

FROM A FLOOD TO A TRICKLE

– Water for all but only if we start saving



South Africans need not fear that their taps will run dry any time soon, but whether what comes out will be a stream or a trickle will depend on their willingness be more conservative in their use. This is one of the main messages emanating from the Department of Water Affairs' latest water resource planning strategy report. Article by Lani van Vuuren.

Over the past few years the Department of Water Affairs (DWA) has embarked on several reconciliation studies in water systems across the country, including the Vaal River system, Crocodile (West) system, KwaZulu-Natal coastal metropolitan areas, the Western Cape water supply system, the Algoa and the Greater Bloemfontein water supply area, to name a few. Together the systems investigated carry more than 75% of the country's population and generate over 80% of the national gross domestic product.

The studies examined the future water requirements in these areas in terms of availability of water to meet those requirements, the challenge being to develop interventions timely so as to ensure demand never outstrips supply. A new document has emanated from these studies, namely *Integrated Water Resource Planning for South Africa – Situation Analysis 2010*. The associated costs and energy requirements to extend supplies were also the main subject of a twin report, *An Assessment of the Ultimate Potential and Future Marginal Cost of Water Resources in South Africa*.

DWA Director: National Water Resource Planning, Johan van Rooyen, explains the reasoning behind the reports: "South Africa has enough water only if it uses its resources carefully and plans to meet future water requirements well in advance. Recognising that almost all major sources of readily available water have already been harnessed, the reports set out to review the situation and indicate how the country is to be supplied with water over the next 25 to 30 years."

WE NEED TO START SAVING

What is glaring from the documents is that South Africans have historically been far too liberal in their use of water. "Every water management institution and every

individual must adopt and implement water conservation/water demand management (WC/WDM) with great seriousness," says Van Rooyen. "It is absolute essential that we reduce our water requirements."

This responsibility trickles right down to the local repair of leaky taps. The reconciliation studies indicate that many towns do not measure their water use properly. This means that municipalities generally have a limited knowledge of their water use, not to mention losses, which can be as much as 50% or more. Another key cause of losses is ageing municipal infrastructure as well as poor plumbing, especially in low-cost housing.

The situation is exacerbated where water use by households is not metered and payment for use above the free basic allowance is not enforced. This has led to a per capita use of up to 300 l/person/day while the basic allowance is set between 25 and 50 l/person/day, with supplies planned on this basis.

The reconciliation studies show that most South African cities and towns can reduce their water requirements by between 15% and 30%. Van Rooyen is encouraged that flowing from the reconciliation studies have been strategy steering committees comprising local stakeholders, and that WC/WDM is now recognised and planned for as a key strategy.

The agricultural sector remains the largest user of water in South Africa (more than 60%). Even small savings here could make large volumes of water available for additional use.

LOOKING AT THE ALTERNATIVE

Beyond WC/WDM the situation and the solutions to providing water are not uniform across the country. Key to ensuring that we have enough water is having a realistic understanding of the situation, and what it takes – and what it

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THE OLIFANTS RIVER SYSTEM – AN AREA IN NEED

Recently completed reconciliation studies have raised alarm bells over the water supply situation in the Olifants River system in Limpopo/Mpumalanga.

The area is experiencing extremely rapid growth and the system has been severely overused in the past. The De Hoop Dam is currently under construction on the Steelpoort River (a tributary of the Olifants) and completion is targeted for 2012. However, while the dam will ease the pressure in the short term, it will not be possible to meet all the requirements of the Environmental Reserve from this dam, and, as growth and requirements continue to rocket, additional water, or a way of accommodating these severe shortages, will have to be found.

A Water Resource Conciliation Strategy Study is now underway and it is hoped that this will offer a range of options for consideration.



will cost – to meet the requirements, notes Van Rooyen.

Innovative thinking is required if South Africa is to adapt to the realities of a water-scarce country. Water resource planners are shifting focus away from the construction of large bulk water schemes towards the

WHAT ARE THE OPTIONS?

Build more dams

More than 70% of South Africa's current available water is received from surface water resources (i.e. dams and direct abstraction from rivers). The limits to the development of surface water sources have almost been reached, and the opportunities for the economic siting of new dams are few and far between. There are still a few large dam projects in the pipeline, though. The De Hoop and Springgrove dams are currently being constructed, with phase 2 of the Lesotho Highlands Water Project in the planning phase, among others.



the use of this technology – has decreased greatly over the last few years. The energy requirement for seawater reverse osmosis, for example, has come down from 22 kWh to produce a cubic metre of water in 1970 to 8 kWh in 1990 and 4 kWh today.

Make use of groundwater resources

At present, groundwater use around the country totals around 2 000 million m³/year, with a potential 5 500 million m³/year more available for use. Groundwater is a particularly attractive option for smaller towns, villages, mines and individual users. Aquifers can also be used as a way of storing surplus water through artificial recharge.

Desalination

Desalination is becoming a more attractive option, especially to meet water requirements close to the coast. Desalination plants can provide additional fresh water at a high but affordable cost, with a rapid implementation time possible. Energy costs – a traditional inhibitor to

Increase water re-use

The re-use of water only accounts for about 14% of all available water at present. Increasing the percentage is an important water reconciliation strategy, especially for mines and industry. The reclamation and re-use of effluents after treatment is now becoming financially attractive compared to other water resource developments.

