



# REAL ECONOMY INSIGHT: WATER

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For four years, the World Economic Forum's yearly global risk reports have cited water as one of the most important global challenges. This year, for the first time, water has moved to the top as the greatest risk facing the world. Water is now considered a bigger global risk than inter-State conflict, the failure to adapt to climate change and chronic unemployment.

In South Africa, concern is also growing about water scarcity and the related risks. About 90% of the 58 JSE Top-100 companies participating in the 2014 Carbon Disclosure Project's 'South Africa Water Report' have indicated that their direct operations are exposed to water risks and 55% believe that these risks will materialise in the next three years. When advisory firm Grant Thornton questioned 100 business executives about their outlook for South Africa for 2015, 68% indicated that they were affected by poor government service delivery and that the greatest issue was that of basic utility services, including water and electricity supply. In the first quarter of 2015, 83% of those surveyed indicated that utilities had negatively affected their businesses.

Ranked among the world's 30 driest countries, South Africa is fast approaching full utilisation of available surface water yields. However, despite being a water-stressed country, demand is rapidly increasing owing to population growth and urbanisation, while resource depletion, contamination and inefficient infrastructure are putting resources under strain. The country uses

235 ℓ a person a day, which is significantly more than the world average of 173 ℓ a person a day.

Against a backdrop of low supply and high demand, coupled with the poor use of existing resources, there have been many warnings that water could become as much of a limitation on economic growth as electricity – a shortage of which has had a severe impact on the country's economy in recent years. In 2014, analysts flagged water as a threat to new investment when South Africa's most populous province and economic hub, Gauteng, experienced weeks of water shortages.

Government has acknowledged the potential human development and economic consequences of water shortages in strategy and policy documents, such as the National Development Plan (NDP) and the second National Water Resources Strategy (NWRS-2); however there are questions about whether policy interventions currently proposed are sufficient to ensure a water secure future.

The Institute of Security Studies (ISS) warned in a 2014 paper, 'Parched Prospects: The Emerging Water Crisis in South Africa', that policies presented in the NWRS-2 were not sufficient to address the water constraints facing South Africa. The ISS estimates a supply and demand gap of more than 3.5 km<sup>3</sup> by 2030, which will reduce to 3.2 km<sup>3</sup> by 2035. The paper's authors note that, even if policies to close the demand-supply gap by 2035 are implemented now, South Africa will still be overexploiting its water resources for the next 20 years, increasing the country's vulnerability to water shocks such as droughts.

Industry commentators have warned that, should the country experience a severe drought, it will only take two years before severe water restrictions will have to be implemented. This will affect coal-fired power stations, irrigation schemes and mines, among others.

## Water planning and regulation

The three water-related policies governing South Africa's water sector are the White Paper on a National Water Policy for South Africa, adopted in 1997; the Strategic Framework for Water Services, adopted in 2003; and the NWRS, first adopted in 2004.



Picture by Duane Daws

### Water boards and catchment management agencies

In line with the second National Water Resources Strategy, the Department of Water and Sanitation (DWS) is consolidating 12 water boards into nine utilities to strengthen the development, financing, management, operation and maintenance of regional bulk water and wastewater infrastructure.

The DWS indicated in a presentation to Parliament's Portfolio Committee on Water and Sanitation in August 2014 that plans for the consolidation had been drafted and that the process was expected to be completed in 2015. As part of the institutional reform, the DWS in 2014 disestablished the Botshelo, Pelladrift and Bushbuckridge water boards and expanded the service areas of Rand Water and Sedibeng Water.

Nine catchment management agencies (CMA) corresponding with the nine water boards will be established to manage water resources at a catchment level in collaboration with local stakeholders. The Inkomati-Usuthu and Breede-Gouritz CMAs are operational, while the Limpopo-North West and Pongola-Mzimkulu CMAs have been gazetted for establishment. The DWS plans to establish the Vaal and Olifants CMAs in 2015/16.

Source: Compiled from Department of Water and Sanitation presentations and reports

The NWRS-2 follows the NWRS-1 of 2004 and gazetted in August 2013. The policy defines the strategic direction for water resources management over the next 20 years, with emphasis on the priorities and objectives for 2013 to 2017. The NWRS-2 is aligned with the NDP and the National Water Act, which requires the NWRS to be reviewed every five years. However, the trend is to develop ten-year strategies and the DWS has indicated that it is considering progressing towards a ten-year window for the NWRS.

