

Supporting the Breede River Catchment

By Amanda Gcanga¹, Annabel Horn²,
Wilna Kloppers³

Grape harvest
(Photo: Robertson Tourism)

An analysis of the Breede River has shown a decline in water quality, and an integrated, multidisciplinary approach is needed to ensure the successful management of this catchment.

The Breede River plays a significant role in driving the economy of the catchment, particularly the upper and middle areas of the Breede River, whose economy is driven by the agriculture sector. To sustain and grow the economy of these areas necessitates thorough water management of both the water quality and quantity.

A recently completed study, funded by the Western Cape Department of Environmental Affairs and Developmental Planning in 2017, carried out an analysis of the water-quality data for the Breede River. The analysis of the results indicated water quality risks that could possibly negatively impact the agricultural sector, subsequently spilling into the social and economic spheres in the region.

The Breede River originates in the Skurweberg Mountains near Ceres in the Western Cape and flows for about 320 km before exiting into the Indian Ocean (see Figure 1). There are many tributaries that contribute significantly to the flow of the Breede River. These include the Hex River (which joins the Breede upstream of Worcester), the Riviersonderend River (the biggest tributary, which joins the Breede upstream of Swellendam), and the Buffelsjags River (which joins the Breede just downstream of Swellendam).

Improved water governance for better water quality management

Managing and improving water quality in the Breede River is a complicated process

as it involves public authorities setting guidelines and monitoring water quality and pollution in the environment, actors contributing to the pollution load of the Breede River such as the agricultural sector and industries, and those that are impacted.

The management of the water resources is governed principally under the National Water Act (No. 36 of 1998), which protects water courses. The National Environmental Management Act (No. 107 of 2009) protects the water resource if the intended activity triggers an environmental impact assessment (EIA).

According to researchers, multi-stakeholder participation in water management is key as it leads to coordinated planning and implementation of water activities. A challenge in the Breede River Catchment is to promote joint vision by different public authorities (listed in Figure 2) and coordinated governance on the part of government agencies tasked with water management. South Africa, just like the rest of the world, has a history of segmented water governance where water ministries solely took the responsibility of managing water resources.

Up until the early 1990s, water governance globally had been technocratic in nature, with strong vertical control by the state and emphasis

on big dam infrastructure.

This was the period where water engineers were primarily concerned with technical control. Sustainability concerns with regard to environmental and social issues were absent in the discourse of water governance.

This governance paradigm came to an end with the realisation that the technocratic water governance style could no longer address the complexity and interactions of culture, politics, environment, urbanisation, and society and how these ultimately shape supply and demand of water. This gave rise to a new water governance approach – integrated water resources management (IWRM) – which marked a shift from techno-centric to a more participatory

FIGURE 1 The Breede Catchment showing the major rivers, national roads and towns (Source: DEA&DP, 2017)



and holistic, sustainable water management approach.

The Global Water Partnership's definition of IWRM is widely cited and defines the approach as "a process that promotes the coordinated development and management of water, land and related resources, to maximise the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems".

IWRM seeks to achieve sustainability and a balance between societal, economic, and environmental objectives. Founding principles include a multisectoral approach, coordinated management, decentralisation of governance to catchment areas, and multi-stakeholder participation. New water institutions, such as catchment management agencies, would be established to implement IWRM within the catchment. With the proposed drive to establish one CMA, it may be argued that this drive is at variance with the original strategy of the IWRM.

Participation of multi-stakeholders in catchment areas through established

catchment agencies is viewed as a key element for establishing cooperative water management with the intention to achieve efficiency, sustainability and democracy.

A study by Stein and Edward (1998) defined multi-stakeholder participation as "a decision-making body (voluntary or statutory) comprising different stakeholders who perceive the same resource management problem, realise their interdependence for solving it, and come together to agree on action strategies for solving the problem". This definition is widely accepted and used in the context of IWRM. With strong support and advocacy from international donors such as the World Bank, African Development Bank, and the Asian Development Bank, the approach permeated in water legislations and policies in developing countries is resulting in major water management reforms.

