**Tropentag, September 16-18, 2015, Berlin, Germany**

"Management of land use systems for enhanced food security: conflicts, controversies and resolutions"

# The Impact of Climate Modes and Precipitation on Tanzanian Maize Yield

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**Abstract**

Previous research has shown the significant impact of the two climate modes El Niño/Southern Oscillation (ENSO) and Indian Ocean Dipole (IOD) on the interannual variability of Tanzanian rainfall. However, the relationship of these modes to crop yield in a country where agriculture is predominantly rain-fed has not yet been investigated. This study analysed in three steps the impact of ENSO and IOD, as well of the regional precipitation on maize yield in the East African country Tanzania. Correlation and multiple linear regression analysis were used to investigate the relationship between monthly climate indices and precipitation and annual maize yield data. IOD was shown to have positive and mostly statistically significant correlation with precipitation throughout almost entire Tanzania during October to February. ENSO has a comparably negligible, mostly non statistically significant impact on the Tanzanian rainfall. It was indicated, that the right timing of the precipitation is crucial for a good development of maize. From January to April, crops show increased susceptibility to drought. Too early precipitation (from August to December) can lead to crop failure. About half of the regions showed a month with statistically significant correlation of maize yield with precipitation. IOD is generally negatively correlated with the maize yield during September to November and positively during December to April. IOD has a stronger impact on maize yield than ENSO. Therefore, more attention should be paid on the Indian Ocean in future research. The available data was not sufficient to prove that climate modes affect the maize yield only via precipitation. A better understanding regarding climate modes effect on agriculture can contribute to a robust supply of food in a country, where food production comes mostly from rain-fed agriculture.

**Keywords:** ENSO, interannual variability, IOD, maize yield, rain-fed agriculture, rainfall

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