini announced a further R10-million to kick-start the revitalisation of the Ngogolo, Mbhunu B, Nhlangu East and West sugarcane projects in Komatipoort. She said the money would help struggling subsistence and emerging farmers in the sugar industry.

The department was also in the process of developing a feasibility study for a fresh produce market in Mpumalanga. "This will help integrate local farmers throughout the value chain and take advantage of the developed infrastructure around the Maputo Corridor, the proximity to Mozambique, Swaziland and other South African Development Community countries," said Mashego-Dlamini.

She added that a fresh produce market would help the province tap into local and international experiences, in particular, the leading fresh produce markets in France and Spain.

Source: BuaNews

Work on acid mine-water underway

Environmental officials are working around the clock to curb the potential dangers posed by the impact of acid mine drainage (AMD) in the Witwatersrand mining area.

An expert team appointed by Cabinet to advise the inter-ministerial committee on the dangers of AMD to Gauteng warned earlier this year of the need to avert "impending crises." The team, drawn from the Council for Geosciences, Water Research Commission and CSIR, among others, identified various risk categories, including the contamination of surface and groundwater required for agricultural and human consumption.

But according to a statement issued this week by the Department of Water Affairs (DWA), "important progress" had been made by the State in implementing the immediate and short-term actions recommended in the AMD Report. It said Minister Edna Molewa had further tasked State-owned TCTA to oversee installation of pumps to extract water from the mines to on-site treatment plants and construction of an on-site mine water treatment plant in each basin.

There will also be an installation of infrastructure to convey treated water to nearby watercourses and the facilitation of the best model, which shall be proposed to the DWA, for the operations of the pumping stations and treatment works.

Treasury had made a budget allocation of R225-million in the next three years towards the design and building of an acid mine-water treatment facility, R5-million of which will be spent on a five-year plan to deal with acid mine drainage.

The statement said recent "collaborative efforts" between the department and TCTA have resulted in an investigation of existing mine water treatment infrastructure in the western and central basin mining areas, and of potential institutional arrangements with the mining companies that are active in these basins.

"The TCTA, by way of tender protocol, appointed a professional service provider to provide an intensive appraisal of the available infrastructure and to formulate appropriate engineering options to adequately resolve the AMD problem," said the department.

The highest priority is being given to the development of solutions to reduce, if not eradicate, the surface decant of AMD in the West Rand area. Also of high priority was the development of measures focused on ensuring that underground mine-water levels in the central basin of the mines do not reach the environmental critical level, which poses a threat.

The department said pumps for the central basin have been procured and are set to be delivered by the end of July. Other engineering requirements in terms of construction and electrical infrastructure will follow. In the eastern basin, the department was awaiting final announcements by the liquidators that are administering the Aurora Mining Company. "The situation is being closely monitored and, if no real solution is provided, Government intervention will be unavoidable."

Source: BuaNews

Anti Scale
Corrosion Inhibitor
ZXCHEM
Biocide
Cleaning & Pre-film Agent
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New MD for consulting engineering firm

SRK Consulting's headcount has tripled since new managing director Peter Labrum joined the business in 1989, but the professionalism that attracted him then remains at the core of his leadership mandate.

It would be hard to find an SRK partner more steeped in the culture of the firm's now global brand than Labrum, whose first stint with the firm went back to 1979 – when he spent 18 months on site as resident engineer for the construction of a rockfall shelter on Kowyn's Pass in Mpumulanga. Having left to become involved in the Garden Route arch bridges in the Eastern Cape, it was little less than a decade later, one of SRK's founders, Hendrik Kirsten, was able to attract him to re-join the head office in Johannesburg, and within a couple of years he became one the firm's partners.

At home in South Africa, as elsewhere, Labrum emphasises the need for SRK to attract and nurture young engineers, exciting them with the challenge of technical excellence in all aspects of a project. "Developing people has always been at the foundation of our company and our industry," he said, "and it will remain a priority for us going forward."

