national planning commission
Department:
The Presidency
REPUBLIC OF SOUTH AFRICA

Some for all, forever

Policy Brief: Investing in Water Security

National Planning Commission

Infrastructure Task Team

Executive Summary

South Africa is a water scarce country facing a severe water crisis, exacerbated by the current and future impacts of climate change. This is a binding constraint on future growth and development. The current level of investment of R165 billion per annum to cover both operational and capital expenses is inadequate. To assess future investment requires to achieve water security by 2030, the National Planning Commission commissioned a report that was compiled under the auspices of a Steering Committee comprised of representatives from the National Treasury, National Planning Commission, Presidential Climate Commission and the Development Bank of Southern Africa (DBSA).[1] The DBSA provided the funding for the research team and the compilation of the report. Three scenarios were assessed: a baseline business-as-usual scenario, a worst scenario and a sustainable alternative. The sustainable alternative is recommended because it is the most affordable and delivers the best results from a developmental and environmental perspective. The overall conclusion is that private sector investors need to be drawn into the funding of water as a public good. It is proposed that this Policy Brief is used as a basis for an engagement with the financial sector to ascertain under what conditions it will be possible to increase investments in the water sector across the entire value chain from upstream water resources to downstream water services.

Introduction

The 'Dublin Principles' for Integrated Water Resource Management (IWRM) were globally agreed in 1992 and it was no coincidence that when South Africa's first democratic government began formulating water policy in 1994, and published the National Water Act in 1998, that the country's legislation resonated with the principles of IWRM (Allen, 2003). South Africa's National Water Act (NWA) commences with the idea that "… Water is a scarce and unevenly distributed national resource which occurs in many different forms which are all part of a unitary, inter-dependent cycle and …the need for the integrated management of all aspects of water resources and, where appropriate, the delegation of management functions to a regional or catchment level so as to enable everyone to participate" (RSA, 1998). The NWA replaced South Africa's Water Act (1956) founded on European

[1] . https://www.nationalplanningcommission.org.za/assets/Documents/South%20Africa's%20Water%20Sector%20Investment%20Requirements%20to%202050_Final%20Report%20August%202023.pdf

water law, and set out to align water allocations with the country's post-1994 democratic ambition. In support of this ambition, the Department of Water Affairs coined the slogan, "Some for all, forever" to foreground the NWA's balance between economic efficiency, environmental sustainability and equity.

The *National State of Water Report 2023* makes it very clear that South Africa is facing a water crisis. If the rate of economic growth is not decoupled from the rate of water use, water will become a binding constraint that hampers future economic growth and undermines development strategies for meeting basic human needs. Furthermore, given that Southern Africa is warming at twice the rate of the global average, the science reveals very clearly that South Africa faces very serious water challenges in the relatively near future.

To address the challenge of water as a binding constraint, it will be necessary to introduce fundamental changes to the way water is regulated, managed and financed. This policy brief focusses on the investment requirements to achieve water security by 2030.

The future investment requirements of three future scenarios are reviewed, namely a baseline scenario which is essentially business-as-usual, a worst-case scenario, and a recommended sustainable alternative. In each case, using the World Bank's 'beyond the gap' assessment method, an analysis is provided of future investment requirements compared to current investment levels.

Research Overview

Research approach

The adapted 'Beyond the Gap' framework that was applied in this study, comprised four steps (Rozenberg and Fay 2019):

- **Identify objectives:** With support from DWS, the Water Research Commission (WRC), and a broader Water Sector Working Group, the NDP goals were interpreted through the lens of South Africa's national water policy and associated targets. Six sector objectives were applied in the model: universal access to safe and reliable water and hygiene services based on the SDGs and South African policy (DWS's National Water and Sanitation Master Plan goal of 175 litres per capita per day); affordable and financially sustainable water services, which was interpreted in the model to imply lowest life-cycle cost and a financing arrangement that equitably distributes liability for the cost; reduced demand on freshwater resources through the adoption of efficiency measures; increased catchment and water infrastructure resilience, particularly in the context of climate change and more intense rainfall events; reducing the environmental impact of service delivery through attention to greenhouse gas emissions and resource efficiency - in South Africa, the 'wastewater treatment and discharge' category accounts for 4.5 $MtCO_2e$ per annum, 0.9% of national emissions; aligning with SDG 6.4, the model assumed a 15% improvement in water use efficiency by 2030, as outlined in the National Development Plan (RSA, 2011).

