



Climate Smart Agriculture Practices and Soil Health Improvement Among Northern Kenyan Smallholder Farmers: A Longitudinal Study

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Abstract

Climate change impacts on agricultural productivity are significant in sub-Saharan Africa, particularly affecting smallholder farmers who rely heavily on rain-fed agriculture. In northern Kenya, where climate variability is pronounced, soil health and crop yields have been adversely affected. The study employed a longitudinal survey design with quantitative data collection methods to gather information from a representative sample of smallholder farmers in northern Kenya. Data were collected through structured interviews conducted over two years. A notable finding was that the implementation of CSA practices led to an average increase in soil organic matter content by 15%, which is crucial for enhancing soil fertility and water retention capacity. Furthermore, there was a significant rise in crop yields across all surveyed crops, with maize yield increasing by 20%. The study suggests that the integration of CSA practices into agricultural management can significantly improve soil health and boost farm productivity among northern Kenyan smallholder farmers. Government agencies and development organizations should promote CSA training workshops to enhance the adoption of these sustainable farming techniques. Additionally, subsidies for equipment enabling more efficient application of CSA methods could be beneficial.

Keywords: *African, Climate Change, Soil Health, Smallholder Farmers, Sustainable Agriculture, Longitudinal Analysis, Precipitation Variability*

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