Project Sheds Light on Underground Water

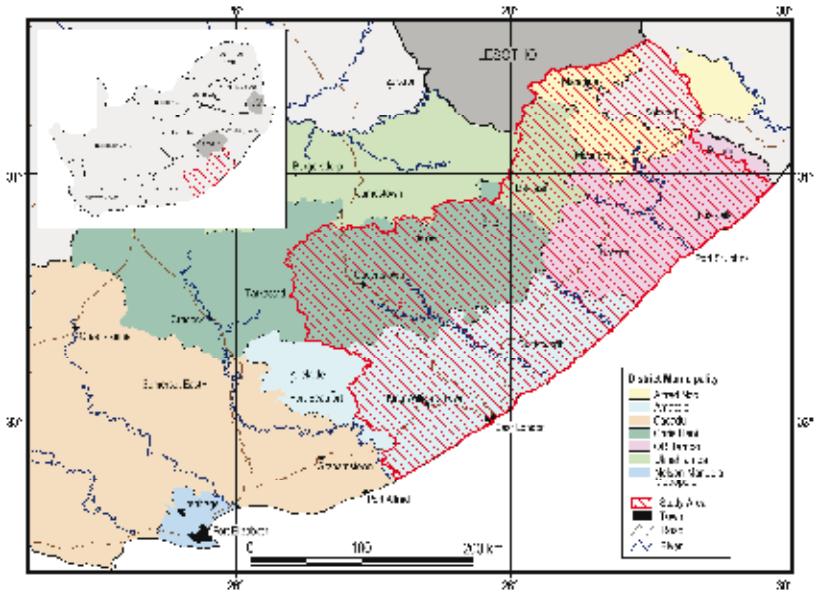
All photographs by Ricky Murray

Despite government's best efforts, lack of access to safe drinking water remains a reality for many South Africans, especially those in far-flung rural areas. Increasing the knowledge about the water resources surrounding these communities could go a long way in alleviating the problem, as one Water Research Commission (WRC) funded project demonstrates. Lani van Vuuren reports.

In the impoverished eastern regions of the Eastern Cape many communities remain without a sustainable potable water supply. Rural settlements are often dispersed and located in inaccessible terrain. It is reported that more than a third of the people in the province are without safe water and/or sanitation.

Most people in the region are dependent on groundwater from boreholes or springs for their domestic water supply. Often these boreholes have not been sited at the best places for groundwater, as the emphasis has rather been on finding sites close to villages that could be equipped with hand- or windpumps.

This can be attributed to the low basic water supply targets of the past (in the former Transkei and Ciskei especially), and to the lack of coordinated groundwater research undertaken in the eastern parts of the Eastern Cape to date. (Interestingly, almost all of the major groundwater research in the region has been



The study area.

funded by the WRC.) The reasons for this can mostly be traced back to the country's discriminatory past.

This means that there is still limited knowledge of the best sources of groundwater (both in terms of water quantity and quality), as well as the sustainability of groundwater resources in the area.

IDENTIFYING RESEARCH NEEDS

Recognising this need, the WRC appointed Groundwater Africa, SRK Consulting, Maluti GSM and the Council for Geoscience to jointly conduct a study aimed at identifying the present groundwater research needs in the eastern regions of the Eastern Cape. The research was focused specifically on the Eastern Karoo Basin, underlying the former Transkei and Ciskei.

Past research was taken into account, and the study considered the most important groundwater research projects completed to date. Officials from the Department of Water Affairs & Forestry (DWAF) as well as a number of locally-based groundwater and engineering consultants were consulted.

But what does research have to do with supplying clean water to needy communities? "The goal of providing all the people in this area with at least a basic level of service means that higher yielding boreholes are required," explains project hydrogeologist Dr Ricky Murray. "The study area has substantial groundwater reserves that are largely untapped. The challenge is to not only access this water cost-effectively, but also sustainably in a way that is not detrimental to the environment or the communities in the long term. One of the first steps in achieving this is attempting to understand the resource and establish how it works so that plans can be developed to access it."

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It has been demonstrated that very high borehole yields can be obtained if the appropriate approach is used in siting them. "We need to establish all the potential high-yielding areas, and work out where it is best to drill in these areas," noted Dr Murray. "This requires thorough scientific investigation."

It appears that there is still very little knowledge of the vulnerability of aquifers in the area, and of baseline water quality. In addition, the environmental impact of groundwater use is not well understood. Current understanding of the relationship of

Queuing for water in a village near Queenstown.

Artesian borehole at Makhoba near Matatiele.

Gathering water from an unprotected spring near Cofimvaba.

Ricky Murray

Poorly sited borehole near a school pit latrine.

different aquifers to spring flow and base flow is undocumented and not considered in either surface water or groundwater management or regulatory decisions (As a result, it is impossible to determine the groundwater component of the Reserve with any accuracy at present).

KEY FINDINGS

The final WRC research report puts forward several preliminary points regarding research needs of the Eastern Karoo Basin. Firstly, it seems little research has been done in the eastern part of the basin, where most of the communities are located. Ironically, this is also the area where there is the greatest need for basic water and sanitation services. The coastal strip, in particular, with its large rural population, is poorly understood.

It was found that data on groundwater was not collected systematically in the past, and little is known about higher yielding Karoo boreholes (those yielding greater than 5 ℓ/s). More investigation is also needed on geological structures such as fractured dolerite sills, ring complexes and dykes.

The presence and/or extent of deep-seated groundwater in the Eastern Karoo Basin remain largely unknown. Little is also known about groundwater sustainability (particularly high-yielding boreholes), about the age and chemical characteristics of (particularly deeper) Karoo groundwater, or the effect of prolonged pumping on the environment, and about possible management options such as artificial recharge.

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The relevant authorities have welcomed the results of the project. "We appreciate any research towards improving management of groundwater in the Eastern Cape, in support of our commitment to ensuring sustainable development of water resources," said Zolile Keke, Director: Water Resources for DWAF in the Eastern Cape. "Groundwater has the potential to contribute to the growth and development of the region and is uniquely suitable to the circumstances of the demographic, economics and socio-political context."

Dr Murray believes the necessary technical and scientific backup exists to be able to conduct the necessary research in the area and answer some of the needs identified in the report. "Large-scale research will be the catalyst for developing local research skills."

Based on the findings of this project, another WRC funded research project has been launched to investigate flow conceptualisation, recharge and storativity in Karoo aquifers. The emphasis is specifically on aquifers falling within the Eastern Cape (Mzimvubu to Keiskamma water management area) and KwaZulu-Natal (Mvoti to Umzimkulu water management area).

DWAF is providing the drilling support for this project. It is envisaged that this project will be completed in 2009.

"There is a substantial knowledge base in the eastern parts of the Eastern Cape," noted Dr Murray. "But as in many areas where the need to meet basic needs is so high, little time is given to trying new things, to exploring alternative ways of doing things. An investment in research creates that opportunity."

- The WRC Report (No **TT 286/06**) is available. Contact Publications at Tel: (012) 330-0340 or E-mail: orders@wrc.org.za