The DWS is reviewing the National Water Act and the National Water Services Act and may consolidate the two pieces of legislation into one to govern the entire water value chain. DWS has indicated that it plans to submit the National Water and Sanitation Bill to Parliament by March 2018. Sanitation is currently governed by the Strategic Framework on Water Services and the Water Services Act and not mandated by the National Water Act.

The DWS has completed the National Water Amendment Act 27 of 2014 process, which streamlined legislation with those of the departments of mineral resources and environmental affairs to create regulatory certainty on water-use authorisation.

### Water infrastructure

The provision of new infrastructure and, crucially, the management, operation and maintenance of existing infrastructure continue to be a challenge to providing sustainable water supply. Cabinet has set a goal of 90% reliable water services by 2019 – a target which requires a major infrastructure commitment.

The importance of water infrastructure is reflected in the Presidential Infrastructure Coordinating Commission's

(PICC's) inclusion of water and sanitation among its 18 strategic infrastructure projects. The PICC, which President Jacob Zuma established in 2012 to accelerate infrastructure delivery, has indicated that it aims to pursue a major dam-building programme to increase access to water. The Clanwilliam dam, in the Western Cape; the Nwamitwa and Tzaneen dams, in Limpopo; the Hazelmere dam, in KwaZulu-Natal; and the Polihali dam, in Lesotho, will be upgraded and expanded, while new dams will be built on the Mzimvubu river, in the Eastern Cape.

Launched in 2014, the Mzimvubu water resources development project entails the construction of two dams, one of which will be used for hydropower generation. Preliminary estimates indicate that the project will cost R20-billion and will include the construction of a dam at the Ntabelanga site, the Laleni hydropower scheme, bulk water infrastructure, infield irrigation infrastructure, access roads and the costs of land acquisition and catchment rehabilitation.

Other major infrastructure development projects at different stages of planning and construction include Phase 2 of the Lesotho Highlands Water Project (LHWP), between Lesotho and South Africa, as well as the Mokolo-Crocodile Water Augmentation Project (MCWAP) and the Mopani Emergency Works, both in Limpopo.

The 17.5-billion LHWP Phase 2 involves a water delivery system to augment supply to Gauteng and the Free State, as well as a hydropower generation system. Work started in December 2014 and the scheme is expected to start delivering water to South Africa in 2023. The Lesotho Highlands Development Authority in February 2015 issued three tenders for construction upgrading,

**Plugging the skills gap**

South Africa is losing 36.8% of its water through poor infrastructure management, largely as a result of an “extreme shortage” of skilled water professionals, costing the country about R11-billion a year.

To augment the skills capacity in the sector and tackle water infrastructure challenges, 35 Cuban engineers, geohydrologists, hydrologists and water supply specialists were seconded to South Africa for a two-year term in February 2015.

The Department of Water and Sanitation (DWS) went ahead with the secondment, despite concerns from industry bodies, such as the South African Institution of Civil Engineering, which believed the DWS would have found skilled professionals locally, if it had launched a recruitment drive with the same remuneration and incentives. Consulting Engineers South Africa also raised concern about the importation of skills in its ‘Bi-Annual Economic and Capacity Survey June to December 2014’, stating that the DWS could have employed “double the number of local and equally, if not better, qualified, professionals”. Of further concern is that Cuban engineers’ skills are not recognised by the Engineering Council of South Africa, because they are not part of the Washington Accord that governs international engineering qualifications.

DWS director-general Margaret-Ann Diedericks indicated in a Parliament Portfolio Committee on Water and Sanitation meeting in April 2015 that the department intended to reduce the vacancy rate for engineers and scientist by 10%. The DWS is targeting South Africans in its recruitment drive, but Diedericks has said that if scarce skills cannot be sourced locally, they will be sourced from outside the country.

The DWS is also collaborating with universities to attract students to the water sector.

Source: Compiled from various sources, including *Engineering News* and the Parliamentary Monitoring Group

geotechnical investigation works and resettlement planning services related to the project.

The R13.4-billion MCWAP was initially expected to start operating in September 2013, but severe flooding in the project area in 2014 and slow pipe-laying progress, owing to contractor and labour issues, had delayed the completion of the project to October 2015. The MCWAP system will run parallel to and join the existing infrastructure that supplies water to the Lephalale local municipality, Eskom’s Matimba power station, the Zeeland power plant and Exxarro’s Grootegeeluk mine. It will also supply water to power utility Eskom’s new Medupi power station.

