Tropentag, September 10-12, 2025, hybrid conference

"Reconcile land system changes
with planetary health"

Climate adaptation strategies and food security in kenyan semi-arid regions

Cyrille Awuonda[1], John Olwande[2], Gideon Obare[3]

[1]*EGERTON UNIVERSITY, AGRICULTURAL ECONOMIC AND AGRIBUSINESS MANAGEMENT, Kenya*
[2]*TEGEMEO INSTITUTE OF AGRICULTURAL POLICY AND DEVELOPMENT, RESEARCH AND PROPOSAL WRITING,*
[3]*EGEERTON UNIVERSITY, DEPARTMENT OF AGRICULTURAL ECONOMICS AND AGRIBUSINESS MANAGEMENT,*

Abstract

Climate variability significantly impacts crop production and livestock in arid and semi-arid regions where farmers depend primarily on rainfall and face frequent agroweather shocks. With extreme weather events projected to increase across Sub-Saharan Africa, identifying effective adaptation strategies is essential for reducing vulnerability among agropastoralist and ensuring food security.

This study investigated how various adaptation strategies affect household food security in Kenya's Laikipia West Sub-County, using data collected from 308 agropastoral households through a multistage sampling approach. The research adopted factor analysis to categorise adaptation strategies, while household food insecurity was measured using the internationally recognised Food Insecurity Experience Scale (FIES). The Rasch (1961) model validated the psychometric properties of the FIES items, and a generalised ordered probit model with marginal effects quantified the impact of different strategies on food security outcomes.

Key Findings:

1. Agropastoralists employ 21 distinct adaptation strategies that were grouped into seven categories: farm risk reduction practices, cultural farm practices, sustainable agricultural practices, farm management practices, livestock management practices, diversification practices, and traditional practices.

2. The Rasch analysis confirmed the reliability (0.83) and validity of the food insecurity measurement scale, with item severity parameters ranging from $^{-3}$.88 to 4.39, indicating the scale's ability to discriminate between varying levels of food insecurity.

3. Most significantly, the study found that certain combination strategies—particularly those integrating farm risk reduction, cultural farming methods, and sustainable agricultural practices—had the strongest positive impact on household food security.

4. Other factors significantly influencing food security status included household size (consumption equivalent), farming experience, household education levels, livestock ownership (measured in tropical livestock units), and access to agroweather information.

Significance and Implications:

This research demonstrates that integrated adaptation approaches are more effective than isolated strategies in enhancing food security among vulnerable populations in arid

Contact Address: Cyrille Awuonda, EGERTON UNIVERSITY, AGRICULTURAL ECONOMIC AND AGRIBUSINESS MANAGEMENT, 536, 20100 Nakuru, Kenya, e-mail: cyrillesamson015@gmail.com

regions. The findings emphasise that policy interventions should not only promote diverse adaptation practices but also incorporate and strengthen locally contextualized strategies within broader development programs.

The study provides an evidence-based framework for policymakers and development practitioners to design more effective climate adaptation initiatives that can meaningfully improve food security outcomes in similar agroecological zones across Sub-Saharan Africa.

Keywords: Agropastoralism, climate Adaptation Strategies, Food Security, Generalized Ordered Probit, Rasch Model, Semi-Arid Regions