

WATER AND SOCIETY

Exploring the socio-hydrological assessment of two small municipalities in the Western Cape

An interdisciplinary study is exploring how small municipalities are adapting to water scarcity, and what lessons can be applied to other settings facing similar water crises. Article by Germaine Owen, Amber Abrams, Kirsty Carden, Sue Harrison, Callies Selala & Bernelle Verster.



A road sign warns of drought conditions in 2017 outside Malmesbury, one of the towns managed by the Swartland Municipality.

Water scarcity is widespread globally, and is increasingly a major concern in Southern Africa. The Western Cape is no exception; its recent multi-year drought has sparked considerable reaction and adaptation. The impact of water scarcity is influenced by location, including both region and nature of settlement.

To develop our understanding of this at the scale of small municipalities, and in collaboration with the South African Local Government Association (SALGA), we conducted a socio-hydrological assessment of water management in Prince Albert and Swartland municipalities over the winter (May to July) of 2018. In addition to understanding how municipalities have adapted to water crises, the study was also an exploration of interdisciplinary research processes and methodologies in order to understand different perspectives of a given context, and to

identify lessons for other interdisciplinary studies.

Following desktop reviews, two-day visits to each municipality were carried out by a research team from the Future Water research institute at the University of Cape Town. These visits followed a mixed methods approach of focus group discussions, transect walks, semi-structured interviews, and observations, with target respondents from the municipality, nature conservation, community groups and farmers, as well as the education, media, tourism, and local business sectors.

Questions drew on different themes ranging from technical aspects, such as water supply, wastewater and solid waste infrastructure and management to the socio-relational aspects of water scarcity, including drought impacts and emerging

responses, coping and adaptation mechanisms, tensions, health concerns, cooperation (social cohesion), equity and economic concerns, and reflections on the municipality's public engagement processes.

This article discusses some of the prominent themes that emerged in this study, with particular reference to the recent (2016 to 2018) drought. The discussions present context-specific scenarios on the water-supply situation and alternative measures in place or envisioned in these municipalities. Further, adaptation measures adopted, people's responses to these, and recommendations by the research team for building resilience in these towns are presented.

Water supply in the Prince Albert and Swartland municipalities

The Prince Albert Municipality is one of three municipalities in the Central Karoo District, with Prince Albert town, in particular, regularly experiencing issues of water scarcity. Some areas of the district, such as Klaarstroom, Leeu-Gamka, and Prince Albert Road are reliant on groundwater. While water availability is a concern for all, for Klaarstroom residents, in particular, the focus is more on water quality. Prince Albert town itself sources the bulk of its water from groundwater (nine boreholes), with surface water from the Dorps River supplementing supply.

Surface water is allocated such that the formal agricultural sector receives about 66.7%, via concreted furrows known as *leiwater*, while the municipality is allocated 33.3% for residential purposes. The North-End community relies only on municipal water through in-house tap connections, with no ability to draw on the *leiwater* system. Surface water supply in Prince Albert town is managed by the Kweekvallei Irrigation Board, which operates as the water users association in the area.

An assessment of the available hydrological information suggested that infrastructural capacity within the town does not meet the demand for both water supply and wastewater treatment at present. There are difficulties with monitoring the flow of water into the town, resulting in uncertainty around supply volumes. The municipality has proposed the building of a dam well as the development of an artificial groundwater recharge system in Prince Albert town and Klaarstroom to boost water supply in the area. The need for more water storage capacity (i.e. reservoirs) was a widely discussed theme among most interview respondents.

The Swartland Municipality falls within the Berg-Olifants Water Management Area and receives the bulk of its potable water from the West Coast District Municipality (WCDM), served by the Berg River (as the main water supply), through the Swartland and Withoogte distribution systems. Both of these bulk distribution schemes are cross-border schemes that supply water to the Swartland Municipality and two other municipalities. There are eight distribution systems: six, including Malmesbury and environs, are fed through the Swartland system and two from the Withoogte system.

The main challenge for water supply is the augmentation of existing water sources from the WCDM. The immediate priority intervention is to implement a water demand and pressure management programme, including replacing old and damaged pipe networks to minimise water losses; this will also

help to reduce high water bills amongst residents. Alternative water augmentation options, such as groundwater, rainwater harvesting, water reuse for potable and non-potable uses etc. are also being investigated for different areas in the Municipality.

Drought impacts

The impacts of the 2016-2018 drought in the Western Cape – reported as one of the worst on record – were widely experienced. Community members from the North-End of Prince Albert, for example, expressed that “there isn't enough water for everyone” and “it is difficult at home.” One dairy farmer in the South-End of Prince Albert had to reduce the number of animals in her dairy herd from 50 to 25 to adapt to the crisis, with related financial losses.

The Zwartberg High School in Prince Albert reported poor hygiene conditions at its facilities, and learners were anecdotally reported to have “stomach bugs” as a result of water shortages. Financial losses were noted from poor harvest of lucerne. Existing long-lived shrubs at the Wolwekraal Nature Reserve succumbed to the shortage of water and the adjacent river dried up. The impacts of the drought also exacerbated social differences, highlighting the ways in which people in the North-End and South-End communities were affected by and adapted to the drought. The South-End community is perceived to have coped better than the North-End community because of their *leiwater* allocation which enabled upkeep of their pools and gardens.