Regarding water infrastructure maintenance, the DWS has stated that 44 dams will be fully rehabilitated by the end of the 2015/16 financial year under the Dam Safety Rehabilitation Programme.

Meanwhile, PICC has highlighted the importance of investment in pipelines to address the current disconnect between large water resources and communities. The separation of functions between the different spheres of government often result in national government completing dams, but communities failing to benefit from them, owing to delays in the installation of water reticulation systems. One such example is the R3.5-billion De Hoop dam, in Limpopo, where district

municipalities are experiencing challenges in connecting the required pipelines for communities to access water from the new dam.

**Nonrevenue water**

Government loses an estimated R7.2-billion every year because of nonrevenue water – a term that refers to the water that is lost through physical leakage or commercial losses (such as meter under-registration, billing errors and theft), as well as unbilled authorised consumption (such as fire-fighting and mains flushing). The Water Research Commission (WRC) estimates that the current volume of nonrevenue water is about 1 580-million cubic metres a year, which is equal to the yearly supply of Africa’s largest water utility, Rand Water.

According to a 2012 report by the WRC, 36.8% of the total municipal water supplied in South Africa is lost before it reaches municipal customers. The report found that nonrevenue water was the product of many factors, including poor planning, limited financial resources to implement programmes, poor infrastructure asset management and lack of capacity. Of the nonrevenue water losses, 25.4% was considered to be lost through physical leakage.

While South Africa compares well with the world average of 36.6%, it does not compare well to other developed

water-scarce countries, such as Australia, which has a nonrevenue water level of less than 10%.

To stem the tide of water losses, the DWS is spearheading a War on Leaks project, which compels municipalities and communities to report and fix water leaks, and introduced the No Drop assessment programme, which is run parallel to the Blue Drop water quality programme. The No Drop programme aims to reduce water losses to 18% by 2025.

President Jacob Zuma also announced in his 2015 State of the Nation address in February that 15 000 artisans and plumbers would be trained to fix taps and better maintain infrastructure. The artisans and plumbers will be trained at public technical and vocational education and training colleges based in municipalities with high water losses and nonrevenue water. The DWS has budgeted R650-million for the training of artisans and plumbers in the 2015/16 financial year.

The DWS is also considering legislating a minimum spend on maintenance to ensure that municipalities maintain existing infrastructure. Water and Sanitation Minister Nomvula Mokonyane indicated in May that

municipalities had to spend at least 15% of their budgets on maintenance.

Further, the Strategic Water Partners Network – a government and business partnership bringing together representatives from the DWS and private-sector companies – in 2015 launched a set of performance-based contracts to allow municipalities to contract practitioners to reduce water losses and be paid from the savings.

### Water quality

The quality of South Africa's freshwater resources is decreasing, owing to more pollution and the destruction of water catchments. The Water and Sanitation Minister has said that discharges from wastewater treatment works are considered the greatest threat to water quality. In response to the threat, government introduced the Green Drop certification scheme to measure the extent of municipal noncompliance to effluent standards in 2018.

The latest available Green Drop report is that of the 2012/13 assessment, which assessed 824 wastewater



Picture by Duane Daws



systems and indicates an improvement in the average performance of municipalities on wastewater management. The national Green Drop score increased from 71% in 2011 to 73.8% in 2013. In 2013, 415 wastewater systems obtained Green Drop scores of more than 50%, compared with 216 systems in 2009. Sixty wastewater systems were awarded Green Drop status, compared with 40 systems in 2011.

In terms of the quality of drinking water, the latest available assessment is the 2013 Blue Drop Progress report, which introduced a Blue Drop risk rating tool to identify, quantify and manage risks associated with drinking water services. The rating is meant to act as a precautionary tool to warn water service institutions about the level of risk at which water services and water quality is delivered. Covering 1 009 water supply systems, the 2013 assessment found that Gauteng had the highest percentage of low-risk systems and the North West the highest percentage of systems in the critical-risk category. The Western Cape, Eastern Cape and KwaZulu-Natal are the three provinces with the next most number of supply systems characterised with good drinking water quality management systems in place. The assessment indicated that of all the systems assessed, 146 systems (15%) showed a significant reduction in their Blue Drop risk rating score since the 2012 assessment. The Western Cape recorded the most systems (44) and the Free State the least systems (2) with significant improvement in risk ratings.