The current water policy reforms in South Africa, which were established between 1996 and 1998, were built on IWRM principles. Water governance was decentralised to

river catchment level and, subsequently, two catchment management agencies (CMAs) were established in accordance with Chapter 7 of the National Water Act to develop the catchment management strategy, which gives direction to quality and quantity objectives, stakeholder participation, cooperative governance, compliance, and monitoring.

Meissner and Funke (2014) raise the question as to how the Breede Overberg CMA, where the establishment began in 1999, with considerable stakeholder involvement under the leadership of the department now known as Water and Sanitation (DWS), will continue

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Catchment falls under
the management of the
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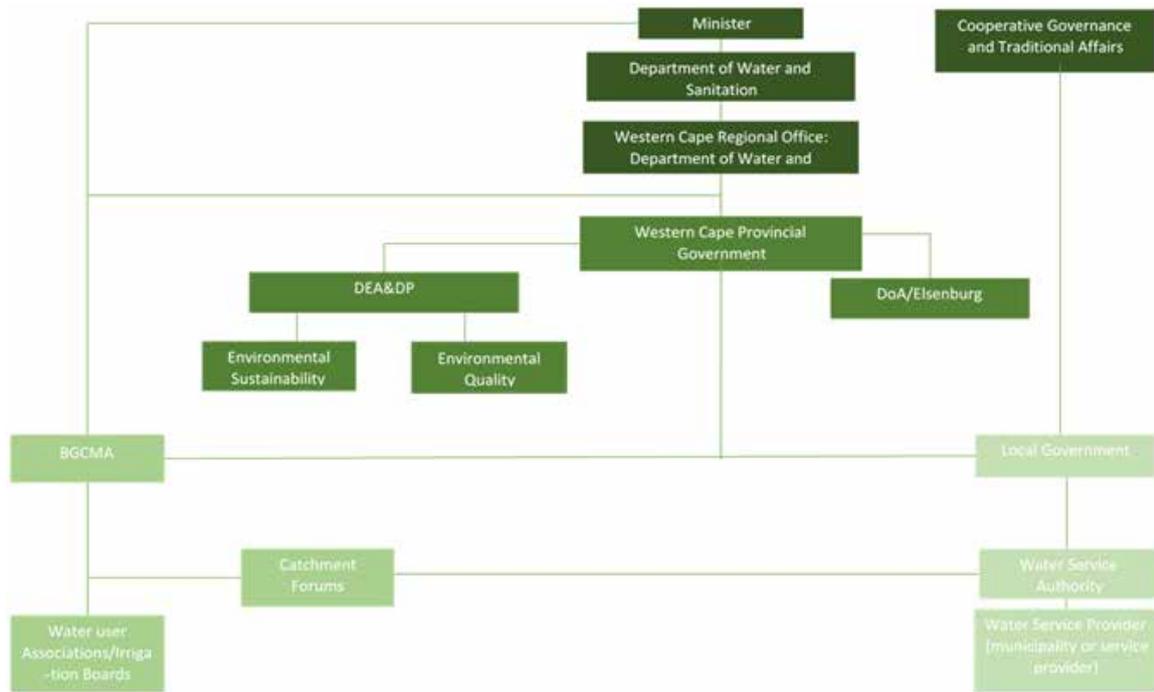


FIGURE 2 Institutional arrangements for water management in the Breede River Catchment (Source: BGCMA, 2016)

to develop this engagement. Further, knowledge of the natural, environmental and engineering sciences are highly valued in guiding the operational processes, and the writers argue that this overshadows the roles that other disciplines could play in advising the management of the CMA.

Breede River Catchment study

The 2017 Breede River Catchment study, under review for publication with *Water SA*, analysed monthly routine river indicator data samples collected by the Breede-Gouritz Catchment Management Agency between 2010 and 2015. The monthly water samples were taken along 23 monitoring points in the Breede River. The samples were analysed for levels of pH, electrical conductivity, sodium, total suspended solids, ammonia, nitrate and nitrite, chemical oxygen demand, orthophosphate, faecal coliforms, *E. coli*, faecal streptococci, turbidity, potassium, and total dissolved solids. The samples were then compared to water quality guidelines and the thresholds of acceptable levels of fitness for use, set by the DWS.

