



Tapping into South Africa's Water

"Dams have made an important and significant contribution to human development, and benefits derived from them have been considerable... in too many cases an unacceptable and often unnecessary price has been paid to secure those benefits, especially in social and environmental terms, by people displaced, by communities downstream, by taxpayers, and by the natural environment."

Prof Kader Asmal, former Minister of Water Affairs

1. Introduction

The Department of Water Affairs (DWA) is responsible for the management of water in South Africa and is divided into two key or main functions, namely Water Resource Management and Water Services Management. Water Resource Management involves the protection, conservation, collection and management of the raw surface and ground water (including the construction of dams), while Water Services Management involves the supply of treated water and the re-treatment of used or effluent water, including sanitation services. The water services sector and its institutional structures are governed by the Water Services Act 108 of 1997.

Over the past two decades, as with electricity, the long-term provision of water was largely neglected as a strategic resource, but now much planning and money is being devoted to the question. Even so, the supply will remain marginal as the demands of a growing population are compounded by climate change and ageing infrastructure.

2. Major Challenges

Acid mine drainage contaminates water and is the most immediate threat to water security in the most populous region of the country. It occurs in areas where gold and coal mines have

been left un-rehabilitated after closure, mainly in Gauteng and Mpumalanga, and is a hugely expensive problem. The Trans-Caledon Tunnel Authority, which has been tasked with cleaning Gauteng's water, is asking for R900 million just for short-term measures. It has received only half of that, although the DWA is working on a long-term solution and is confident that the treasury will give it the funding required. The next concern is **infrastructure**. Some municipalities are operating water systems that are more than a century old, with up to a third of the water leaking from broken pipes. This is one of the department's main targets for saving water, but many municipalities do not have the budget to upgrade their water infrastructure or even fix their pipes. Indeed, 45% of them have failed to get 'Blue-drop' status (a measure of water quality), mainly because of crumbling infrastructure and a lack of skills.

Sewage works are also in dire straits. Only 45% of municipalities achieved a rating of more than 50% in the most recent 'Green-drop' report, which assesses municipal waste-water works, which means they are not cleaning the water in towns properly. Instead, large amounts of E-coli are being released into rivers and the water table. As we head towards 50 million people, new water infrastructure is rapidly outstripped by **population growth**. In rural areas, a new water system can lead to people moving to that area and overwhelming it. In informal settlements

near big cities, the lack of clean water and sewerage systems leads to further pollution of water resources and waterborne diseases. **Industrial, mining and agricultural expansion** also contributes to pollution of water sources and rivers, and to the destruction of wetlands. Statistics are limited when it comes to **climate change**, but it is predicted that the western part of the country will get drier, and the eastern wetter. Seasons will be more extreme, resulting in more flooding, in shorter and heavier rainy seasons and longer droughts. This will put huge pressure on dams, one of the reasons behind their proliferation.¹

This paper will look briefly at the various sources of water in our country and the quality of the water from our rivers. Our relationship with water in terms of the way we use it, and its scarcity, will be examined, and recommendations regarding our water sector will be considered.

3. The Quality of Our Rivers

The main problems affecting water quality in South African rivers are eutrophication (the over-supply of nutrients to water bodies, resulting in excessive growth of photosynthetic bacteria or plants); faecal pollution; salinity; toxicity (pesticides, endocrine disruptors, radioactivity); and acid mine drainage. In an August 2011 presentation to Parliament's Water Portfolio Committee, the DWA revealed its findings about the state of numerous rivers in the country.

In the **Western Cape** we have a situation whereby the Nuy, Groot, Olifants, Groot Brak, Swartvlei, Swartkops, Kariega, Mooi and Blaauwbank Rivers are affected by high levels of salinity. To the North, the Vaal River system, and the Orange River near the confluence with the Vaal, are impacted due to mining activities and irrigation, power generation and sewage effluents. The Waterval, Blesbokspruit, Natalspruit and Klip Rivers in the **Gauteng region** are also affected by effluents from wastewater treatment plants and industry, while the lower Crocodile River has been found to contain elevated salinity and phosphate concentrations which pose a concern, especially with respect to irrigation. It has been established that the upper Crocodile River has been polluted by effluents from gold mining activities and effluents from wastewater treatment works, and that the trophic state of virtually all the dams in

the Crocodile River catchment is very high, with algal blooms common. The Olifants catchment area is receiving discharges of acidic water from activities such as mining, while serious acid conditions prevail in the Klipspruit and Kromdraaispruit Rivers, with sulphate concentrations exceeding the Resource Water Quality Objectives.²

In the **Free State**, sedimentation is a problem, especially in the upper Orange River due to the soil structure which is sandy. However, the major dams in the Orange River, the Gariep and Vanderkloof, have very good water quality and sedimentation has no impact on them. Some **Northern Cape** rivers experience high levels of chlorides due to return flows mining and irrigation.

