June 2013
The WRC operates in terms of the Water Research Act (Act 34 of 1971) and its mandate is to support water research and development as well as the building of a sustainable water research capacity in South Africa.

POLICY BRIEF

Water Resource Management

The Water Resources 2012 (WR2012) study

Researchers undertaking South Africa's most comprehensive water resources study undertaken yet have expressed concern over the state of the country's hydrological data monitoring.

Background

It is well known that water is South Africa's most precious resource, and that the country counts among the world's 30 most parched. With an average annual rainfall of only 465 mm a year and a concomitant high evaporation rate, South Africa has a mean annual runoff of less than 50 000 million m^3/annum. This is equal to only 50% of the mean annual flow of the Zambezi River.

As a result of this inherent scarcity, the country walks a constant tightrope between development and protection of its water resources. This makes quantifying exactly how much water the country has one of the most important tasks to be undertaken in the local water sector. Undertaking regular water resource quantification assessments not only informs the country of its available water resources, but helps to augment decision-makers' and specialists' understanding of how the natural hydrological cycle behaves.

WR2012

The WR2012 study, which was launched in March 2012, is the sixth comprehensive national water resource assessment to be undertaken in South Africa since the first study was completed in 1952. The objective of the study is to assist decision-makers at all levels of government to make informed choices about all policies concerning South Africa's water resources.

Each water resource assessment study builds on the technology and knowledge gained from the study before. A significant factor has been the exponential growth in computing power over recent decades – said to double every two years. This has made it possible to develop better hydrological tools using increasingly powerful computer power, resulting in more precision and consequently more accuracy and confidence in the results.

WR2012 will be the most accurate assessment of South Africa's water resources yet. The assessment study includes updates of all hydrological data up to 2010, further enhancements to hydrological models, revised groundwater data, and a monthly time series of present day flow, among others. The project is also in the process of creating a publicly-accessible, Web-based and interactive reporting system to continually quantify both the surface and groundwater resources of South Africa.

With each consequent study it has been found that South Africa actually has less water resources available than previously thought. This is not due to climate change, but actually the result of more precise and accurate assessment. **The latest figures (from WR2005) put South Africa's surface water resources at 49 210 million m^3/annum.**

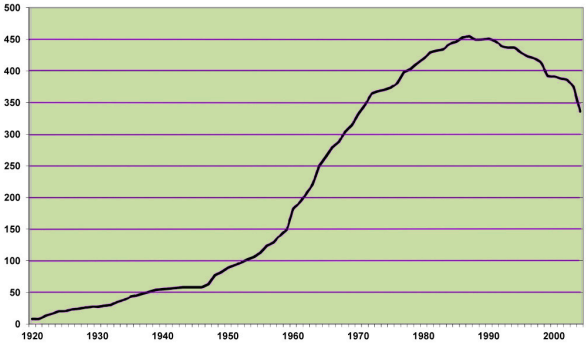
Decline in hydrological data

A significant challenge hampering hydrological studies in South Africa at present is the increasing decline in streamflow and rainfall data as well as diminishing quality of data currently being experienced in South Africa. WR2012 hopes to highlight some of these challenges.

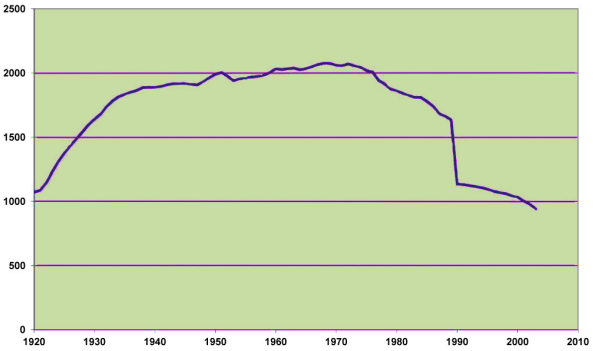
Spatially representative, long-term consistent records of rainfall and streamflow data are essential for achieving a high level of understanding about water resources. Rainfall is the primary input to hydrological computer models, not only to determine streamfow, but also irrigation requirements and net evaporation from reservoirs. On the other hand, information on streamflow is necessary to calibrate the hydrological

models to ensure South Africa gets the most accurate determination of its water resources.

The number of useful streamflow gauges in South Africa has showed steady decline from a peak of 450 in the late 1980s to less than 350 in 2004. In terms of rain gauges, the country now has roughly the same number of rainfall stations it had in 1920.



Number of useful flow gauges open in each year.



Number of rainfall stations open in each year.

This could have serious repercussions for future accuracy in terms of water resource development and planning.

Several discussions regarding the challenges around data have been organised by the WRC with stakeholders to discuss possible solutions. In the meanwhile, the WR2012 assessment is attempting to determine the minimum monitoring requirements that the country cannot do without in order to understand and effectively manage its water resources. WR2012 will be completed in 2016.

Recommendations for consideration by major Government data collection agencies

As the leading climate and hydrological data monitoring bodies, the South African Weather Service, Department of Water Affairs and Agricultural Research Council have to play a leading role in halting the diminishing of observation networks. More investment is urgently required to operate and maintain the optimum climate and hydrological observation networks for the country to ensure the sustainability of the country's climate and hydrological data integrity.

The development of an integrated, official central repository for climate, hydrological and water-related data is key to efficient water resources management in South Africa. Such a repository will improve data storage, data availability and analysis, and facilitate information-based decision-making.

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