

FIELDNOTE

Managing floods and droughts,
lessons for municipalities



August 2018





National government can't be expected to lead cities in dealing with water scarcity and drought. Research shows they are slow to intervene, and when they do their actions, they are often not at the right scale or timely enough. Local governments are in a better position to take decisive action and act at a local scale where they can engage citizens, communities and businesses in averting a water crisis.

In 2016, South Africa experienced one of the worst droughts in decades. Many towns and cities across the country were left with compromised water supply systems and limited food production. This placed pressure on an already fragile economy. This drought taught us that to avert a future water crisis, the country needs to seek alternative sources of water supply and reduce reliance on conventional surface water schemes like dams and reservoirs.

Another key lesson is that cities need more autonomy to act decisively, although proactive, inter-governmental support and cooperation is both helpful and necessary. So, the question municipalities must ask is. "How do we best manage floods and droughts?"

Recent Water Research Commission-funded (WRC) project successes in the Western Cape have shown that Water Sensitive Design (WSD) and Sustainable Drainage Systems (SuDS) are two viable ways for South African municipalities to manage floods and droughts, and in the process also save water.

Dr Kirsty Carden of the University of Cape Town has been involved in various WRC projects on integrated and sustainable approaches to addressing problems of water management in the urban areas of South Africa. Her research interests include the relatively new field of WSD in South Africa. She attributes her team's successes in working with municipalities on WSD and SuDS to careful negotiation during discussions with municipal stakeholders. She is also a strong proponent to local innovation and new technologies. "We have been involved in WRC-supported research to do with WSD and SuDS for some years now, and have been responsible for the development of locally-relevant

frameworks and guidelines, which can be used by decision-makers in local and national government to start building the concepts into the required policy at a local level."

Join the WSD Community of Practice

Dr Carden says these concepts are being reinforced by a separate programme which they lead on behalf of the WRC, entitled 'Development and management of a Water Sensitive Design Community of Practice programme', which is essentially focused on spreading the word about WSD, sharing information on WSD-related activities around the country, and conducting training. Many of these activities have been directly targeted at the metropolitan municipalities around South Africa, with relevant personnel becoming an important part of this Community of Practice.

There is now a much more well-developed understanding and knowledge of WSD around the country, and uptake and buy-in are slowly improving. If you work at a municipality or metro you can get involved and attend these workshops and dialogues.



Stormwater harvesting – A game changer



The harvesting of stormwater offers an alternative water supply source. Almost entirely untapped in South Africa, it could ensure improved water security for towns and cities across the country.

During the 2016 drought, stormwater harvesting was identified as a key strategy to help South Africa manage its water shortages. This is the collection and storage of rainfall run-off in open ponds or aquifers. It's been identified as one alternative water resource that could supplement traditional urban water supplies. Stormwater could be treated to potable standards, but it may not be economically feasible and it may be preferable to use the stored water for non-potable purposes like irrigation and toilet flushing. It is different from rainwater harvesting, which is the collection and storage of run-off water from an individual property for private use – usually from the roofs of buildings.

There's only been one large-scale example of successful, long-term stormwater harvesting in South Africa. This is in the town of Atlantis on the country's west coast.

The low rate of adoption of stormwater harvesting is likely due to a range of socio-institutional challenges. These include resistance to innovative approaches, fragmented and underfunded water management institutions, a lack of political will, and a shortage of capacity required to operate and maintain the harvesting process. There are however signs of increasing interest of utilising stormwater as a resource in the country with a number of smaller scale schemes being undertaken.

Stormwater and higher-quality treated municipal effluent in Atlantis are used to recharge the aquifer beneath the town for later extraction through boreholes. The scheme has successfully ensured a consistent supply of water for the town over the last 37 years. Approximately 30% of the town's groundwater supply comes from the artificial recharge scheme.

Stormwater harvesting can improve water security and increase resilience to climate change in urban areas. It can also prevent frequent flooding and provide additional benefits to society – such as creating amenities and preserving biodiversity.

