WRC Drought Factsheet 1

Background to current drought situation in South Africa

November 2015

Background

South Africa is a semi-arid to arid country with a highly variable climate with highly constrained freshwater resources. These limited water resources are affected by weather extremes imposed by climate variability and change. Drought, which is currently devastating parts of the country, is a recurrent characteristic feature of the country's highly variable climate and weather extremes. It is one of the most devastating natural disasters worldwide whose socio-economic impact tend to be severe in regions with an annual rainfall of less than 500 mm. South Africa's annual average rainfall is approximately 450 mm and this makes this country prone to recurrent droughts.

South Africa's climate is characterised by periods of wet spells also called La Niña (years receiving above-normal rainfall) and dry spells also called El Niño (years receiving below-normal rainfall). Scientific analysis of rainfall data has shown that South Africa experiences spells of either predominantly wet years or spells of predominantly dry years, and these spells have not affected regions of this country exactly the same or equally. For instance, in 2009 to 2011 the Southern Cape Region was devastated by a severe drought while the rest of the country generally received above normal rainfall. The severity of the Southern Cape drought was amplified by the interacting risk drivers that had progressively escalated the risk of a widespread water shortage. These drivers included greatly increased water consumption prior to the onset of meteorological drought conditions, both in agriculture and in rapidly growing coastal towns. Prior to the drought emergency in this region, the water resource development had not kept pace with rising demand, there was no rigorous water conservation and demand management, and there was a lack of systematic drought risk management planning. Climate variability and changing weather conditions were noted as key risk drivers, but there were no accompanying indicators that would have allowed for early signal detection and possible early action.

The 1991-1992 drought, regarded as the worst in the 20th century, was due the powerful El Niño event which was associated with below normal rainfall and drought in southern Africa. It was first detected between July and September 1991 through the advance meteorological alert as a "slow onset" threat. The first impacts were felt through agriculture and through the deterioration of water supply and quality, and the actual extent and intensity of the effects of rainfall deficit were uncertain but became clearer as drought process evolved. Unfortunately, the country did not have an early warning system for drought, and this made it difficult to anticipate and avert the full range of human, environmental, economic, and other consequences.

The country has not experienced a drought of the same magnitude as the 1991-1992 drought, but recent predictions suggest that the scale, intensity and severity of the 2015 drought will be the same or worse than the 1991-1992 drought. A year ago, the WRC commissioned a study to characterise the regionally-extensive droughts (REDs) over Southern Africa and to investigate the mechanism that produce/control these droughts. The study is also examining how climate change may influence the characteristics of REDs in future. An online drought monitoring system will be developed as part of the project.

Characterisation of drought

The preliminary results below detect a temporal and geographical extension of droughts as well as a spatial variation of seasonal drought frequency over southern Africa for the period 1950 to 2013. The intensity of drought has increased (seasonally and yearly) since the 1950s (figure below), and the next stage of the project is to develop a system to project the likely drought scenarios into the future.

The graph below clearly demonstrate that drought occurrence, duration and frequency has increased from the 1980s and the "drying" is projected to increase into the future.

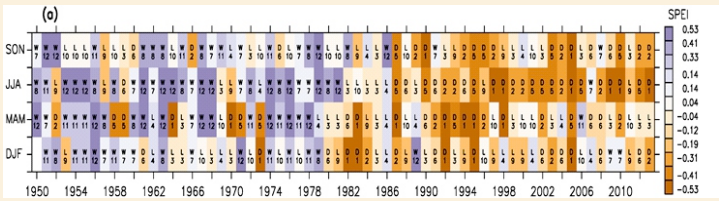

Figure 1: Inter-annual variation of drought for the present-day (1951-2013) reflecting drought patterns. (W = wet, L = low, D = dry)

Further analyses were conducted to project the drought scenarios into the future. The scenarios project a general increase in the drought coverage, and depending on the scenarios and seasons the percentage of drought area may increase up to 90% in the year 2100.

Recommendations

Drought is natural hazard of South Africa's climate, and it is expected worsen with climate change projections. Therefore, the country needs to prepare for this natural phenomenon.

The key to drought preparedness and readiness is about knowing the what, how and when of the drought. To achieve this goal the scientific expertise to monitor and predict, the capability of the observation networks, information systems for drought early warning have to be improved. A similar need was identified from a number of water resources assessment studies and discussed extensively for five years in various scientific forums concerned with water resource planning and development. To address this need, the WRC has made a call for proposals in this current cycle to investigate the feasibility of establishing a Hydrology Institute to act as a clearinghouse for all hydrological datasets to support the water sector in the implementation of the NWA. The proposed institute/facility could play a critical role for the water sector in drought monitoring and research.

For more information:

Visit the WRC Drought Portal at www.droughtsa.org.za