Rainwater harvesting

The potential of rainwater harvesting as a water resource has not yet been quantified in South Africa, and at present it is mostly applied in rural households. However, it could become an important source of drinking water, livestock and irrigation water, or to refill aquifers through the recharge of groundwater. Several municipalities now have experience with

roof rainwater tanks for domestic use, which have been found to be particularly effective when used conjunctively with other water supplies.

Reallocating water use

Water may be moved from a less efficient to a more efficient use, traded from low value to high value use, or there can be a switch from a high consumptive use to a less demanding requirement. This changing use can affect whole sectors (for example, agriculture) and must be carefully considered for its consequences and planned over time to make water available where it is more needed.

Water conservation and water demand management

Considered the foremost strategy in reconciling the water balance, it is believed that water use in larger systems could be reduced by up to 30% through water conservation and water demand management. Water losses of up to 50% have been recorded in smaller towns and many are still not measuring water use properly. Addressing these issues could go a long way towards securing South Africa's water future.

Source: Integrated Water Resource Planning for South Africa – A Situation Analysis 2010

Water conservation and water demand management have to be implemented in all areas as a matter of urgency.



careful management and optimisation of existing use, increased use of groundwater resources, the re-use of water, as well as the desalination of brackish groundwater, mine-water and seawater.

Planning will not only have to be done at a national level, but also at a local and sectoral level. District and local municipalities, for example, will have to ensure that attention is given to water resources in integrated development planning,

something which is often lacking. It is believed that the reconciliation strategies should go a long way towards addressing this.

THE COST OF WATER

Despite attention shifting to alternative ways of enhancing water supply more bulk water schemes will have to be considered in some areas. Advanced planning here is crucial as such schemes can take anything from

ten to fifteen years from initiation to completion. Plans for Phase 2 of the Lesotho Highlands Water Project (LHWP), the raising of the Clanwilliam Dam, the Mokolo and Crocodile River (West) Water Augmentation Project as well as a dam on the Mkomas River to supply Durban are well underway. Other schemes being considered include the Nwamitwa Dam on the Great Letaba River, the Vioolsdrift Dam on the Orange River, and the iSithundu Dam on the Mvoti River.

The costs of most of these dam building options are very high, and much higher now that the more accessible sites have all been utilised. "We have long known that water is growing scarcer and that it will get more and more expensive. What we did not know was just how expensive this water would be, and how much augmentation costs would differ for different centres," Van Rooyen tells *the Water Wheel*. "Most particularly,



Lani van Vuuren

The needs of the environment is a serious consideration in modern water resource planning and management.

increasing supplies to the Olifants water management area will be exceptionally costly."

The Situation Analysis also shows that unit cost of water from options for increasing the water availability in the Vaal River system, whether

the processing of acid mine drainage for potable use, Phase 2 of the LHWP, or the Thukela Water Project are all estimated to be in the order of two to ten times the cost of the most recently undertaken new resource developments. Water supply to the

Call for Expression of Interest: WDM Projects

The Water Demand Management (WDM) Programme is hosted by the Development Bank of Southern Africa (DBSA), and supported by the Swedish International Development Cooperation Agency (Sida). The Programme is focused on building a WDM culture in the Southern African Development Community (SADC) region to ensure effective and sustainable use of water that contributes to the SADC goals of regional integration and poverty alleviation.

Support from the WDM Programme will be considered for projects which embody the Programme objectives. The Programme Implementation Unit (PIU) invites Expressions of Interest (EOIs) for WDM projects. The EOI should outline the project details, the WDM intervention required, an estimated budget, and proposed time frame. It should be no longer than 10 pages. There are three fundamental criteria an EOI should exhibit, namely (1) pro-poor impact, (2) cost effectiveness, and (3) demonstration value.

The types of projects the WDM Programme will consider supporting include technical as well as community based projects.

Who should apply?

Municipalities * Water Utilities * Water Services Institutions, including water user associations and international water management bodies * State owned enterprises * Government departments.

Once an EOI is received, an assessment is made by the PIU and a decision is taken, in consultation with the Reference Group (RG), regarding support for implementation.

EOI guidelines are available from the WDM Programme website as well as from the PIU.

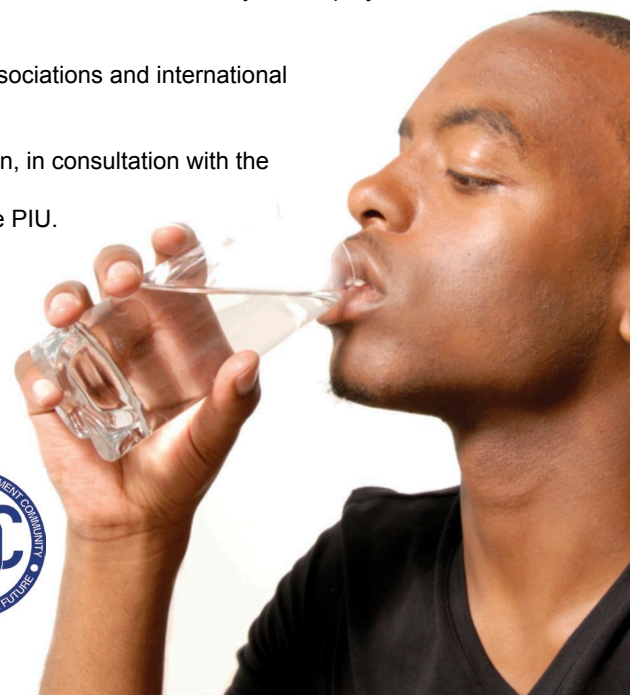
The process is flexible and tailored to each case.