Multimillion wastewater treatment contract awarded

Veolia Water Solutions & Technologies South Africa (VWS South Africa) has been awarded a R187-million contract by the City of Cape Town's Department of Water & Sanitation to upgrade its Bellville wastewater treatment works. The upgrade is expected to relieve the strain on the existing works and improve the effluent quality.

With this upgrade, the Bellville plant will feature the largest membrane bio-reactor (MBR) in the country to date. The design and build contract, including all mechanical and electrical works, will see VWS South Africa supply a new inlet works for the MBR plant, biological reactors and six membranes. A new sludge dewatering facility will also be supplied, and the existing electrical and control systems infrastructure at the wastewater treatment plant will be upgraded.

Currently in the basic engineering design phase, the plant is due for commissioning in 2013. VWS South Africa will provide training and maintenance support for the first year of operation.

New West Cape groundwater chair announced

Dr Kornelius Riemann, principal hydrogeologist at Cape Town earth sciences consultancy Umvoto Africa, is the new chairperson of the Western Cape Groundwater Division of the Geological Society of South Africa (GSSA).

The GSSA was established in 1895 and is one of the oldest scientific societies in South Africa. It represents geologists and earth scientists with an interest in Africa, and southern Africa in particular, and has over 2 500 members and student members.

The GSSA Groundwater Division was established in 1978 by members of the groundwater community and the

Directorate of Geohydrology, Department of Water Affairs. It is a body of scientists and technicians with involvement or interest in the optimal development of the country's groundwater as a limited natural resource, and in the preservation of its quality. The Western Cape branch currently has 62 members.

Dr Riemann, who focuses on integrated water resource development and management at Umvoto, says his role will include communication about groundwater and related issues both within and beyond the groundwater community, and supporting the professional development of groundwater practitioners. He is currently involved in organising the Groundwater Division's bi-annual groundwater conference, to be held in Pretoria later this year in association with the International Association of Hydrogeologists (IAH).

Gaborone sewerage reticulation project passes halfway mark

Halfway through ACE GIBB's massive project to upgrade Gaborone's sewerage network, an update from the front line is that the project is cleared for success.

The refurbishments to the system are set to make a meaningful difference in the lives of Botswana citizens. According to project manager Vernon Joubert, the project involves the decommissioning of certain pump stations, refurbishment and construction of other pump stations as well as building trunk and main sewers in Gaborone to provide capacity up to the planning horizon of 2030. "Furthermore, we are tasked with provision of sewerage systems for some 6 000 remaining self help housing area plots, which currently run on septic tanks."

ACE GIBB, in joint venture with Pula Consultants, received the contract to plan, design and supervise the upgrade of Gaborone's sewerage system in 2008. China Jiangsu International Botswana is handling construction.

Initially, the completed project was to be handed over to the Gaborone City Council; however, the responsibility for sewerage systems has recently been taken over by the parastatal Water Utilities Corporation. During the construction stages of the project, locals are benefiting from employment opportunities in different areas of operation.

Water on the web

http://wwf.panda.org/who_we_are/history/50_years_of_achievements/
It has been 50 years since the establishment of the WWF, one of the world's most well known conservation organisations. To celebrate, the organisation, with its distinct panda logo, has developed a special website highlighting achievements throughout WWF's 5 decades of existence.

http://www.wrc.org.za/Pages/Learning.aspx
The Learning page on the Water Research Commission website offers learners, teachers and students a variety of material. Delve into the world of water knowledge by browsing the Water Wheel's 'water kidz' articles or download lessons pertaining to water for Grade 0 to 12. Aspiring and current students will also find the WRC's career guide here, which provides valuable information on job opportunities in the sector.

Predicting and preventing environmental collapse – it's possible, says study

By closely monitoring environmental conditions at a remote lake in Wisconsin, USA, researchers have found that the model used to assess catastrophic changes in economic and medical systems can also predict environmental collapse.

Stock market crashes, epileptic seizures, and ecological breakdowns are all preceded by a measurable increase in variance – be it fluctuations in brain waves, the Dow Jones index, or in the case of the Wisconsin lake, chlorophyll.

