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Dynamics of Rainfall and Temperature Variability in Relation to Food Crop Production in Southeastern Nigeria

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Abstract

This study examined the effects of climate change on major food crops in southeastern Nigeria. It was conducted in three states out of five states in the region, which are Abia, Ebonyi and Imo. In the study, time-series climatic data on monthly rainfall amount and average temperature, and data on annual yield of maize and cassava were analyzed. The climatic data generated at selected synoptic stations in the capital cities of the study states was collected from Nigeria Meteorological Agency (NIMET), offices in the states. Crop yield data on the two arable crops (maize and cassava) for the states were collected from Agriculture Development Programme (ADP), headquarters in the states. The archival time-series climatic data and crop yield data for 30 years (1988–2017) were statistically analyzed, employing correlation coefficient and regression models. The study generally indicated evidence of climate change and variation in the region, with steady high, and increasing temperatures trend, which conforms to scientific observations of steady increases in global average air and ocean temperatures. Annual rainfall was shown to have decreased in the region within the study period. Results from the statistical analysis showed uncertainty rainfall patterns affecting agricultural outputs occasioned by climate variation. Correlation analysis showed about 10 % of variation in maize yield influenced by rainfall and temperature acting together, while about 37 % of variation in cassava yield was influenced by the same climatic parameters. Regression analysis showed that maize units of 14.74 and cassava units of 1.45 were affected by rainfall in the last 30 years in the region, while maize units of 0.07 and cassava units of 0.09 were affected by temperature variations per annum in the same period. Invariably, the study established that in Southeastern Nigeria, temperature variation affects cassava yield more than maize yield, and rainfall variation affects maize yield more than cassava yield. However, crop production can better be predicted if climate records are available and properly managed, their forecasts communicated to the farmers in due time. Then sustainability of food security can be achieved in the region.

Keywords: Climate change, Effects, food crops, southeastern Nigeria