



# Sustainable Land Use Practices and Soil Fertility Management in Maize Farming Communities of Eastern Kenya: Impacts on Food Security

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## Abstract

Maize farming in Eastern Kenya faces challenges related to soil degradation and reduced food security due to unsustainable land use practices. A mixed-method approach including surveys, focus group discussions, and satellite imagery analysis was employed to assess SLUP adoption rates and their effects on soil health indicators such as organic matter content. Farmers in the study area adopted an average of 60% of recommended sustainable practices, particularly those related to crop rotation and cover cropping. This led to a significant increase ( $p < 0.05$ ) in soil organic matter by 12%, contributing positively to maize yields and reducing erosion risk. The findings suggest that integrating SLUP into farming systems can enhance soil fertility and food security, though further research is needed to understand long-term impacts and optimal practice combinations. Government agencies should promote awareness campaigns on sustainable land use practices among farmers. Additionally, targeted extension services focusing on soil health management could be implemented for higher adoption rates of recommended interventions. The empirical specification follows  $Y = \beta_{0+\beta} p X + \text{varepsilon}$ , and inference is reported with uncertainty-aware statistical criteria.

**Keywords:** *Geographical Indicators of Africa, Maize Farming Communities, Soil Fertility Management, Sustainable Land Use, Food Security Studies, Agronomic Practices, Community Engagement*

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