Significantly high values of salinity were found in the middle and lower Breede River. The decline in the quality of the river is attributed to the irrigation return flow into the river, geology of the area, and certain agricultural practices such as

the intentional leaching of natural salts. To bring the salt content of the river to acceptable levels, water is released from the Brandvlei Dam to dilute the salinity levels downstream. However, this method is not sustainable in drought periods.

A second water quality concern is the amount of undesired microbial life carried into the river by the poorly treated effluent from wastewater treatment plants, wineries, and other industries. Wastewater treatment plants are under tremendous pressure to comply with effluent standards; however, factors such as limited budget and a shortage of qualified plant operators hinder progress.

Informal settlements within the catchment area that lack adequate sanitation facilities also contribute to the microbial life that ends up in the river, and then only in certain areas where there is drainage to the rivers of the catchment. High levels of microbial life result in additional expense in cleansing water for agricultural irrigation. Lastly, agrochemicals such as pesticides that are carried by the irrigation return flow into the river threaten fish life and human life through accumulation in the food chain.

The Breede River Catchment falls under the management of the Breede-Gouritz Catchment Management Agency (BGCMA), which was established by the DWS in 2005. The BGCMA has a

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Low water flows in the Breede River (Photo: Jason Mingo)

A strong foundation for infrastructure success



responsibility to bring together multi-stakeholders to achieve coordinated water quality management in the catchment.

Significant efforts have been made by the BGCMA towards creating a coordinated management culture. In its 2015/16 annual report, the BGCMA reported to have established strong working relationships with water user associations, irrigation boards, municipalities, provincial government, academic institutions such as Cape Peninsula University of Technology and University of Cape Town, and non-governmental organisations such as the World Wildlife Foundation and Upper Breede Collaborative Extension Group.

However, there is still work to be done in terms of aligning plans from various institutions and ultimately working together to manage water quality and quantity in the Breede River Catchment area. This can largely be attributed to how public water institutions are structured to operate, mainly operating in silos, with individual monitoring and evaluation systems.

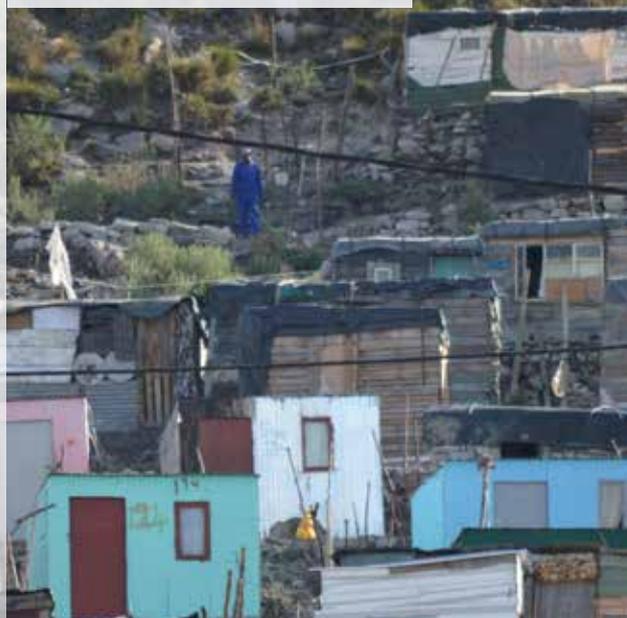
This management style minimises the opportunities for flexibility or responsive adaptation to changing environmental circumstances to ensure sustainable water provision for all sectors. Breaking down the departmental walls and creating a multidisciplinary culture of solving problems within government without leaving out the non-governmental organisations, civil society, and private sector is the optimal way forward. ³⁵

¹ Corresponding author, Stellenbosch University

² Department of Environmental Affairs and Development Planning

³ Department of Environmental Affairs and Development Planning

Informal settlements with minimal drainage and sanitation facilities
(Photo: Annabel Horn)



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