In **KwaZulu-Natal** there is a range of issues. The middle Umngeni River experiences high phosphate levels due to poultry farms and effluent from beef cattle feed-lots and informal settlements without sanitation facilities. The Umsunduzi River was found to have problems with turbidity caused by soil erosion and overgrazing; faecal pollution due to raw sewage entering the river via small streams; alien vegetation that impacts the river flow; and high salinity in some areas. The Umlazi river is heavily impacted due to sewage effluents discharged into the river; a solid waste site close to the river; sand mining that has resulted in diversion of the river; and industries, including a textile factory, that discharge directly into the river.

Finally, in the **Eastern Cape** it was found that the Mthatha River is impacted by high nutrients and faecal pollution due to overflowing sewage manholes and overloaded wastewater treatment works. The Great Fish River has high salinity but is diluted by the water from the Gariep Dam transfer scheme. The middle and lower stretches of the Buffalo River are affected by discharged effluents from wastewater treatment plants, although upstream remains pristine.

4. The Plan for the Future

The recently-published National Development Plan calls for all South Africans to have affordable access to sufficient safe water and hygienic sanitation to live healthy and dignified lives by 2030. Standards of service provision are expected to vary across the country, however, and there will be differentiation between densely

built-up urban areas and scattered rural settlements. While local government will retain the main responsibility for ensuring adequate service-provision, regional utilities will provide services where municipalities have inadequate technical and financial capacities. Sanitation services depend on the availability of adequate water resources and, if not managed properly, may damage the natural resource (by contaminating rivers and groundwater). For this reason, the authorities responsible for water resource management will co-ordinate their activities with local service providers, and monitor and support them.

4.1. Improved Access

It is estimated that between 1994 and 2010 the number of South Africans with access to basic water supplies increased from 23 million to 46.3 million (59% to 93% of the population), while the number with improved sanitation increased from 18.5 million to 39.4 million (48% to 79%).³ Improved infrastructure investments have also formed a key part of delivery since 1994, addressing problems resulting from earlier underinvestment. Changes include establishing institutions to focus on this task, such as the Trans-Caledon Tunnel Authority, and critical partnerships within the region, such as the Lesotho Highlands Project. However, implementing well crafted policies and strategies remains a challenge. While significant progress has been made in ensuring greater access to water, backlogs still exist. For example, the National Planning Commission's *Diagnostic Report* notes that access to potable water increased from 84.5 % in 2002 to 89.3% in 2009, but this figure was as low as 75% in the Eastern Cape (although up from 56.8 percent in 2002).⁴

4.2. Reduced Demand

Reducing demand, rather than just increasing supply, is important. Current planning assumes that it will be possible to achieve an average reduction in water demand of 15% below business-as-usual levels in urban areas over the period leading to 2030. Achieving demand reductions on this scale will require active programmes to reduce water leakage in distribution networks, and to increase the efficiency of water use by domestic and commercial consumers. Agriculture uses the largest volume of water, and the farming sector will therefore have to increase the efficiency of its water use to expand production and allow

transfers to other users in water-scarce areas, as well as for expansion in irrigated agriculture. The Planning Commission proposes a dedicated national programme to provide support to local and sectoral efforts to reduce water demand and improve water-use efficiency. Water-saving and demand-management projects should be considered as part of the overall range of water supply investment programmes. These can be compared with supply expansion projects, and should be prioritised accordingly, based on their merits. One strategy to increase the amount of water available for use, while protecting the resource, is to re-use water.

