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Climate change can cause decline in crops especially in vulnerable areas. In southern Tanzania maize production is expected to decline due to projected future warming and changes in seasonal rainfall patterns and distribution. This study investigated the impacts of a changing climate on three maize cultivars commonly grown in southern part of Tanzania and projections of future rainfall and temperature for Tanzania.

Impacts of a changing climate on maize yields were investigated by using DSSAT cropping system model. Prolonged dry-spells and decreased seasonal rainfall intensity during vegetative and reproductive stages of maize growing caused severe loss of maize yields for all cultivars. However, yields increased with increased temperature of 2.5°C and up to 4.5°C for some maize cultivars and declined with further temperature increase. The current average growing season temperature in some locations already exceeded the optimal production temperature for all three cultivars. Hence, they are less suitable for optimal production in these regions in the projected future warmer and drier climate.

The study also used Empirical Statistical Downscaling (ESD) to provide downscaled climate projections for three future periods; 2010-2039, 2040-2069 and 2070-2099. Downscaling results suggested wetter conditions for October-December rainfall season and drier condition for December-April season. In March-May season, some areas were projected to feature wetter and some drier conditions. Results also suggested future warmer climate except for a few locations in September-November season.

The results from this work can be very useful for strategic adaptation measures in crop agriculture in Tanzania. Knowledge about climatic factors limiting growing condition for various crops and future climate projections is needed to develop adaptation measures.