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INTERNATIONAL WATERS

WATER RELATED TRAINING EDUCATION AND RESEARCH IN THE GLOBAL SOUTH

Policy Brief **June 15, 2017**

The Future of Drought Management for Cape Town: Summary for Policy Makers

Executive Summary

The City of Cape Town (CCT), and South Africa in general, have been experiencing significant water shortages due to the ongoing drought. In early April 2017, the CCT was reportedly down to its last 100 days of water (News24, 2017) and on 31 May, the City imposed unprecedented Level 4 water restrictions, which introduced stricter limitations on residential water use, encouraging use of up to 100 liters (l) per person per day; forbidding irrigation with municipal water; and suggesting the use of treated effluent and wastewater for non-potable purposes. The indigent water allocation for impoverished households was capped at 350 l per day (CCT, 2017). On 31 May, CCT announced they will start working on a new *Water Resilience Plan* to address the future of Cape Town's water. Due to climate change effects, drought events are no longer within an envelope of predictable probability. In fact, South Africa is likely to experience more frequent droughts in the future. As our research suggests, existing institutional barriers to alternative water source integration may be limiting effective adaptation responses to hydrological variability and regime changes. Our research serves to inform the new *Water Resilience Plan* by highlighting aspects that can best contribute to increased water-related resilience. We find that *Water Sensitive Urban Design* principles and enhanced groundwater protection measures show promise to provide a more flexible portfolio approach to drought in Cape Town. This can reduce dependence on dams and surface water and provide additional buffer in times of scarcity. This policy brief is based on research that investigated the water governance landscape of the CCT, with a focus on resilience in the water sector.

Policy Recommendations

1. **Shift from surface water-centered to a more diverse water supply portfolio approach that better utilizes the existing natural and physical infrastructure.**

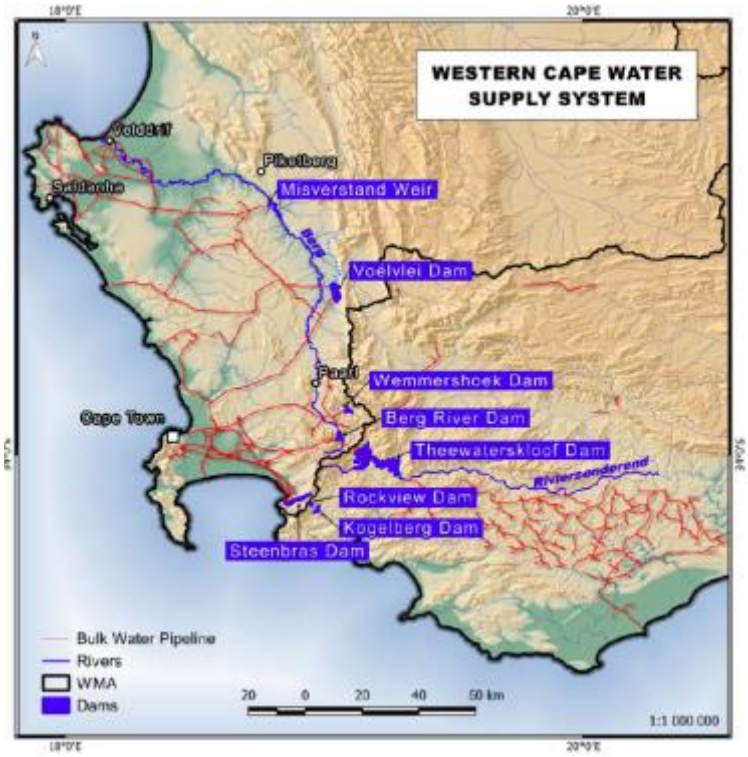
2. **Upscale efforts to implement Water Sensitive Urban Design into new city-wide development projects.**

3. **Work collaboratively with diverse stakeholders to address ongoing social challenges while adapting to a more water sensitive city.**

