

Grain Yield Responses of Selected Crop Varieties at Two Pairs of Temperature Analogue Sites in Sub-humid and Semi-arid Areas of Zimbabwe

Abstract

Climate analogues, based on 30 years meteorological data, were identified in smallholder areas of Zimbabwe. The sites were Kadoma (722 mm annual mean rainfall; 21.8 °C annual mean temperature) which was the higher temperature analogue site for Mazowe (842 mm annual mean rainfall; 18.2 °C annual mean temperature) for wetter areas, and Chiredzi (541 mm annual mean rainfall; 21.3 °C annual mean temperature) which was the higher temperature analogue site for Matobo (567 mm annual mean rainfall; 18.4 °C annual mean temperature) for drier areas. At each site and for each crop, three varieties were laid out in a randomized complete block design with three replications. The trials were conducted for two seasons (2011/2012 and 2012/2013). Maize and groundnut yields were higher at the cooler and wet sites and decreased significantly at the warmer and dry sites. In case of sorghum and cowpea, yields at the hotter site remained high implying that these crops are more tolerant to warmer temperatures predicted for 2050. At the drier sites, yields for all crops were significantly lower at the hotter site implying that crop production in the 2050s climate of the cooler site will be more difficult. The hypothesis that with increasing surface temperatures in a climate change scenario short duration genotypes can perform better compared with long duration was not confirmed.