

Understanding drought in South Africa

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The climate of an area is a function of both below-average and above-average conditions. Climate can be defined as the long-term average weather conditions for a specific area. One of the main characteristics of seasonal rainfall globally, but also in South Africa, is that there is a semi-cyclic nature with consecutive seasons of below-average rainfall, followed by consecutive seasons with above-average rainfall.

This feature of rainfall often complicates the planning process for agricultural decision-makers. The timing of new farmers' entry into the industry often depends on where in the cycle they enter.

Drought cycles can last between one and seven years or longer, depending on the area. Dry periods tend to be more extended in the lower rainfall areas towards the western parts of South Africa, than it is towards the eastern parts. These cycles may be interrupted temporarily by short-term or single-season disturbances such as El Niño or La Niña, which can result in atypical behaviour during a cycle.

ENSO occurrences

The oceans of the world are the most important source in which thermal energy is stored, not only because 70% of the surface of the earth is covered by water, but also because of water's heat storing capacity. The build-up of energy due to climate change is much more intense in oceans than on land. This increase in ocean heat content causes an increasing frequency and intensity of cyclones and changes in weather patterns.

The so-called El Niño Southern Oscillation phenomenon (ENSO) includes El Niño (warming of the central Pacific Ocean) and La Niña (cooling of the central Pacific Ocean) events. Both El Niño and La Niña occur in around 20 to 30% of years, or in one out of four to one out of five years. Approximately 50% of years or seasons are in

a neutral state (neither El Niño nor La Niña).

Although the Niño areas are located thousands of kilometres from Southern Africa, there are so-called 'teleconnections' in which the overlying weather systems above the Niño areas are linked globally to other weather systems, especially in the Southern Hemisphere.

Effects of El Niño

During El Niño years or the so-called warm events in the Pacific, the rainfall activity is concentrated over these warmer areas of the ocean with drier weather over Australia and Southern Africa. The opposite occurs during La Niña or cooler events, with enhanced rainfall probabilities over Australia and Southern Africa.

South Africa is currently in the seventh season of the drier cycle and compared to historic drier events, close to the turning point if the most recent four cycles are considered.

Although El Niño is usually responsible for drier conditions, there is also an underlying longer-term trend, which means that the effect of El Niño is not always the same. An El Niño event in a dry cycle is more than often responsible for extremely dry conditions, while El Niño in a wetter cycle is less intense in terms of the drought.

The Indian Ocean also affects weather systems over Southern Africa and Australia. Warmer water near the African coastline causes increased rainfall activity and more intense low-pressure systems (cyclonic activity) over the western Indian Ocean. This results in dry weather over Southern Africa with rain over the adjacent ocean.

A combination of El Niño and the warmer western Indian Ocean is usually a recipe for extreme drought conditions, like in 2015/16.

The current situation

Neutral conditions have been prevailing in ENSO (Niño areas) since around July this year, although there are still remnants of the El Niño that occurred from October 2018 until June 2019. Forecasts favour the continuation of the neutral conditions for the rest of the summer, although on the El Niño side.

Conditions in the Indian Ocean were still negative for rainfall at the time of writing this article due to the warm water off the Horn of Africa. Forecasts indicate that there will be a return to more neutral conditions in the western Indian Ocean towards the end of 2019.

This combination of more neutral conditions in both Niño areas and the western Indian Ocean can enhance the prospects of rain in the second part of the season.

Most of the summer rainfall area and especially the central to western parts of South Africa have been in a drier cycle since 2012, and similar cycles have occurred in the past.

Drought in Southern Africa is more common than above-average rainfall or wetter years. Below-average rainfall in consecutive years is part of the long-term rainfall history. South Africa is currently in the seventh season of the drier cycle and compared to historic drier events, close to the turning point if the most recent four cycles are considered.

From a planning point of view, it is extremely important to not only utilise the favourable portion of the rainfall cycle, but also prepare for the unfavourable part. The current drought will end soon, but similar scenarios will be repeated in future. 🌧️

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