4.3. Water re-use

There is extensive indirect re-use of water in inland areas, where municipal and industrial wastewater is reintroduced into rivers after treatment. Significant areas and industries are supplied from this source, with the latter including, notably, the platinum mines of the North-West Province. There is, however, considerable scope for further water re-use. In coastal areas, for example, significant amounts of wastewater are discharged into the ocean, instead of being re-used. Desalination in these areas is also possible, although this option is often more expensive than re-use. Up to now, the major constraint on both re-use and desalination is that cheaper solutions have been available, mainly the building of dams. But this is changing; in many parts of the country there is no further scope for dam-building.

4.4. Water as a Public Good

The institutions that manage and develop water resources should reflect the shared, public nature of water, and the need for users and potential users to understand and respect the limits to its use, while also being involved in decisions about its management and related costs. Like land, water is vital for life and cannot be created – we have to manage with the amount that nature provides. Consequently, any tendency to commodify water should be resisted. Although current policy and legislation provides an institutional framework to achieve this, implementation has been slow. This is, in part, because the growing challenges of water constraints, and the need to build institutions to deal with them, are not fully understood. These institutions are needed to monitor, protect and administer the use of the resource, especially in regions where supplies have reached their limit,

or where pollution and contamination are serious problems.

5. Water Scarcity versus Water Wastage

It has long been a popular assumption that the major wars and conflicts of the future will be fought over water. This has framed the thinking with which most states, South Africa included, have sought to ensure water security. However, the situation in South Africa is not as dire as one might imagine, as the opportunities for co-operation and equitable use are greater than realised. Unfortunately, however, the approach that has been taken by South Africa in managing its water might, ironically, lead to greater insecurity at local community levels and turn the hypothesis into a self-fulfilling prophecy.

Mike Muller, former Director-General of the Department of Water Affairs and Forestry, recently speculated that an expansion of the Lesotho Highlands Water Project (LHWP) would ease the insecurity over water in Gauteng.⁵ This approach, based on the engineering of water transfer projects between distant river basins on a vast scale, places too much emphasis on the securing of more water as a cure to water insecurity, and fails to confront the underlying values and concepts that constitute South Africa's system of water supply. Greater prominence must be placed on the sustainable conservation of water throughout the system (which Mr Muller has also emphasised), especially once it reaches cities and urban areas, at which point it is most easily lost.

South Africa has helped in the institutionalisation of the management of water and in securing peaceful co-operation at State level, for example

by participating in organisations such as the Orange-Senqu River Basin Commission (ORASCOM). However, this needs to be accompanied at the domestic level by the use of more efficient apparatus and a reorientation of ideas towards conservation. It is thus encouraging to see that, within the discourse on water security, a nascent holism in thinking is emerging. The report to the Inter-Ministerial Committee on Acid Mine Drainage⁶, as well as the recent South African Energy and Water Forum (SAWEF), have acknowledged the inherent complexity of the context within which policy and decisions must be made.

6. Conclusion

Ensuring that human security is prioritised requires a systematic process that engages directly with consumers of water and that encourages more responsible consumption as well as conservation. Storing available water, and conserving and purifying existing water sources, is a neglected area which opens space for private industry and investment to supply apparatus such as water tanks and purification equipment, whilst encouraging more efficient household and industrial water usage.

South Africa leads the world in ensuring that water access is recognised as a basic right, but ensuring that such a right is implemented and enforced requires that all of us continue with a systematic rethinking about how water security can be attained for all.⁷

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¹Sipho Kings McDermott 'Water watch increasingly urgent'. *Mail and Guardian*, 20 March 2012.

²DWA Portfolio Committee *State of our Rivers* Presentation – 17 August 2011.

³Strategic Overview of the Water Sector of South Africa. 2010. Department of Water Affairs, Republic of South Africa - http://www.dwa.gov.za/dir_ws/wsnis/relatedInfo/A6_Strat_Overview_2010_08_ver_02M_email.pdf

⁴National Planning Commission *Diagnostic Report*. 2011.

⁵Timothy Walker, Rethinking South Africa's Water Security. Institute of Security Studies, 10 May 2011.

⁶Mine Water Management In The Witwatersrand Gold Fields With Special Emphasis On Acid Mine Drainage. 2010. Report To The Inter-Ministerial Committee On Acid Mine Drainage – <http://www.dwaf.gov.za/Documents/ACIDReport.pdf>

⁷Timothy Walker, Rethinking South Africa's Water Security. Institute of Security Studies, 10 May 2011.

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