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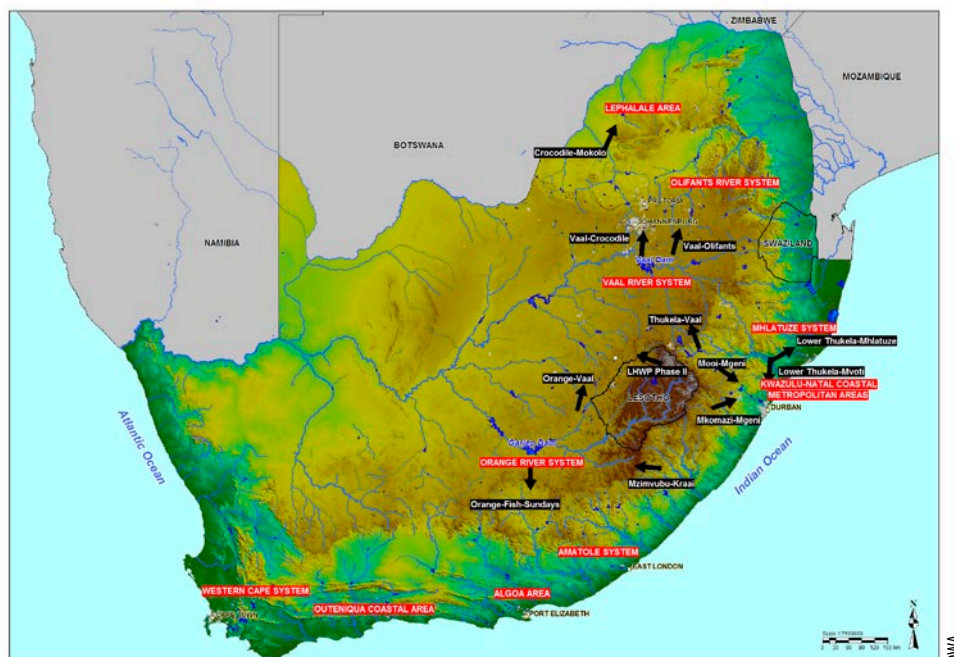
Cape coastal cities is also expected to be costly over the long term, and here desalination of seawater will probably become a serious consideration.

“Not surprising perhaps is that the unit cost of water from many new developments will substantially exceed the economic value it currently has for some existing water users,” notes Van Rooyen. “Changing the use of this water may be far more sensible than implementing new schemes – but these are not decisions to be taken lightly. The future cost of water can be expected to become a major incentive with regard to the location of growth and development nodes.”

WATER FOR THE ENVIRONMENT

Something else that requires much more consideration is water to meet the Ecological Reserve. “As a nation we have already, for many rivers, taken more water than is good for the functioning of those rivers,” says Van Rooyen. “We have an obligation to try and restore the balance if our rivers are to continue to provide ecosystem services.”

Recognition of the Environmental Reserve and the volumes of water that have been set aside or declared necessary to meet those requirements



Above: The remaining bulk infrastructure development options.

Left: Desalination of seawater is becoming an attractive option for coastal communities.

RELATED DOCUMENTS

To access the reports:

- *Integrated Water Resource Planning for South Africa – Situation Analysis 2010*
- *An Assessment of the Ultimate Potential and Future Marginal Cost of Water Resources in South Africa*,

Visit: <http://www.dwa.gov.za/Documents/Default.aspx> and click on the relevant document.

In addition, an explanatory booklet, *Integrated Water Resource Planning for South Africa* is available from the Department of Water Affairs.

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have meant that users have not been allowed to squeeze every last drop out of the system. Less water is being made available than might otherwise have been the case.

“As planners our thinking has changed to the extent that we now understand that this water never was, in reality ‘available’ – we are using water that was not ours to use,” explains Van Rooyen. “In some systems far too much water has already been put to use, and it is going to be very difficult to reverse the situation and make the necessary water available to meet the requirements of the Reserve.”

There will be difficult choices in a number of systems. New infrastructure

can be built in order to provide ecological flows in the dry season, or users may be required to return some of their water to the system.

South Africa has enough water to stay in business but the country must accept that the days of plenty are over. The documents will now serve as background to spatial and sectoral development planning at national scale, and guide development options. Says Van Rooyen: “It is our hope that these documents will place the issue of water resource planning and management firmly on the national agenda so that together we can take the necessary steps to ensure that we will never run out of water.” □