In a paper published in the journal, *Science*, a team of ecologists from the Cary Institute of Ecosystem Studies are apparently the first to show that by paying attention to variability in key ecosystem processes, scientists can detect the early warning signs that precede environmental collapse. Insight into regime shifts – the reorganisation of an ecosystem from one state to another – is critical in identifying ecosystems that will fail without intervention.

"Early warning signs help you prepare for, and hopefully prevent, the worst case scenario," notes contributing author Jonathan Cole. "We are surrounded by problems caused by ecological regime shifts – water supply shortages, fishery declines, unproductive rangeland – our study shows that there is promise in identifying these changes before they reach their tipping point."

The team, led by Stephen Carpenter, a limnologist at the University of Wisconsin-Madison, triggered a regime shift in a Wisconsin lake by introducing a top predator. The study lake was originally dominated by small fish living off invertebrates. Researchers destabilised the lake by adding largemouth bass. The goal was to observe the cascade of environmental changes that eventually led to a food web dominated by piscivorous fish.

Throughout the lake's three-year manipulation, its chemical, biological and physical vital signs were continuously monitored to track changes. It was in these data sets that researchers were able to detect the signals of the ecosystem's impending collapse.

As the number of bass increased, smaller fish spent more time swimming in groups near the shoreline to avoid being eaten. Freed from predation, invertebrates living in the open water shifted to forms that were larger in size. Phytoplankton, the preferred food of these invertebrates, became more variable.

More significantly, more than a year before the food web transition was complete, variance in chlorophyll measurements was found to be a reliable early warning indicator of the impending food web regime shift.

"The field experiment is a validated statistical early warning system for ecosystem collapse. With more work, this could revolutionise ecosystem management," Carpenter comments. The catch, however, is that for the early warning system to work, continuous monitoring of an ecosystem's chemistry, physical properties, and biota are required.

Such an approach may not be practical for every threatened ecosystem. However, Carpenter sites the price of doing nothing: "These regime shifts tend to be hard to reverse. It is like a runaway train once it gets going and the costs, both ecological and economic, are high."

Global population to pass 10 billion by 2100, UN projections indicate

The world's population is projected to surge past 9 billion before 2050 and then reach 10,1 billion by the end of the century if current fertility rates continue at expected levels, according to the latest UN figures.

Most of the increase will come from so-called 'high fertility countries' mainly in sub-Saharan Africa, but also in some nations in Asia, Oceania and Latin America, the figures reveal. The 2010 Revision of World Population Prospects prepared by the Population Division at the UN's Department of Economic and Social Affairs, shows that a small variation in fertility could lead to major long-term differences in the size of the global population.

Based on the medium projection, the number of the people in the world – currently close to 7 billion – should pass 8 billion in 2023, 9 billion by 2041 and then 10 billion at some point after 2081. However, a small increase in fertility could mean a global population of as much as 15,8 billion by 2100, while a small decrease could result in an eventual overall decline in population to 6,2 billion by the end of the century.

Source: UN News

Hydrofracking changes water wells

American researchers have found high levels of leaked methane in well water collected near shale-gas drilling and hydrofracking sites.

The scientists from Duke University collected and analysed water samples from 68 private groundwater wells across northeastern Pennsylvania and New York.

Hydraulic fracturing (also known as hydrofracking or fracking), involves pumping water, sand and chemicals deep underground into horizontal gas wells at high pressure to crack open hydrocarbon-rich shale and extract natural gas. South Africans were recently introduced to the technology when Shell announced plans to introduce fracking to the Karoo. To the relief of opposition groups government has since placed a moratorium on fracking in the country.

Interestingly, the Duke University study found no evidence of contamination from chemical-laden fracking fluids, which are injected into gas wells to help break up shale deposits. "However, we found measurable amounts of methane in 85% of the samples. Levels were 17 times higher on average in wells located within a kilometre of active hydrofracking sites," noted Stephen Osborn, post-doctoral research associate at Duke's Nicholas School of the Environment.

By using carbon and hydrogen isotope tracers the scientists could distinguish between thermogenic methane, which is formed at high temperatures deep underground and is captured in gas wells during hydrofracking, and biogenic methane, which is produced at shallower depths and lower temperatures. The latter is not associated with fracking.

