

The state of water in South Africa – are we heading for a crisis?

Executive summary

The state of water in South Africa has been the subject of widespread public discussions over the past couple of months. Questions asked include: Is SA heading for a water crisis? Does SA have sufficient freshwater resources to sustain both its path of economic growth and its population growth? Is the quality of water deteriorating? Some of these issues are addressed in this Strategy Insights. The recently published Water for Growth & Development Framework (version 7) by DWAF makes a number of high level recommendations regarding how government intends to avoid a looming water crisis. Lastly, a couple of pointers are provided on what the business community and industry can do to relieve water stress.

Introduction

The state of water in SA has been the subject of widespread public discussions over the past couple of months. The issues of decreasing water quality, increasing water scarcity and deteriorating or dysfunctional municipal water infrastructure leading to a potential water crisis in the country have featured strongly in the media with headlines such as *SA water quality is fast deteriorating; South Africa at risk of cholera; South Africa: The quiet water crisis; Not all SA tap water safe; SA engineers warn of 'dysfunctional' municipal water infrastructure; Major SA water crisis possible.*

SA's water sector is faced by numerous challenges, eg, water deficits in an increasing number of water management areas; water pollution and decreasing water quality that affects not only net availability of water but also negatively affects human health; ageing water and wastewater infrastructure; a severe lack of skilled human resources; the impact of climate change on water resources; the illegal use of water; and the inappropriate use of funds by different spheres of local government.

This *Strategy Insights* (Natural Environment) addresses some of these challenges and how government intends to avoid a looming water crisis in SA, as well as what the business community can do to alleviate water stress.

The state of water security – is it deteriorating?

Water is critical in sustaining life and it is crucial to economic growth and social development, as well as for environmental sustainability. In global terms, SA's freshwater resources are scarce, extremely limited and disproportionately available, both in time and space, relative to demand. The average rainfall of 497mm/yr is well below the global average of 860mm/yr. SA is already categorised as water stressed with an annual freshwater availability of less than 1 700m³ per capita (the index for water stress).

The central question being asked is: Does SA have sufficient freshwater resources to sustain both its path of economic growth and its population growth with concomitant needs? In addressing this question, the Dept of Water Affairs and Forestry (DWAF, 2009:10) 'has taken a long term perspective and is assessing and addressing in a very detailed manner the quantity of water available in relation to projected demand, and ways of addressing imbalances where they exist'. This is done in the form of reconciliation strategies, which have been completed for some of the country's major water supply systems, and are to be followed by reconciliation studies for every town in SA – a process to be completed by mid-2011.

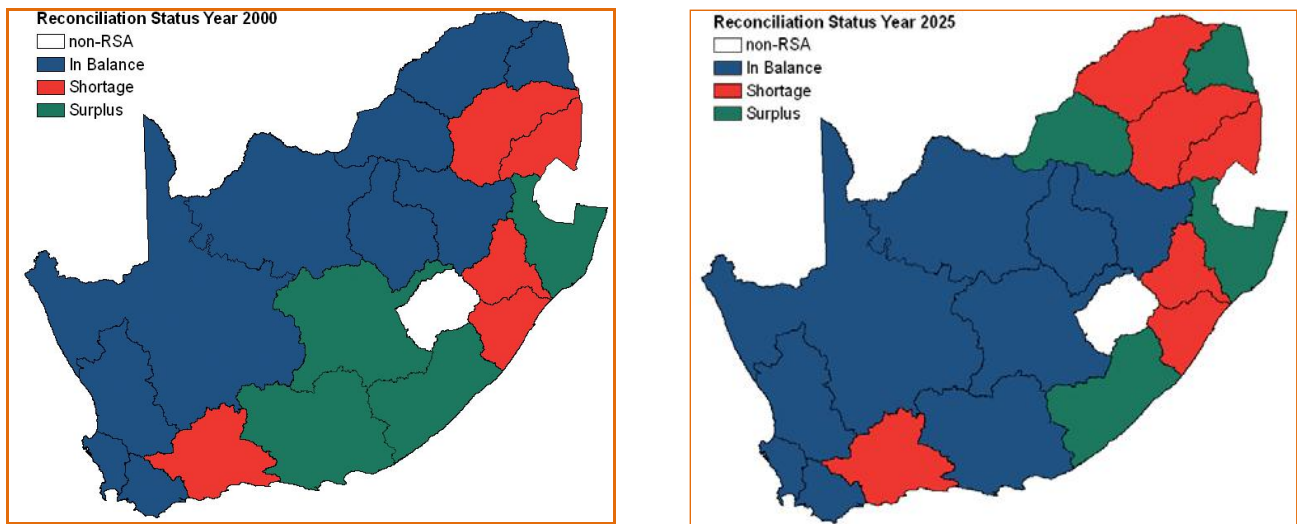


Figure 1: The state of water security by water management area, 2000 (left) and 2025 (right)
Source: DWAF, 2009:10.