- **Identify policy choices:** The policy choices that influence the investment required to achieve the described 'objectives' was selected with help from the project steering committee (comprised of DBSA, SA-TIED, the PCC, and NPC). The options included (i) attainment of the NDP goal for water and sanitation on every property, or, alternatively, in line with DWS precedents allowing for these water services to be shared by up to five properties in some instances; (ii) different water service

technology options: “conventional” (standpipe taps and flush toilets), “low cost” (ventilated pit latrines) or “alternative” (waterless and biodigesting toilets) technologies; (iii) different degrees of “water conservation and demand management”; (iv) timing – whether the objectives were achieved by 2030 as imagined by the SDGs or by 2040; (v) the extent of invasive alien plant clearing and its impact on run-off in major catchments; (vi) the size of the water allocation to South Africa’s agricultural sector, ranging from an increase of 15%, to an increase of 6% or a reduction of 15% on 2020 levels; (vii) a respective 15% improvement and 15% decline in operational efficiencies at bulk water supplies and inter-basin transfers by 2030, that the model then assumed would be maintained until 2050.

- **Identify exogenous factors:** Attention was given to “exogenous factors” that are unrelated to water policy but which influence the quantum of required investment to attain the ‘objectives’ identified in the first step. The extent of anthropogenic warming and its impact in South Africa, and the choice of South Africa’s energy sector strategy, were respectively identified as significant on the quantum of required investment in the water sector (DBSA/WB, 2022).

- **Estimate investment requirements for achieving objectives:** By combining exogenous factors with policy choices, a set of future scenarios was established. Capital and operating costs of achieving the identified objectives under each water demand future was forecast using two Microsoft Excel models. The first involved a Water Services Model that calculated demand for potable water and the cost of providing the water distribution infrastructure, taps and toilets to meet this demand for urban formal, urban informal, rural formal, and rural informal communities respectively between 2023 to 2050. The second, involved a Water Resources Model that captured the cost of securing additional water, in order to meet demand in each of South Africa’s seven major water systems.

- **Estimate the funding gap**: The final step of the ‘Beyond the Gap’ framework involved calculating the difference between existing flows of investment and the required investment, to report the funding gap for both capital and operating expenditure, under the different scenarios of future water demand. Current levels of investment in both operations and capital investment is R165 billion per annum across the entire value chain (i.e. from bulk water resources through to water services at municipal level).

Research results

- *Baseline scenario* assumes no policy change, median climate change impacts, maintenance of current energy mix, achieving the NDP goals by 2030 using conventional technologies only, maintenance of existing levels of Invasive Alien Clearing (IAP) clearing, continuation of existing allocations of water to agriculture, and existing levels of (in)efficiency in the integrated bulk supply system continue at current levels.
    - Financing the baseline: R256 billion will be required for both operations and capital expenditure annually between 2023 and 2050 to achieve the NDP’s water sector objectives within this baseline scenario - R91 billion more than current investment levels.

- *Sustainable alternative*: in this scenario it is assumed that a significantly wetter climate on the more eastern side of the country will occur, a meaningful transition away from coal takes place in accordance with IRP2019 and IRP2023, sharing of some water taps in certain communities, aggressive water conservation/demand management, increased clearing of IAPs, reduced allocations of water to agriculture as a result of improve water use technologies, and improved bulk water system efficiencies.
    - Financing the sustainable alternative: annual investment requirement to cover both operational and capital expenditure could be reduced under this scenario to R214 billion per annum which is R75 billion more than current levels of investment (R16 billion less than keeping the baseline scenario going).
- *Worst scenario*: in this scenario a much drier climate across the country unfolds, no energy transition takes place to a low-carbon energy system, full conventional water technologies are used, no management of IAPs takes place, there is an increased water allocations to agriculture, and a decline in system efficiencies.
    - Financing the worst scenario: to achieve the NDP goals under this worst scenario will require an investment of R314 billion per annum to cover both operational and capital expenditure – a funding gap of R149 billion per annum (nearly 50% increase compared to current levels)

Figure 1: Aggregate estimates of investment need across the baseline, high and low scenarios 2021-2050.