But research shows that it should also be seriously considered as an alternative water source in other areas. In Cape Town most of the harvestable stormwater is only available during the wet winter months when the reservoirs are typically filling in any case. If it were properly captured it could be used as a way to reduce normal demand during this time.

Cape Town obtains roughly 400 million cubic metres of water annually from its supply reservoirs. But more than three times this amount falls onto the city every year as rain that becomes stormwater. A recent study of the Liesbeek River Catchment in Cape Town found that stormwater harvesting had the potential to reduce the total current residential potable water demand of the catchment by more than 20% if the stored stormwater was used for purposes like irrigation and toilet flushing. For such a reduction to take place, the vast majority of residents would be required to make use of harvested stormwater. This would likely necessitate changes to the regulations related to the supply of water in the city.

Stormwater harvesting appears to be financially and technically viable in South Africa but it would depend

on whether all sectors of society would be willing to use harvested stormwater, and for the required municipal policy and regulatory processes to be put in place.

“We have had great success in the research that we have been conducting into the use of alternative water resources (specifically stormwater and greywater) and the way that this links to Water Sensitive Design as a whole, as I think this has the potential to really change the way we manage water in South Africa, while enhancing issues of equity and preserving public health. It has been very gratifying to be part of this change in thinking about managing water, and to get the positive feedback when we give training seminars and present at conferences.”
– Dr Kirsty Carden, UCT

There are further opportunities for municipal managers to actively manage the stormwater systems using real-time control. This can be done in a way that, prior to a predicted storm event, the storage is partially emptied resulting in an increase in the flow rates in the river ahead of the storm, but a decrease in the peak flows during the storm, which could prevent flooding. In this way, additional storage capacity is created for harvesting.



Five key lessons other cities can learn from Cape Town's water crisis

1. Cities are the new catchments	A water resilient city reduces risk by diversifying water sources to include supplies from groundwater, storm water, reused water, treated effluent and desalination. Resilient, water sensitive cities also integrate the whole urban water cycle into their water resource management systems. This means capturing rainfall across the city, storing storm water underground, and reusing treated effluent for a variety of purposes, not necessarily for drinking purposes.
2. Cities lead	National government can't be expected to lead cities in dealing with water scarcity and drought. Cities need more autonomy to act decisively, although proactive, inter-governmental support and cooperation is both helpful and necessary.
3. Measure more, manage better	A city without reliable data will struggle to implement strategic plans and priorities. Measuring and monitoring is essential to understand water demand and flows. But not all data are useful and more data adds little value in the absence of robust analytical and reporting systems.
4. Mixed messages	Public responses to communication and messaging put out by local authorities is often unpredictable. What citizens really want to know is what actions are being taken to alleviate the crisis and relieve the risk. In the case of Cape Town the city has been reporting on the state of the water by supplying information on dam levels, water demand, models and water quality. What it hasn't done well enough is contain the level of misinformation shared in the public domain and media.
5. Public trust	Above all, public trust is key to encouraging water saving and helping to establish confidence in managing the crisis. Trust is strengthened by honest, credible messaging when progress towards averting the crisis is demonstrated and understood, and when ordinary citizens, communities and businesses are engaged in making a meaningful contribution. Trust gains momentum when citizen voices are heard and when politicians and officials respond accordingly.



If you are interested in implementing WSD and SuSD approaches in your municipality contact: Mr Jay Bhagwan: email: jay@wrc.org.za, or Visit: <http://www.wrc.org.za/Pages/LH1-WaterSensitiveDesign.aspx> for more information.





Water Information Network-South Africa (WIN-SA) aims to capture the innovative work of people tackling real service delivery challenges. It also aims to stimulate learning and sharing around these challenges to support creative solutions. Most importantly, WIN-SA strengthens peer-to-peer learning within the water sector.

To read further, download reports from the WRC Knowledge Hub visit www.wrc.org.za
Contact: Hlengiwe Cele, Stakeholder Liaison, Water Research Commission
Email: hlengiwec@wrc.org.za or call +27-12-761-9300