According to the *National Water Resource Strategy* (DWAF, 2004:36), the total annual demand for freshwater in SA in 2000 amounted to 12 871m³, just slightly less than the available yield of freshwater of 13 227m³. This means that 98% of the national water resource was already allocated or in use in 2000, with little surplus water left. Based on the latest available data (including the completed reconciliation studies), five of the 19 water management areas (WMAs) were already experiencing water shortages in 2000, while only four experienced water surpluses and the remainder were still in balance (Figure 1 - left). A water supply/demand scenario by DWAF (2009:10) illustrates that by 2025 water shortages will become more prevalent 'if proper attention is not given to providing more water, and managing demand'. In general, water deficits are projected to widen and surpluses to narrow. Thus, the country is 'more likely to experience water shortages than water surpluses' (Figure 1 - right) (DWAF, 2009:10).

It is important to note that for the country as a whole, water consumption/demand (black bars in Figure 2) is projected to exceed water availability/supply (yellow bars) by 2025 in both the base and high scenarios of DWAF. Although there is the potential for the development of an additional 5 410m³/yr (red bar), mainly through the construction of new storage dams and further groundwater utilisation, the potential for water resource development exists mainly in the southern parts of KwaZulu-Natal and the eastern parts of the Eastern Cape.

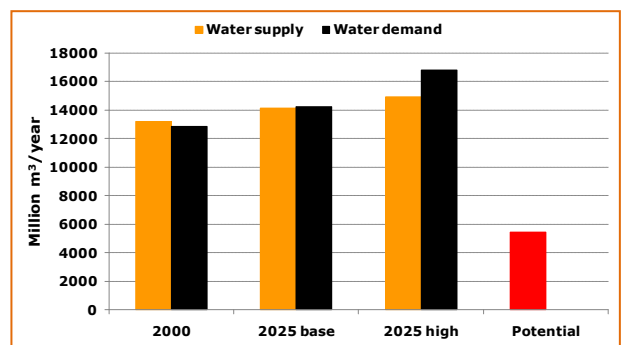


Figure 2: Water supply vs water demand in SA, 2000 and 2025 (base and high scenarios)

Source: DWAF, 2009:10

Of particular concern is the status of water security in the major metropolitan areas of SA. Not only are these the hubs of economic growth (and economic development leads to increased water use), but these are also the areas experiencing relatively high population growth rates due to rapid urbanisation, which, in turn, increases the stress on water infrastructure. In fact, it is stated by DWAF (2009:17) that based on the existing reconciliation strategies, 'water shortages are predicted for the majority of large towns [not only for the metropolitan areas] in the short to medium term, necessitating urgent intervention'.

The possibility of Gauteng, a largely metropolitan province (consisting of Johannesburg, Tshwane/-Pretoria and Ekurhuleni), experiencing water shortages as soon as 2013, especially if there is a period of severe drought, was recently debated in the media. Although Ms LB Hendricks, Minister of Water Affairs and Forestry reacted to this by stating that the water shortage in the province can be averted, given the recent decision of cabinet to proceed with the 2nd phase of the Lesotho Highlands Water Project, subject to the conclusion of a protocol with the government of Lesotho, the project is expected to be completed in 2019 – six years after the expected 2013 water shortage in Gauteng (Naidoo, 2009:18).

The state of water quality – is it worsening?