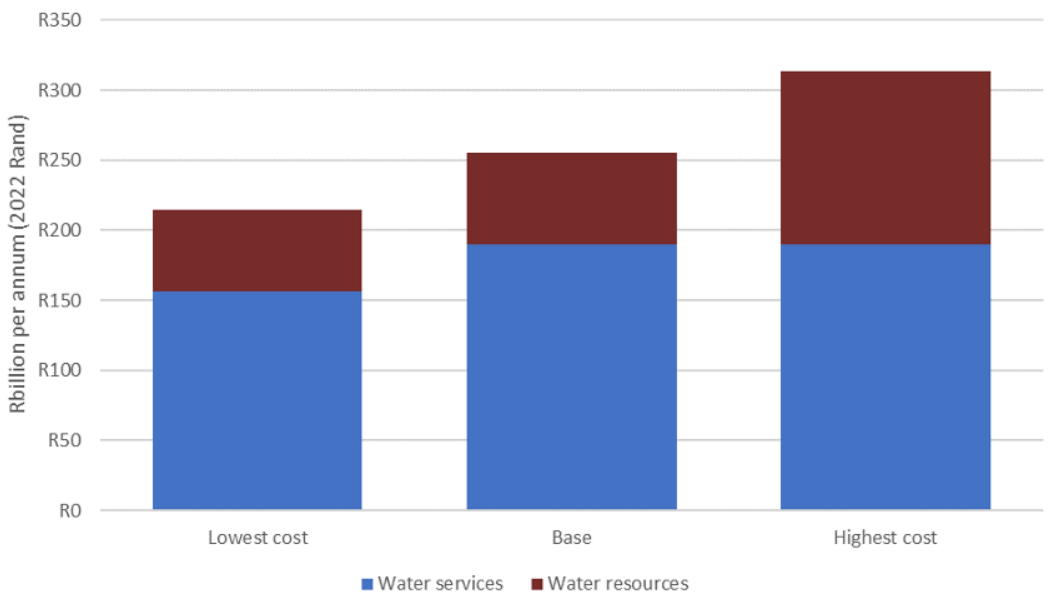
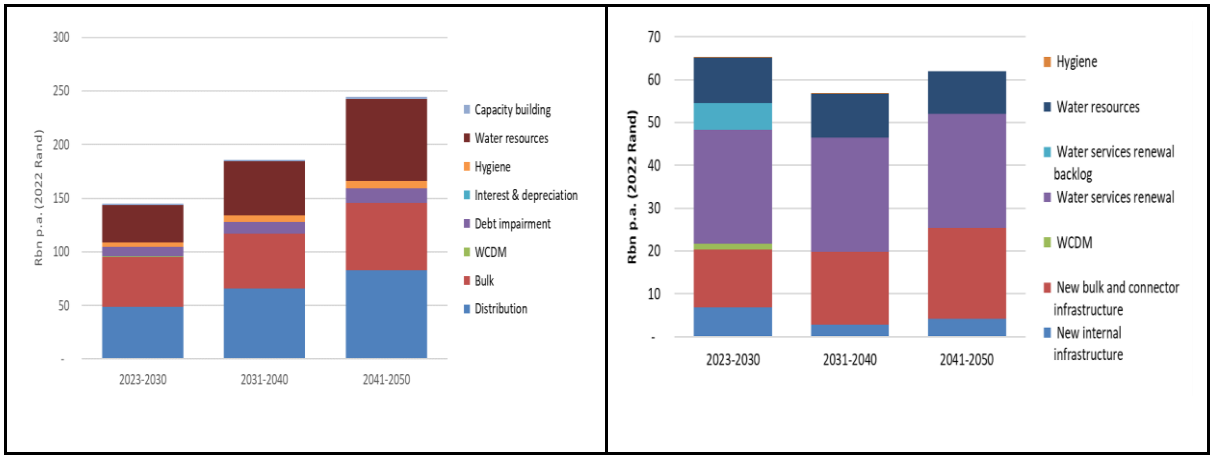


Figure 4: Disaggregated operating expenditure requirement associated with the baseline scenario.

Figure 5: Disaggregated capital expenditure requirement associated with the baseline scenario.



(Source: DBSA et al. 2023)

Analysis of Research Findings

The most significant research finding is that the *sustainable alternative* is financially more affordable compared to the baseline (business-as-usual) and the worst scenario.

The inclusion of both capital and operating expenditure and water supply and water distribution and treatment, accounts for the generally higher estimates of investment needed relative to previous studies, including the National Water and Sanitation Plan (NWSMP) estimate of R899 billion between 2018 - 2028 for capital expenditure only. The inclusion of all costs is, however, considered a more accurate reflection of the cost of attaining NDP and related water policy goals and SDG6. The magnitude of annual operating costs is shown to be 3 to 4 times larger than capital costs (Figure 1), and ignoring operating costs is one of the causes of infrastructure decay and backlogs. It is noteworthy that any policy choice that results in high near-term demand, such as an immediate increase in the allocation to agriculture, drastically increases the investment need by requiring near term investments in water

The model results point to the importance of timing in infrastructure investment and maintenance. Given the extent of South Africa's water assets (nearly R1 trillion) it is no surprise that delays in maintaining and replacing this infrastructure, result in higher investment needs.

