

WATER AND THE ENVIRONMENT

Threatened KZN wetlands offered a lifeline



The outcome of several scientific investigations have revealed on-going declines in water levels in Northern KwaZulu-Natal.

Technical director and geohydrologist at JG Africa engineering and environmental consulting, Mark Schapers, was invited to share his experiences working on groundwater projects in rural areas to assist in developing a workable solution for the declining water levels in northern KwaZulu-Natal. This includes the Vazi Pans peatland wetland system.

The workshop was held at Isibusiso Esihle Science Discovery Centre earlier this year, and brought together a number of stakeholders, including community leaders, municipalities, state departments, scientists and industry. It was held under the banner of the KwaZulu-Natal Wetlands, and supported by the South African Environmental Observation Network (SAEON), as well as JG Afrika.

Schapers alerted the Water Research Commission (WRC) and SAEON to serious declines in water levels in the Vazi-wetlands three years ago, based on JG Afrika's ongoing operations in the northern coastal flats aquifers. His findings complemented those of SAEON, which has been focusing on understanding the relative impacts of climate and land use on the groundwater table and the wetlands system.

Outputs from several scientific studies concur that forestry plantations in the region are having a significant impact on the water resources. Additional stressors include a prolonged drought and increased levels of abstraction for human consumption. The latter, however, has had a minimal impact compared to those of forestry and drought. Superimposed on this is the threat of climate change impacts on the area.

Exacerbating the problem is the burning of the peatlands, which are important stores of carbon and which, by acting as a sponge, help hold up the water table.

The declining water table has led to the drying out of the peatlands with the earliest reported incident of severe burning in Vazi-North in 1998. In 2017 fires broke out again in some of the peatlands resulting in an increased loss of peat that has taken thousands of years to accumulate and with it the release of greenhouse gases, such as methane and carbon dioxide.

The declining water levels are also having a dire influence on the livelihood of the rural community in the area who, for many years, have been aware of the threat that the pine and blue gum trees pose to their small farming activities.

Sue Janse van Rensburg, SAEON Grasslands-Wetlands-Forests Node Coordinator, is encouraged that all stakeholders have now agreed on the issues and there is a commitment to work together to find water sustainable options for livelihoods, economic growth and job creation.

"These are important steps that will ensure an outcome that emphasises climate resilience. Moreover, the day ensured a collective understanding of the severity of the situation, but also provided a road map to explore alternatives and solutions proposed by experts. It requires a bottom-up approach to ensure ownership, and complemented by integrated research that spans various relevant fields, ranging from environmental monitoring to resource economics," Janse Van Rensburg says.

Schapers concurs that the workshop was a sound starting point, considering that there is now beneficiary buy-in and the relevant authorities understand the need for action. He says that his experience in groundwater projects clearly shows that there is a greater chance of success when there is increased interaction between the technical, political and social components.

A formal proposal is now being drafted and, importantly, it focuses research into ways of replacing the existing resource-based economy in the area with sustainable alternatives. It will include suggestions made by resource and environmental economists, who were also invited to share their insights at the workshop.

This plan will be used to apply for funding from various sources, such as the Green Climate Fund, to assist in the development of a document that will guide the implementation of a strategy for the Vazi wetlands.

Janse Van Rensburg notes the need for urgent action, and points to research undertaken by Schapers and his team of groundwater and surface water specialists at JG Afrika concerning the greater area around the Vazi wetlands and, in particular, the Lake Sibaya system.

Their work has revealed a significant drop in the water table as early as 2000, while changes in climate and low rainfall levels in the area have compounded the situation.

After monitoring efforts came to a halt in 2014, when water tables fell below gauging stations, the SAEON, working with the DWS, and Schapers intervened to ensure real-time data was available to capture the continued declining trend.

As she notes, "good data is our life blood, and even sophisticated models rely on *in-situ* data".

The combined impact of forestry and below average precipitation in the area is evident by the extremely low levels of Lake Sibaya. Located in the iSimangaliso Wetland Park, water levels of the largest fresh water lake in South Africa are at the lowest ever recorded.

A combination of current below average rainfall trends and continued forestry operations will result in the rapid deterioration of water levels at the Vazi wetlands. Further research is required to determine whether changes in land use, rainfall levels and climate will reverse the decline.

Groundwater recharge in the area is under investigation. While previously thought to be a simple function of rainfall, Schapers explains that studies into the recharge of groundwater are further complicated by high-energy events, such as cyclones, as well as flooding on the Pongola River. There may be further consequences for the entire system should these dynamics change.

Covering about 19 000 ha, the Manzengwenya and Mbazwane Plantations are located in Mhlabuyalingana Municipality within the uMkhanyakude District, and affect three traditional councils, including KwaTembe, KwaMabila and KwaMabaso.

The forests are part of a major state-driven land redistribution programme in the area, and the plan will, therefore, also propose ways of substituting existing and future employment opportunities created in the forestry value-chain.

Janse Van Rensburg says that many of these jobs could be

supplemented by developing the significant eco-tourism potential in the area.

Schapers emphasises that a long-term solution to the declining water levels in the northern coastal flats aquifers is dependent upon the accurate capture and interpretation of information by relevant and experienced scientists. This will assist in the identification and interpretation of trends, as well as in forecasting the eventual complete depletion of water levels.

He also advises the authorities to increase expenditure in the area to assist in the development of a formal implementation plan, including familiarising politicians and local contractors with the latest standards and protocols.

Deterioration at surface water ponds throughout the area has confirmed the sheer extent of the challenge that lies ahead.

For example, JG Afrika's research has revealed an estimated 3,5 m drop in the water table level at the Giba Pan in Mhlabuyalingana. Water loss from the groundwater system is between 450-million m³ and 900-million m³, equating to between 3 200 and 6 400 litres per person annually for the entire uMhlabuyalingana Local Municipality.

"The area that was investigated is about 1 500 km² in size, with an average porosity range varying between 10% and 20%. Taking a conservative estimate of only 5% porosity, the groundwater system in the northern coastal flats has declined by at least 225-million m³. This is a very serious loss of water from the system, and is showing no signs of recovery," Schapers says.

He thanks the National Research Foundation, WRC and SAEON for the opportunity to participate in an initiative that has already received such a favourable response from all stakeholders and that is expected to have a profound positive impact on the Vazi-wetlands.



Stakeholders have gathered to find a workable solution to declining water levels in the Vazi Pans Peatland Wetland system.