Context

Drought Management in Cape Town

Due to the success of the Water Demand Management/Water Conservation (WDM/WC) Strategy rolled out in 2001 (and significantly revised in 2007), the City of Cape Town (CCT) has been able to postpone water supply-side interventions over the past decade, as overall water demand in the region has remained relatively stable. However, increasing population and economic growth have driven rising overall water demand since 2014. For long term water supply planning strategies, the CCT and the national Department of Water and Sanitation rely on the Western Cape Water Reconciliation Strategy (2007), which identified four water supply augmentation schemes for the region served by the Western Cape Water Supply System (WCWSS) (see Figure 1). Two of the four schemes involve groundwater source development and aquifer use. These alternative schemes have been postponed several times due to the success of demand management, however growing demand and the intensity of the current drought mean that supply-side interventions will be necessary more quickly than has been anticipated in CCT water strategic plans. Notably, the state of emergency surrounding the current drought has prompted the reconsideration of groundwater development, namely drawing water from the Cape Flats and Table Mountain Group aquifers (News24, 2017a).



Water Policy Landscape

At the national level, South Africa has several policies and strategies in place to deal with drought conditions, including the Disaster Management Act No. 57 of 2002, the National Disaster Risk Management framework of 2005, and the Drought Management Plan of 2005. In addition, South African provinces and municipalities have their own drought management plans (e.g., Western Cape Sustainable Water Management Plan – 2012).

In terms of responsibility, the bulk water supply authorities play a crucial role in handling drought risk in South Africa. The national Department of Water and Sanitation is mandated to manage the country's water resources and thus has ultimate responsibility for the country's dams, pipelines, and bulk water and irrigation schemes. Municipalities are mandated to implement demand management and water conservation, which have been promoted as the most important drought coping strategies (e.g., Meissner and Jacobs-Mata 2016). Unlike the rest of the country, the CCT has been highly successful in implementing a WDM/WC strategy since 2001, leading to widespread recognition and multiple awards, including a C40 Cities Award in 2015. However, as we argue below, WDM/WC plays an important but

insufficient role in drought management in Cape Town, because the success of this strategy has delayed proactive alternative water supply planning. Demand management in Cape Town has also been critiqued for its negative effects on impoverished urban populations (e.g., Mahlanza, et al, 2016; EMG 2016). The current drought has demonstrated that water use restrictions are insufficient when dealing with increasing water scarcity— an issue that is likely to intensify with ongoing climatic regime changes (Pohl et al, 2017).

Research

This policy brief is based on research conducted as part of the requirements of a Master of Science degree and a PhD degree at the Institute for Resources, Environment and Substantiality at the University of British Columbia, Canada. The research focused on several topics relates to water system resilience and groundwater governance in Cape Town, and this policy brief synthesizes these findings in relation to specific options for drought management in Cape Town. The broad goals of the research were to investigate the water governance landscape of the City of Cape Town, with a focus on resilience in the water sector. Topics investigated include: groundwater use viability and governance; future water supply schemes; the current state of, and possibilities for, implementation of water-sensitive urban design; and stormwater upgrades in various part of Cape Town, including in informal settlements. As part of the research, 32 in-depth expert interviews were conducted with managers and department heads from the City of Cape Town; hydrological and hydrogeological consultants; and technical and academic experts involved with research, decision-making, planning and management of local water resources. This research also draws on site visits and analysis of relevant policy documentation. For more information, visit www.edges.ubc.ca.

Key Findings

The expert interviews, in conjunction with policy review [e.g., The Reconciliation Strategy for the Western Cape Water Supply System (2007)], suggest that **Cape Town has reached its maximum dam construction potential**. Thus, additional bulk surface water supply schemes are highly unlikely, only small-scale augmentation schemes are reasonably possible.

In the last few months, Level 3, Level 3b, and Level 4 restrictions have been rolled out in quick succession. Water consumers have found it difficult to meet these restrictions during the height of the 2016/2017 summer, as evidenced in CCT news releases, suggesting that water demand **restrictions are not a reliable and sustainable option** for drought management on their own. Experts at CCT suggest that the efficiencies gained with demand conservation come at the cost of flexibility in the longer term, as there is a limit of how much water consumption can be constrained while still enabling wellbeing and productive livelihoods. Further, aspects of WDM/WC have also become socially contentious in impoverished urban areas, where the installation of water demand management devices has resulted in social resistance, or high levels of debt and other justice concerns. Demand management and conservation can become a significant burden on impoverished households (EMG, 2016; Mahlanza, et al 2016), who consume smaller amounts of water relative to wealthier neighbourhoods. These factors suggest that with the likely increased frequency and intensity of droughts in the future, **Cape Town will need to broaden its portfolio**

of water supply options, rather than relying solely on conventional surface water sources and WDM/WC.