"Methane in water wells within a kilometre had an isotopic composition similar to thermogenic methane," explained Avner Vengosh, professor of geochemistry and water quality. "Outside this active zone, it was mostly a mixture of the two."

The scientists confirmed their finding by comparing the dissolved gas chemistry of water samples to the gas chemistry profiles of shale-gas wells in the region using data from the Pennsylvania Department of Environmental Protection. "Deep gas has a distinctive chemical signature in its isotopes. When we compared the dissolved gas chemistry in well water to methane from local gas wells, the signatures matched," noted Robert Jackson, Nicholas Professor of Global Environmental Change.

Methane is flammable and poses a risk of explosion. In very high concentrations, it can cause asphyxiation. Little research has been conducted on the health effects of drinking methane-contaminated water.

The team's findings have appeared in the Early Edition (dated 10 May) of the *Proceedings of the National Academy of Sciences.* To view the article, Visit: http://www.pnas.org/content/early/2011/05/02/1100682108

Will extreme climate now become 'regular'?

Dramatic climate swings behind both last year's Pakistan flooding and this year's Queensland floods in Australia are likely to continue as the world gets warmer, scientists predict.

Researchers at the universities of Leeds and Oxford have discovered that the El Niño Southern Oscillation (ENSO), the sloshing of the warmest waters on the planet from the West Pacific towards the East Pacific every two to seven years, continued during the Earth's last great warm period, the Pliocene.

Their results suggest that swings between the two climatic extremes, known as El Niño and La Niña, may even have occurred more frequently in the warmer past and may increase in frequency in the future. extreme ENSO events cause droughts, forest fires, and floods across much of the world (including South Africa) as well as affecting fishery production.

Lead scientist Nick Scroxton from the University of Oxford said: "We know from previous studies that the mean state of the Pacific during the warm Plioecene (which lasted from 5 to 3 million years ago) was similar to the climate patterns observed during a typical El Niño event that we see today. However, until recently it was believed that a warmer Pacific would reduce the climate swings that cause the dramatic weather extremes throughout the region leading to a permanent state of El Niño. What we didn't expect was that climatic variability would remain strong under these warmer conditions."

The team combined experiments performed on the Met Office Hadley Centre climate model, HadCM3, with the analysis of the chemical composition of lots of individual shells of small organisms, known as foraminifera. These were collected from a deep sea sediment core in the East Equatorial Pacific, and provided a record of temperature in the upper layer of the ocean through time. They discovered that the range of temperatures experienced by these organisms during the Pliocene, was higher than what would be expected from just the seasonal cycle.

The extra variation in temperature can be explained by the additional extreme temperature swings provided by the El Niño/La Niña system. The authors say the agreement in findings from both ocean data and modelling leaves little doubt that ENSO will persist in a warmer world.

The study has been published in the journal *Paleoceanography* (http://www.agu.org/pubs/crossref/2011/2010PA002097.shtml)

Water by numbers

- **88%** - The number of people in the Western Cape who have access to basic services – the highest in the country. This is according to the Universal Household Access to Basic Services Index.
- **26** – The number of directives against polluters issued by the Department of Water Affairs last year. A total of 25 cases are currently before the courts.
- **2 litres** – The average person's daily drinking water requirement. However, it takes between 2 000 ℓ and 5 000 ℓ of water to produce one person's daily food.
- **277 million hectares** – The extent of land under irrigation in the world, about 20% of all cropland.
- **40%** - The percentage of the world's food production gained from irrigated agriculture.
- **10%** – The percentage of the world's irrigated lands suffering from waterlogging and salinisation as a result of poor drainage and irrigation practices.
- **2 million tons** – The amount of human waste that ends up in the world's water courses every day, according to the UN.
- **21** – The number of water management inspectors now working for the Department of Water Affairs. The number is up from 14 last year.
- **2** – The number of people who joins the global urban population every second.
- **1,8 billion** – The number of people who have gained access to improved drinking-water sources since 1990.
- **95%** – The percentage of urban population growth that will take place in the developing world over the next decade.

