

DROUGHT MONITORING ACTIVITIES: CASE STUDIES

Extract from WMO publication, 'Drought Monitoring and Early Warning: concepts, progress and future challenges', (WMO-No. 1006).

<http://www.wamis.org/agm/pubs/brochures/WMO1006e.pdf>

SOUTH AFRICA



Drought is a normal, recurrent feature of the South African climate. Droughts have in the past resulted in significant economic, environmental and social impacts and highlight the country's continuing vulnerability with regard to this natural phenomenon. During low

rainfall periods, policymakers, agriculturalists, businesses and the general public often require additional rainfall data for decision-making and planning.

In response to recurring drought in South Africa, the South African Weather Service (SAWS) established a drought monitoring desk where information regarding observed rainfall and long-range forecasts could be presented in one place for easy access. It also provides an opportunity for people to compare the current year's rainfall with amounts from previous dry periods to assist them in their decision and planning practices.

Neither the percentage of normal nor the decile-based drought indices can assist decision makers with the assessment of the cumulative effect of reduced rainfall over various time periods. Neither of these indices can describe the magnitude of the drought compared with other drought events. SPI can alleviate both of these principal shortcomings while at the same time being less complex to calculate than some of the other drought indices now in use at the South African Weather Service. SPI is an index based on the probability of rainfall for any timescale; it can be useful in assessing the severity of drought and can be calculated at various time-scales that reflect the impact of the drought on the availability of water resources. The SPI calculation is based on the distribution of rainfall over long time periods, preferably more than 50 years. The long-term rainfall record is fit to a probability distribution, which is then normalized so that the mean SPI for any place and time

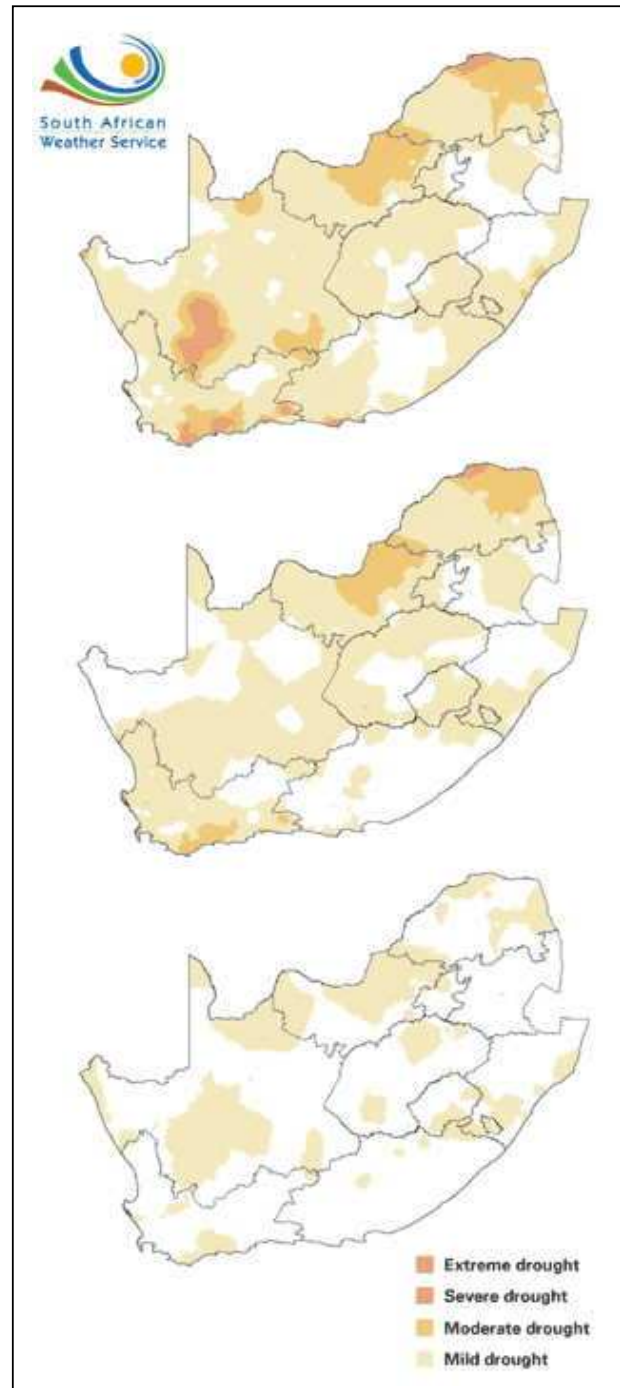


Figure 15. Standardized Precipitation Index (SPI) for South Africa, November 2005 (top); September to November 2005 (middle); June to November 2005 (bottom). (Source: South African Weather Service)

period is zero. SPI values above zero indicate wetter periods and values less than zero indicate drier periods.

On 23 November 2005, the Department of Agriculture issued a report indicating that eight of South Africa's nine provinces were being severely affected by drought, the exception being the densely populated Gauteng province, a minor player in agriculture. At that time, the northernmost province, Limpopo, had had districts flagged as disaster areas since 2003 and 2004, with 27 of its 37 municipalities affected. The dams of the province were at their lowest levels, an average of 36 per cent of capacity, compared with 64 per cent the previous year.

The severity of the situation was clearly reflected in the different timescales of the SPI maps on the SAWS Drought Monitoring Page (<http://www.weathersa.co.za/DroughtMonitor/DMDesk.jsp>), updated at the beginning of December 2005. A very dry winter and the lack of good spring rains exacerbated the dry conditions in some areas.

The main rainfall features in November 2005 were near normal rainfall over most of South Africa, but wet conditions over parts of the Western Cape, the Eastern Cape, KwaZulu-Natal and Mpumalanga (Figure 15, top). According to available data, no part of the country received rainfall much below the normal value for the month.

From September to November 2005, there was some alleviation of the dry conditions in the northern provinces as well as the far south (Figure 15, middle). However, some dryness remained in the northernmost province, Limpopo.

The rainfall for the six-month period, as shown by the SPI map for June to November 2005, shows near normal conditions over the largest part of South Africa, but moderate to very dry conditions in several areas, most notably in the Southern Cape, southern parts of the Northern Cape and the far north (Figure 15, bottom). Even though some parts of Limpopo received good rains during November 2005, there was still a strain on water resources.