Our research findings suggested **groundwater as an inevitable addition to Cape Town's portfolio**. Regional, large-scale groundwater use and aquifer development in the Table Mountain and Cape Flats can increase water security during droughts as groundwater has shown to be more resilient to hydrological extremes and variability than surface water (Taylor et al, 2013). However, integrating groundwater schemes into the WCWSS is also associated with considerable uncertainties around groundwater management, as well as with knowledge, capacity and governance barriers. More importantly, developing the Cape Flats aquifer for water storage or supply augmentation, will necessarily impact various water users and stakeholders in both the short and long runs. Therefore, a successful groundwater management plan will also **require a robust and equitable stakeholder engagement process**, including the City's water planning departments, various urban developments in the Cape Flats areas, food producers in the Philippi Horticultural area, and others.

Along with groundwater strategies, Cape Town has **demonstrated limited but promising success with sustainable stormwater infrastructure options**, such as regulating developments adjacent to floodplains and reducing impervious surface areas to decrease pollutant loads in urban runoff. This path is worth pursuing as a way forward for Water Sensitive Urban Design (WSUD) in Cape Town. Notable achievements in the policy domain include the Floodplain and River Corridor Management Policy (2009), Management of Urban Stormwater Impacts Policy (2009) and Sustainable Urban Drainage Systems: Landscape and Indigenous Plant Species Guideline (2011). N. Armitage and other colleagues (2013; 2014) have begun assessing different WSUD options for South Africa and Cape Town more specifically. More recently, researchers from the University of Cape Town provided additional evidence in support of stormwater harvesting as a possible alternative water source that could supplement conventional water supply systems (Fisher-Jeffes, et al 2017), although considerable debate about the potential of stormwater harvesting is ongoing (see Knight, 2017). Our expert interviews suggest that the Stormwater Department in Cape Town has lower capacity (in terms of resource and institutional support) than the Bulk Water and the Water Utility departments, which is one of the main barriers to further investigating and scaling up WSUD in the city.

Conclusions

Cape Town, as with many other municipalities, faces highly variable and uncertain hydrological regimes, particularly in light of anticipated climatic changes (Pohl et al, 2017). While many experts agree that there still are considerable uncertainties in *exactly how* hydrologic regimes will change in the future, cities and water planners need to act in the face of ongoing and emerging risks nonetheless. While there are no easy solutions, we believe that moving towards a diversified water supply portfolio approach that focuses **on working within the existing natural (ecological) and physical (built) infrastructure is more likely to increase resilience to drought both in the short and in the long term,** as opposed to exclusive reliance on WDM/WC or costly large-scale bulk surface water supply schemes. This would involve scaling up sustainable urban drainage projects and groundwater abstraction while enhancing groundwater recharge

and protection, wastewater reuse, and 'fit for purpose' water reuse solutions (i.e., using water of certain quality for a purpose that is appropriate for that quality, such as using non-potable water for toilet flushing; see more in Armitage et al, 2014)

While demand management has been key in curbing overall demand growth in Cape Town, focus on this strategy has likely slowed the uptake of other approaches for diversifying the City's water supply portfolio. Short planning horizons in drought management and a general hesitation to integrate alternative sources into the water supply system, due to future uncertainties, among other reasons, have impeded the implementation of forward-looking and innovative water planning. Lastly, we recommend careful and **sustainable groundwater development and aquifer protection** for urban recharge zones, in consultation with the various stakeholders involved. Aquifer protection involves a range of strategies, including identifying groundwater protection zones to be exempt from development, land use changes, and managing stormwater quality - all of which will help build long term resilience of the city's water systems. We also recommend expanding the uptake of the WSUD framework in future water policy changes.

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