The availability or quantity of water is closely linked to the quality of water. If the latter deteriorates, it has a negative impact on the net availability of water. In SA, water resources are comprised of the following three sources, viz, 77% is sourced from surface water (eg, dams and rivers), 14% from return flows (eg, sewage and effluent purification) and 9% from groundwater (eg, boreholes) (DWAF, 2009:12; *Imiesa*, 2009). The major sources of water pollution include uncontrolled sewage, poorly managed waste water treatment works, chemical discharges, petroleum leaks and spills, dumping in old mines and pits, human settlements, and agricultural chemicals that are washed off or seep down from farm fields. Bacterial contamination, which arises not only from the absence or the poor maintenance of sanitation facilities, but also from livestock defecation entering rivers and streams, is widespread in SA. If used untreated, such contaminated water can cause water-borne diseases such as diarrhoea, cholera, dysentery and skin infections.

The recent very severe cholera epidemic in Zimbabwe which infected more than 90 000 people and caused the death of more than 4 100 people comes to mind. Although a host of factors combined to make this outbreak of cholera so devastating, the main cause was the total breakdown of water and sanitation infrastructure. Compared to Zimbabwe, SA has a well developed water and sanitation infrastructure system in place, and tap water that is among the best in the world (excluding some rural areas), according to DWAF. However, about 5m people still lacked adequate and safe water supplies in 2008, while 15m still lacked basic sanitation in spite of millions of South Africans gaining access to a formal water supply and sanitation services since 1994. Until this backlog is eradicated, the threat of water-borne diseases remains a reality.

In general, the quality of SA's freshwater resources is deteriorating. According to Dr Anthony Turton, former water scientist at the CSIR, SA's water resources have lost their dilution capacity, 'so all pollutants and effluent streams will increasingly need to be treated to ever higher standards before being discharged into communal waters or deposited in landfills' (Turton, 2008:3). Decades of mining for gold and other minerals have left much of the water supply heavily polluted with heavy metals and other pollutants. A 2008 CSIR study entitled *State of the Nation Report* found cyanobacterial blooms (also known as blue-green algae that can cause diarrhoea and vomiting) recorded in many 'if not most' of river and reservoir systems – from where most of SA's drinking water is obtained – because of 'prevailing high levels of eutrophication caused by inadequate treatment of domestic and industrial effluents' discharged in their catchments (Independent Online, 22 Sept 2008).

'Of particular concern is the status of the Waste Water Treatment Works, which are affected by failing infrastructure (water purification and reticulation infrastructure), poor waste water collection and treatment systems, and lack of human resources (capacity and skills) to meet effluent standards. The impact of poorly managed Waste Water Treatment Works is the inability to sustain safe drinking water' (DWAF, 2009:23). Addressing a municipal conference on water and sanitation in Johannesburg in 2008, Minister Hendricks said far too many municipal Waste Water Treatment Plants were operating below the required standards. 'Indications were that 60% of the treatment plants, the facilities that treat sewage, required maintenance or intervention, with poor compliance to the required effluent standards' (*Business Day*, 2008). According to Dr Turton, SA has failed to maintain its investment in the infrastructure needed to maintain a clean water supply. Capital investment in water and sanitation infrastructure peaked in the 1980s and has since declined drastically (Figure 3).

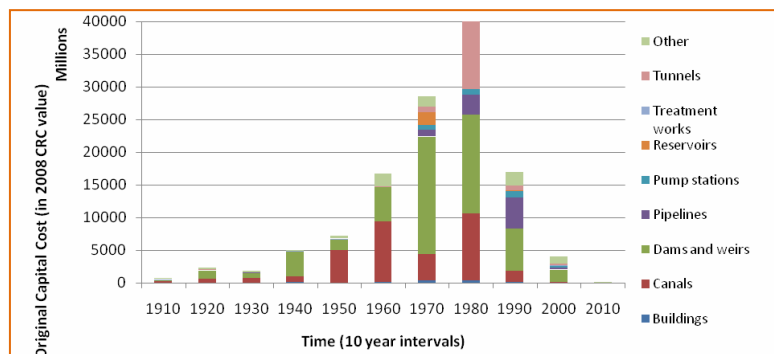


Figure 3: Capital investment in water infrastructure
Source: Turton, 2008:10.

Not only is there a need to invest in new infrastructure in areas that lack safe water supplies and sanitation services, but there is also the need to invest in the upgrading and maintenance of existing water and sanitation infrastructure. According to DWAF (2009:23), limiting factors for addressing backlogs and expanding service delivery include

- lack of skilled contractors to render services and poor construction supervision, which diminishes the life expectancy of infrastructure;

- lack of municipal staff (especially engineers, scientists and technicians) to operate and maintain water services infrastructure; and
- absent or weak municipal systems for infrastructure management.

