

## Abstract

Africa continent is under pressure from climate stresses and is highly vulnerable to the impacts of climate change. In Kenya, agriculture is the backbone of the economy making it an important contributor to food security of rural households. Currently crop productivity is being affected by continued climate variations and decline in soil fertility. Adaptation to climate change and soil fertility management requires to be given high and urgent priority for sustainable crop production. A study was conducted in Mavuria ward, Mbeere South Sub-County, Embu County to evaluate the effects of climate change adaptation and soil fertility enhancement measures on crop production. The study used both descriptive and experimental research designs. The primary data on adaptation measures was collected from farmers, institutions using questionnaires and soil samples collected and analysis done in Soil Cares laboratories to determine the nutrient levels. In the data analysis, descriptive statistics was used to organize the climate data and that of the respondents into frequencies. Further, the Person's correlation test was done to determine the relationship between climate parameters and the yield of the four major crops at  $\alpha=0.05$ . From the study findings, the relationships between rainfall and the crops were all positive with strong correlation coefficient for beans ( $r=0.719$ ) and cowpeas ( $r=0.556$ ) and weak coefficients for maize ( $r=0.443$ ) and green grams ( $r=0.394$ ). However, all the correlation coefficients with rainfall were not significant ( $p>0.05$ ). The relationship of the crop yields with temperature could not be determined since the mean annual temperature did not vary across the years. Most of the soils were deficient in nitrogen (66.7%), and phosphorus was within recommended range (66.7%) and 32.3% were above the recommended level. Regarding potassium levels, all the soils had levels above the maximum recommended. The main adaptation mechanisms identified were soil fertility improvement, soil and water conservation, early planting, pest and disease control, provision of certified seeds, and awareness creation. In view of these findings, the study recommends the continuous implementation of the measures that can help strengthen farmers and institutional adaptation mechanisms towards climate change for improved crop production.