

Executive Summary

Water plays a central role in the South African economy, society, environment and health. Sustainable development of the country's water resources already faces major challenges, which will be further exacerbated in future, including through increased demands, services backlogs, ecosystems' assimilative capacities, and climate change. The biggest challenge area that must be addressed up front and as part of all other challenge areas is human and institutional capacity building. During the droughts of the sixties, the SA government, at the time, identified the need to establish a water research facility which could assist in more informed decision-making. The added challenge was that this institution should be sustained and resourced by the water users themselves to ensure that it remained relevant and responsive to current and future challenges faced by the sector. Since its inception, now almost 40 years ago, the WRC has been striving to fulfill its mandate of serving the water sector, including:

- Promoting co-ordination, co-operation and communication in the area of water research and development
- Stabilising water research needs and priorities
- Stimulating and funding water research according to priority
- Promoting effective transfer of information and technology
- Enhancing knowledge and capacity-building within the water sector.

Capacity building is thus a key component of the WRCs mandate. The WRC periodically invests in anecdotal and quantitative research in order to assess the impact it has created in different arenas in the water sector and to benchmark itself internationally. The objective of this study is to focus on research regarding groundwater resources, which are becoming increasingly important in South Africa. Groundwater has always been the Cinderella of water resources in South Africa. While it now has a strategic importance as main source of community water supply throughout the country, this role is not yet properly understood and reflected in policies and strategies and appropriate capacity at the right levels. This situation can only be changed through ongoing awareness and capacity building with regard to groundwater resources within an IWRM and 'Water for Growth and Development' framework. Like with other resources, the management of the groundwater resource will not be possible without adequate human capital development through education and training as well as research and development. The study hence highlights an important aspect of long term investment in building sufficient human capital to face both current and future challenges faced by this sector.

In line with a growing international understanding, this assessment of the impact on water sector capacity has focused on both more effective people and more effective institutions, which together would be better able to provide products and services on a sustainable basis.

The general template used throughout the assessment addressed research inputs and their impacts on knowledge creation, human resources development, knowledge transfer and impact on water resources management.

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The assessment found that WRC investment into groundwater research in South Africa has been strategic and ongoing for 35 years now. This investment has, in all probability, been the most significant contribution to the building of capacity for the sustainable utilization and management of groundwater resources in South Africa. The research priorities over many years were of a resource characterization and groundwater technology nature. Since 2000 a greater resource management focus within an IWRM framework was added. This progression in research focus reflects the progression of groundwater attention nationally, before and after the National Water Act, 1998. The Water Research Commission was instrumental in developing the strong research and teaching centers in groundwater hydrology in South Africa (e.g. Institute for Groundwater Studies at the University of the Free State and the groundwater programme within the Earth Science Department at the University of the Western Cape). The WRC also supported several other universities (Fort Hare, Venda, Pretoria, KwaZulu-Natal and Witwatersrand), science councils, NGOs and consulting firms. Through the academic institutions that have developed and that had the benefit of this research investment, a significant human resources development impact has been achieved nationally, in the southern African region and on the continent as a whole. The groundwater research undertaken in South Africa could generally be classified as applied research and little of the research outcomes could be viewed as cutting edge research. A weakness in this regard was the relatively limited publishing in the international literature. Also missing have been longer-term research partnerships with leading international researchers. Significant knowledge transfer has taken place through the freely available WRC reports. Particularly valuable in this regard has been the synthesis of knowledge for key Africa

groundwater issues, published in book form by leading international science publishers.

The highest impact on improving groundwater resource development, utilization and management was obtained when there had been a planned synchronization of research and national development objectives. Such a coordinated approach has proved to be very challenging, because of the continuing poor institutionalization of the groundwater resource management function in government.

While growing in strategic importance, groundwater has, for a variety of reasons, experienced a serious decline in capacity for its sustainable utilization and management, particularly in the government sector (national and local) as well as in the academic sector. Given this situation, it is imperative that the WRC's investment into groundwater research and capacity building is continuing and is made even more effective and efficient than it has been to date.

Considerable weaknesses are apparent in the capacity building process in South Africa. These appear to be amenable to positive change if there was a much greater and strategic cooperation in the water sector. Opportunities to move in this direction present itself at this point in time with all the major players, both nationally and on the continent. Given its mandate, resources and excellent track record, the WRC should play a critical facilitation role to bring the key players with their respective roles and resources together for the common objective of growing the capacity for the sustainable utilization of groundwater resources in South Africa and beyond.