Implications

SA is a water scarce country with demand already exceeding supply in certain WMAs and cities. In addition, water quality is deteriorating and many municipalities are unable to maintain ageing water and wastewater infrastructure particularly due to a lack of skilled personnel such as engineers and technicians. Factors that could worsen the water situation in SA are the impact of climate change on precipitation, increasing urbanisation, population growth, expansion of business activity and increasing affluence. If SA's water resources are not properly managed, the country is heading for a crisis.

Although the provision of freshwater and sanitation services is primarily the responsibility of the government, water is everybody's business and everybody's responsibility. In conclusion, the main recommendations of the *Water for Growth and Development Framework* (WGDF) recently launched by DWAF are summarised, that is how government intends to avoid a water crisis, followed by some pointers on what industry/business can do to alleviate water stress.

Recommendations by government

The WGDF is intended 'to guide actions and decisions that will ensure water security in terms of quantity and of quality to support South Africa's requirements for economic growth and social development' (DWAF, 2009:2). The main recommendations of the WGDF are the following:

- Strengthening institutional capacity.
- Mainstreaming water – water must be placed at the heart of all development planning decisions.
- Diversifying the water mix. While surface water will remain the predominant source of water in the long term, DWAF expects surface water to contribute proportionately less (65% by 2040 compared to 77% in 2008), with significant increases in return flows through the treatment of urban and mining effluent (22% vs 15%) and desalination (3% vs <1%). The latter is considered to be highly feasible for limited use in coastal locations.
- Promoting water conservation and water demand management.
- Promoting and maintaining water quality.
- Addressing service backlogs and achieving the 2014 target for universal access to water and sanitation services.
- Changing water use behaviour for the future, especially the unlawful and damaging extraction from, and pollution of the Vaal River system by commercial users and the extent of water use inefficiencies among commercial irrigation agriculture.
- Nurturing attitudinal and behavioural changes towards the value of water by means of national awareness campaigns (DWAF, 2009:3-5).

The role of industry/business in alleviating water stress

The business community forms part of the solution to issues or problems related to water and sanitation. Jack Moss of the group Business Action for Water recently stated at the Fifth World Water Forum held in Istanbul: 'Without water, there is no business. Without business, there is no water' (Inter Press Service, 2009). According to the World Business Council for Sustainable Development (2006:13), industry/business can do the following to alleviate stress on water resources:

- Put its own house in order by
 - Measuring and monitoring water use – understanding the water 'footprint' of the business both inside and outside the corporate 'fence line'.
 - Continuing to reduce water consumption per dollar of output and work towards the goal of zero discharge by:
 - Recycling and reusing water.
 - Lowering toxic and other contaminants in all operations involving water.
 - Changing production processes to be more water efficient.

- Encouraging suppliers and purchasers up and down the supply chain to adopt best management practices – assisting small and medium-sized enterprises to improve water management.
- Innovating – searching for new more efficient water treatment technologies.
- Enter into creative partnerships with
 - Municipalities where business operates to develop cost-effective water supply and sanitation options.
 - Non-governmental groups to encourage water conservation and improved water management systems.
 - The scientific community to improve understanding of water resources and their management and to develop technologies to get the most value of the water cycle.

References

- Business Day*, 12 Sept 2008. South Africa: Municipalities to get grades for water quality. [online] URL: <http://allafrica.com/stories/printable/200809120413.html>.
- DWAF. 2004. *National water resource strategy*. Pretoria: DWAF.
- DWAF. 2009. *Water for growth & development framework* (version 7). [online] URL: <http://www.dwaf.gov.za>.
- Imiesa*, 34(3), 2009. Water if life.
- Independent Online, 22 Sept 2008. *SA water is fast deteriorating*. [online] URL: <http://www.iol.co.za/general/news>.
- Inter Press Service, 22 Mar 2009. *Development: Troubled waters hard to bridge*. [online] URL: <http://www.ipsnews.net/print.asp?idnews=46227>.
- Naidoo, B. 2009. Water crunch. *Engineering News* 29(10):16-18; 111.
- Turton, A. 2008. A clean South Africa. Keynote address that was to be presented at the CSIR Conference Science Real and Relevant, Nov 2008.
- World Business Council for Sustainable Development. 2006. *Water: Facts and trends*. [online] URL: <http://www.wbcsd.org>.

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