Understanding the full extent of the outstanding investment need, R75 billion - R149 billion per annum, represents a critical step towards unlocking the multiple benefits that would arise if the country implemented its water policies. Infrastructure investment models have a track-record of either under-reporting actual investment costs or reporting very large numbers based on an 'ideal world' scenario that has very little chance of being funded (Andersen et al., 2016; Flyvbjerg and Gardner, 2023). This assessment mitigated those risks by assessing the gap between existing and required investment, and by including the influence of policy choices and exogenous factors. While the estimated investment gap is large, the study reveals how it can be increased or decreased by a variety of decisions and actors.

The approach serves to achieve a number of important outcomes: it locates infrastructure finance in the policy world rather than as a discrete science; it challenges policy officials and financiers to consider the impact of their decisions on the amount of investment required; it foregrounds the role of macro-economic policies in achieving the NDP goals and it translates the impact of climate change into the availability of a critical resource and the need for investment (Hallegatte and Mach, 2016). It

also highlights the importance of paying for renewal of existing infrastructure in order to prevent a reduction in the efficiency of the operation of existing systems (such as the bulk systems) that are threatened by a lack of funding and technical capacity both within national entities (such as DWS to manage the bulk systems) and municipalities (to maintain the water and sanitation infrastructure).

New financing approaches will have to be found if the suite of benefits associated with realising the NWA vision and NDP goals for water are to be unlocked (Alaerts, 2019). These approaches will need to balance fiscal stability against the financially systemic risk of not achieving the NDP goals for water; both the failure to deliver on water policy objectives and the rapid allocation of capital to achieve these objectives hold the risk of macro-economic and political instability in South Africa. Future work by the NDP's Finance Task Team will address this challenge.

Reallocating water from agricultural to higher-paying household and business users, and increasing tariffs across all users, could reduce the funding gap to just 18%, but these options have proven difficult to apply amid concerns around food prices and rural economies (Cartwright, 2021). The most significant investment savings result from reducing the extent of "non-revenue water", investments in IAP clearing, water conservation and demand management, capacity building and more efficient integration of different water schemes.

Where failing water infrastructure assets and rolling water shortages or floods are recognised as everyone's liabilities (as was the case during the Day Zero Drought 2016-2018, or in the wake of the KZN floods of 2021), households begin investing in water storage tanks, farms installed multiple small dams and reservoirs, and investing in groundwater extraction or grey water re-use become attractive. In the wake of the KZN flood damage in 2022, the need to invest in more stable water catchments, capable of retaining water in grasslands, wetlands and soils and reducing flood damage, suddenly became apparent to all asset owners. In this context, it is possible to raise finance for both water resource and water services infrastructure from a multiplicity of sources. Where this investment can create jobs, such as has been demonstrated by various ecological infrastructure options, or through the proliferation of grey water recycling for example, it supports the type of poverty alleviation that could enhance the capacity to raise finance through water tariffs.

Recommendations

In a context of conservative fiscal and monetary policies that are unlikely to change in the near future, effective blending of public and private financial flows to support the attainment of the NDP water goals will become essential. This will not only unlock the multiple significant benefits of universal access to water services, but serve as a critical exemplar of how to achieve other NDP goals that are currently at risk of under-investment.

Private sector involvement in water services is already in evident in South Africa, albeit in a limited way. Some Water Service Authorities are now run by private sector operators (e.g. Queenstown, Stutterheim, Nelspruit). The untapped potential of blended finance solutions is being addressed by the Development Bank of Southern Africa (DBSA) which has established the Infrastructure Fund as a vehicle for blending grants from the national fiscus with private sector funding provided mainly by the pension funds (DBSA, 2022). The Infrastructure Fund works with the newly created National Water Resources Infrastructure Agency (established by the DWS) to coordinate blended finance solutions in the water sector. These institutional innovations offer important potential, but need to be

complemented by an enabling financing paradigm if they are to unlock private sector financial flows for universal access to safe and reliable water services.

The following are the specific recommendations that flow from the above findings and analysis:

- take a strategic and policy decision to define the *sustainable alternative* as the preferred future scenario, not least because it is the most affordable;
- translate the *sustainable alternative* into an integrated water policy framework that includes upstream water resources and downstream water services, with a focus on both operational and capital investment requirements;
- engage the financial sector to ascertain under what conditions will it be possible to significantly increase private sector investments in the provision of water as a public good for the benefit of all;
- address the capacity constraints in the water sector across all spheres of government, in particular at municipal level where it might be necessary to adopt creative institutional solutions to address the many challenges that have emerged at municipal level.

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