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The State of Water in South Africa – Are we Heading for a CRISIS?

The Institute for Futures Research looks at the current state of affairs and provides some pointers on what the business community and industry can do to relieve water stress.

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. South Africa's water sector faces numerous challenges, e.g. 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.

IS THE STATE OF WATER SECURITY 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, South Africa's freshwater resources are scarce, extremely limited and disproportionately available, both in time and space, relative to demand. The average rainfall of 497 mm/year is well below the global average of 860 mm/year. South Africa is already categorised as water stressed with an annual freshwater availability of less than 1 700 mm³/person (the index for water stress).

The central question being asked is: Does South Africa have sufficient freshwater resources to sustain both its path of economic growth and its population growth with concomitant needs? In addressing this question, the Department of Water & Environmental Affairs (DWEA) 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 all of the country's major water supply systems, and are being followed by reconciliation studies for every town in South Africa – a process to be completed by mid-2011.

According to the National Water Resource Strategy of 2004, the total annual demand for freshwater in South Africa in 2000 amounted to 12 871 million m³, just slightly less than the available yield of freshwater of 13 227 million m³. 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 nineteen water management areas (WMAs) were already experiencing water shortages in 2000, while only four experienced water surpluses and the remainder were still in balance. A water supply/demand

scenario by DWEA 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.'

It is important to note that for the country as a whole, water consumption/demand is projected to exceed water availability/supply by 2025 in both the base and high scenarios of DWEA. Although there is the potential for the development of an additional 5 410 m³/year, 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.

Of particular concern is the status of water security in the major metropolitan areas of South Africa. 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 DWEA 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, experiencing water shortages as soon as 2013, especially if there is a period of severe drought, has been debated in the media. Although former Minister of Water Affairs & Forestry Lindiwe Hendricks reacted to this by stating that the water shortage in the province can be averted, given the recent decision of Cabinet to go ahead with Phase 2 of the Lesotho Highlands Water Project, subject to the conclusion of a protocol with the Lesotho government, the project is expected to be completed in 2019 – six years after the expected 2013 water shortage in Gauteng.

WHAT ABOUT WATER QUALITY?

The availability of 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 South Africa, water resources are comprised of the following three sources, viz. 77% is sourced from surface water (e.g. dams and rivers), 14% from return flows (e.g. sewage and effluent purification) and 9% from groundwater (e.g. boreholes). The major sources of water pollution include uncontrolled sewage, poorly managed wastewater 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 South Africa. If used untreated, such contaminated water can cause waterborne diseases such as diarrhoea, cholera, dysentery and skin infections.

The recent 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, South Africa has a well developed water and sanitation infrastructure system in place, and tap water is still among the best in the world (excluding some rural areas), according to DWEA. However, about 5 million people still lacked adequate and safe water supplies in 2008, while 15 million 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 completely eradicated, the threat of waterborne diseases remains a reality.

In general, the quality of South Africa's freshwater resources is deteriorating. According to Dr Anthony Turton, Director Touchstone Resources, South Africa'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." 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 recorded in many "if not most" of river and reservoir systems – from where most of South Africa'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.

"Of particular concern is the status of the wastewater treatment works, which are



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The status of water security in the major metropolitan areas of South Africa is a major concern.

affected by failing infrastructure (water purification and reticulation infrastructure), poor wastewater collection and treatment systems, lack of human resources (capacity and skills) to meet effluent standards. The impact of poorly managed wastewater treatment works is the inability to sustain safe drinking water," said DWEA in the Water for Growth & Development Framework.

Addressing a municipal conference on water and sanitation in Johannesburg in 2008, former Minister Lindiwe Hendricks said that far too many municipal wastewater treatment works 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." According to Dr Turton, South Africa 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.

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 DWEA, 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

South Africa 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 South Africa are the impact of climate change on precipitation, increasing urbanisation, population growth, expansion of business activity and increasing affluence. If South Africa'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), launched by DWEA earlier this year 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. The main recommendations of the framework are:

- ◆ Strengthening institutional capacity;
- ◆ Mainstreaming water – i.e. 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, DWEA 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 and desalination. 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.

THE ROLE OF INDUSTRY/BUSINESS

The business community forms part of the solution to issues or problems related to water and sanitation. Jack Moss of the Business Action for Water recently stated at the Fifth World Water Forum, in Istanbul, Turkey: "Without water, there is no business. Without business, there is no water."

According to the World Business Council for Sustainable Development, industry/business can do the following to alleviate stress on water resources:

- ◆ Put its house in order by
 - Measuring and monitoring water use – understanding the water 'footprint' of the business both inside and outside the corporate fenceline;
 - Continuing to reduce water consumption per money unit 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; and
 - 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. 