This dichotomy raised the issue of water rights in the area which is embedded in the socio-politics of this region, as historically, properties in the South-End were allocated *leiwater* via their title deeds. Some of these residents suggested that their water rights were being violated because they have been asked to



Prince Albert town leiwater system passing in front of Zwartberg High School.

give a certain percentage of 'their' water to the municipality. The study highlights the need to urgently redress the issue of equity of water supply in the town, and recommends establishing dialogue through a task team of different stakeholders in order to discuss the redistribution of resources to mediate historic injustices.

Through using an interdisciplinary lens, the research team was also able to identify differentiated views linked to environmental risks with potential consequences for the environment and water availability in Prince Albert. There is a perception that the solid waste disposal site located near the nature reserve is negatively impacting the Dorps River, groundwater and the nature reserve through leaching of pollutants or through contaminated runoff.

The municipality, while confirming there are challenges at the landfill site, reported that there is no proof of pollution of the river and adjacent land. Dialogues between the municipality and interested persons would provide a constructive way forward around this. Safety concerns linked to the discharge of treated and untreated effluent from the wastewater treatment works into the nature reserve were also raised as a perceived threat, as well as potential negative impacts on the plant species that are endemic to the reserve. The municipality confirmed that treated effluent consistently meets irrigation standards as per the requirements of their discharge permit, but this study recommends further consultation between the municipality and concerned stakeholders to address these concerns.

The agricultural sector in Swartland was particularly affected by the drought, and the largest tourism event in the area – the Riebeek Valley Olive festival – was cancelled in 2018 because of very low olive production yields, with related financial losses. One of the farmers described the drought as "unheard of". One resident of Swartland municipality reported that "the whole process (drought) has actually been quite a shock." Small businesses, such as car washes, were also affected by the drought, and there were agricultural job losses, which heightened concerns about persistent droughts. A recurring theme among town dwellers and people living in farmlands was fervent praying for rain, not unlike that experienced in the Prince Albert Municipality. This could be viewed as social cohesion, empathy and understanding emerging from shared experiences and similar responses.

Methods of adaptation

During the drought, the two municipalities used different platforms to communicate the issue of water scarcity to their residents and the need for water conservation. In Prince Albert, the municipality set water restrictions of 90 ℓ per person/day, and information on the drought was circulated through social media, the local newspaper, the *Prince Albert Friend*, and radio, a dedicated SMS system, and ward committee meetings.

Further public engagement was made possible through the *Drop the block* campaign, which entailed encouraging residents to insert dense plastic blocks into toilet cisterns to reduce the amount of water flushed. For the most part, residents adhered to water restrictions and used alternative water sources (such as greywater) for flushing toilets and watering gardens. This indicated some level of cooperation at the interface between the municipality and its residents as a result of public

engagement processes, and highlighted good practice for other municipalities to follow. However, it was also noted that some community members did not adhere to water restrictions and felt entitled to exceed their water allocation as rate payers. This reinforces the importance of communicating information on water scarcity and its impacts earlier to the public as well as providing reasons for water restrictions as remediation to the water crisis.

In the Swartland Municipality, the approach adopted to manage the crisis was three-pronged: technical (flow usage, pressure management etc.), financial (tariffs) and social (restrictions and awareness campaigns). The restriction of water usage to 50 ℓ per person/day was successful in raising drought crisis awareness. Information campaigns on the drought were also run through public meetings and on social media with a dedicated Facebook page, as well as through the use of tools such as flyers, banners, notices, and bookmarks.

Cooperation in these campaigns was evident through people using greywater for gardens and flushing toilets instead of using freshwater, and in people switching from showering to using basins for bathing. In the township of Illege Lethu, car wash owners adapted, for example, by sourcing borehole water from the West Bank farmers and using rainwater collected in rainwater tanks.

Farmers adapted to the crisis by implementing zero till planting, which allows seeds to be planted regardless of how dry the soil is. Good adherence to water restrictions was confirmed through monitoring of water usage by the municipality, although there were some incidences of non-compliance (e.g. the prison facility). Whilst some Illege Lethu community members suggested that the municipality had not planned ahead properly, there was a general sense that the drought had raised awareness on the importance of conserving water, with some residents suggesting this as a positive outcome.

The tourism sector noted that visitors to the area had generally complied with the water restrictions although had found them a "hard pill to swallow" in the beginning. The drought encouraged people to be creative in finding additional water saving tips; the ways in which people shared these with others (e.g. through Facebook) was a positive outcome, indicating an emerging sense of social cohesion in the face of the crisis.

In conclusion, the interdisciplinary processes and methodologies have provided an opportunity to learn different aspects of a given context, as well as what aspects to build on in future studies of this nature. This study highlights opportunities both for the expansion of water supplies through alternative sources and for addressing efficiency of water use and water savings.

In both municipalities, local residents and communities found ways to cope with water scarcity, the majority of people adapted to water restrictions and engaged with communication and public awareness campaigns on the importance of saving water. However, ongoing education on issues of water scarcity and public responses is necessary. The study offers recommendations to encourage multi-faceted collaborative action around water scarcity, so that municipal officials, local professionals, and residents actively engage in addressing and finding solutions for managing all water related matters in their local area.