Civil rights organisation AfriForum has launched its own blue and green drop project to test the quality of potable

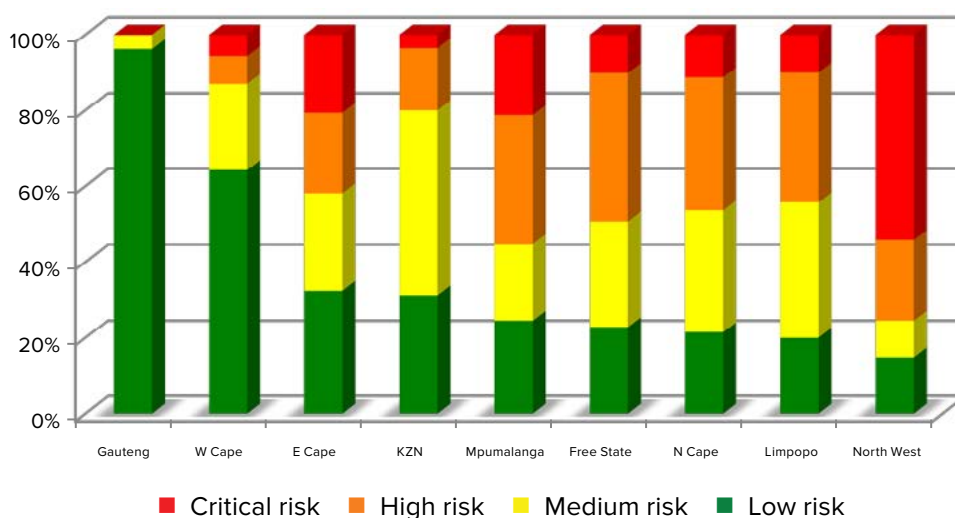
and treated water in the municipalities throughout South Africa where its branches are situated. The campaign tested the quality of drinking and sewage water in 132 towns in March this year, and showed a marked improvement in water-quality management. Five out of 132 municipalities did not comply with the quality standards for drinking water, compared with 11 out of 107 drinking water systems that were not up to standard in 2014. AfriForum also tested 58 sewage water systems, of which 26 did not comply with quality standards.

Mining activity has resulted in significant water quality challenges, with acid mine drainage (AMD) considered one of the country's greatest environmental challenges. AMD, which refers to the flow, or seepage, of polluted water from mined-out areas, has become well publicised in recent years.

In November 2014, the DWS announced it had set aside R10-billion to mitigate AMD in the Witwatersrand goldfields. The Western and Central basins already have operational AMD treatment plants and work is under way on a similar plant in the Eastern basin. State-owned entity Trans-Caledon Tunnel Authority is implementing an AMD reuse project, in Gauteng, which involves the treatment of AMD and its sale to industry for reuse.

The DWS has also announced plans to establish an AMD or Mine Water Unit to ensure integrated and composite approaches for AMD and mine water management. Further, a WRC-funded study is under way to develop the South African Mine Water Atlas, to provide water managers and policy makers with a comprehensive

**Blue Drop risk ratings categorised by province**



Source: Department of Water and Sanitation, 2013 Blue Drop Progress Report

reference on the extent of mine-influenced water on the surface and underground. The atlas will be published in 2016.

## Prospects

Government and experts agree that changes are required to ensure South Africa has a water secure future, but concede that there is no magic-bullet solution to fix what is considered a complex problem.

Conserving water and reducing demand is a key message from government and industry commentators alike, considering that nearly half of urban water is wasted. The importance of reducing water losses has long been recognised by national government and was again highlighted in February, when President Jacob Zuma announced plans to train 15 000 plumbers to fix leaking pipes and taps in municipalities.

Some of the DWS's solutions to conserve water and better manage demand are to move sanitation systems from water-borne sewerage to low-water and no-water solutions; shifting from a system of highly centralised, expensive wastewater treatment dominance to one that has a combination of centralised and localised waste treatment; and moving away from high-energy waste treatment and technologies to low-energy and energy-producing waste treatment systems.

There is also a strong focus on improving South Africa's water mix by increasing the use of water sources other than surface water. These include a greater reliance on groundwater, rainwater harvesting, reusing municipal and industrial waste water, the reuse of treated AMD and desalination. It is estimated that municipal water demand could be reduced by about 30% if industrial, commercial and residential sectors adopted rainwater harvesting nationwide.



Picture by Duane Daws

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