

# ENSO and implications on rainfall characteristics with reference to maize production in the Free State Province of South Africa

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## Abstract

El Niño-Southern Oscillation (ENSO) plays an important role in the inter-annual variability of rainfall in most parts of southern Africa. The effects of ENSO on the rainy season characteristics and possible impacts on rain-fed maize production were investigated. The rainy season characteristics of concern are the onset of rains, cessation of rains, duration of rainy season and seasonal rainfall total. Rainfall data from 1950 to 2008 for 309 climate stations over the Free State Province were analysed. The rainy season indices for each agricultural year were further subdivided into El Niño and La Niña years. The differences between mean of the rainy season indices were determined for the negative phase of ENSO versus the overall mean and for the positive phase of ENSO versus the overall mean. The results of the onset of rains show no clear pattern in the Free State with some areas experiencing late onset and others early onset in both El Niño and La Niña years. However, the cessation of rains occurs early during the El Niño and later in La Niña years over most parts of the province. Consequently, the duration of the rainy season is shorter than normal in El Niño years and longer than normal in La Niña years. Seasonal rainfall is also lower than normal in El Niño years while in La Niña years more cumulative rainfall is mostly observed. As a result, maize production is favoured in La Niña years and reduction in production is normally observed during El Niño years.

**Keywords:** Cessation of rain; Duration of rainy season; Onset of rain; Seasonal rainfall