

## **Influence of climate change on crop water requirements to improve water management and maize crop productivity**

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### **Abstract**

Climate change has continued to impact meteorological factors like rainfall in many countries including Nigeria. Thus, altering the rainfall patterns which subsequently affect the crop yield. Maize is an important cereal grown in northern Nigeria, along with sorghum, rice, and millet. Due to the challenge of water scarcity during the dry season, it has become critical to design appropriate strategies for planning, developing, and management of the limited available water resources to increase the maize yield. This study, therefore, determines the quantity of water required to produce maize from planting to harvesting and the impact of drought on maize during different growth stages in the region. Rainfall data from six rain gauge stations for a period of 36 years (1979-2014) was considered for the analysis. The standardized precipitation and evapotranspiration index (SPEI) is used to evaluate the severity of drought. Using the CROPWAT model, the evapotranspiration was calculated using the Penman-Monteith method, while the crop water requirements (CWRs) and irrigation scheduling for the maize crop was also determined. Irrigation was considered for 100% of critical soil moisture loss. At different phases of maize crop growth, the model predicted daily and monthly crop water requirements. The crop water requirement was found to be 319.0 mm and the irrigation requirement was 15.5 mm. The CROPWAT 8.0 model adequately estimated the yield reduction caused by water stress and climatic impacts, which makes this model appropriate for determining the crop water requirements, irrigation planning, and management.

**KEYWORDS:** Irrigation scheduling, Cropwat model, Crop water requirement, climate change, water scarcity

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