Pesticide to be eliminated after placed on UN list of hazardous chemicals

An insecticide widely used in agriculture for pest control has become the latest hazardous chemical to be added to the United Nations' (UN's) list of persistent organic pollutants (POPs) targeted for elimination from the global market.

According to the UN, Endosulfan, an organochlorine insecticide, has been added to the POPs list as it is known to cause reproductive and developmental damage in both animals and humans. The chemical is mainly used as a pest control agent in cotton, coffee and tea farms worldwide.

"[It has been recognised] that financial and technical support is required to facilitate the replacement of the use of Endosulfan in developing countries and countries with economies in transition," noted Achim Steiner, UNEP Executive Director. "In establishing a consultative process on finance for the chemicals and waste conventions, UNEP has responded to the need of those countries by seeking to make the sound management of hazardous chemicals a development priority of the green economy in which all countries can fully and fairly participate."

Source: UN News

Scientists detect Earth-equivalent amount of water within the moon

The moon has much more water than previously thought, US scientists have discovered.

First-time measurements of lunar melt inclusions show that some parts of the lunar mantle have as much water as the Earth's upper mantle. The results may change the prevailing theory about the Moon's origin as well as shed new light on the origin of water at lunar poles.

Lunar melt inclusions are tiny globules of molten rock trapped within crystals that are found in volcanic glass deposits formed during explosive eruptions. The new funding shows lunar magma water contents 100 times higher than previous studies have suggested.

The result is the culmination of years of investigation by the research team searching for water and other volatiles in volcanic glasses returned by NASA Apollo missions in the last 1960s and early 1970s.

Compared with meteorites, Earth and other inner planets contain relatively low amounts of water and volatile elements, which were not abundant in the inner solar system during planet formation. The even lower quantities of these volatile elements found on the Moon has long been claimed as evidence that it must have formed following a high-temperature, catastrophic giant impact. But this new research shows that aspects of this theory must be reevaluated.

"Water plays a critical factor in determining the tectonic behaviour of planetary surfaces, the melting point of planetary interiors and the location and eruptive style of planetary volcanoes," said Erik Hauri, a geochemist with the Carnegie Institution of Washington and lead author of the study.

The study also puts a new twist on the origin of water ice detected in craters at the lunar poles by several recent NASA missions. The ice has been attributed to comet and meteor impacts, but it is possible some of this ice could have come from the water released by eruption of lunar magmas.

Source: Brown University

Third of world's food wasted – study

More than a billion tons of food – roughly one third – produced in the world for human consumption every year gets lost or wasted, according to a study commissioned by the Food and Agriculture Organisation of the United Nations (FAO).

Other key findings from the document, *Global Food Losses and Food Waste*, published earlier this year, are that developed and developing countries dissipate roughly the same quantities of food – respectively 670 and 630 million tons; and that every year, consumers in rich countries waste almost as much food as the entire net food production of sub-Saharan Africa. Significantly, the amount of food lost or wasted every year is equivalent to more than half of the world's annual cereals crop.

Food losses, which occur at the production, harvest, post-harvest and processing phases, are experienced more by developing countries, while food waste is more of a problem in industrialised nations. The FAO study shows that per capita waste by

consumers is between 95-115 kg a year in Europe and North America, compared to 6-11 kg in sub-Saharan Africa and South and Southeast Asia.

Food loss and waste amount to a major squandering of resources, including water, land, energy, labour and capital and needlessly produce greenhouse gas emissions, contributing to global warming and climate change.

Interestingly, at retail level, large quantities of food are wasted due to quality standards that over-emphasise appearance. This while surveys show that consumers are willing to buy products not meeting appearance standards as long as it is safe and tastes good. Customers thus have the power to influence quality standards and should do so, the report said.

In addition, good use for food that would otherwise be thrown away should be found. Commercial and charity organisations could work with retailers to collect, and then sell or use products that have been disposed of but that are still good in terms of safety, taste and nutritional value.

To download the document, *Global Food Losses and Food Waste*, Visit: http://www.fao.org/fileadmin/user_upload/ags/publications/GFL_web.pdf