Abstract

Climate variability and change are major challenges in ensuring household food security. However, there is a dearth of knowledge and information on the interactions between climate variability, land-use and household vulnerability to food insecurity. In this study, food insecurity was used as a proxy for livelihood. This study was conducted in Makueni and Kajiado Counties, within the southern rangelands of Kenya, to address this gap. The main objective of the study was to establish the influence of climate variability and change on household food security under different land-use systems in the two selected counties. Data sources included household interviews, Focus Group Discussions, direct observations, Key Informant interviews and secondary data.Data were analysed using both descriptive statistics and regressions. Descriptive statistics suggested that among other factors, there was a link between rainfall and household vulnerability to food insecurity (VFI). Also, households in Makueni County, predominantly agropastoral, were more food secure, with a VFI of 0.27, than those of Kajiado County, which had a VFI of 0.59. Pastoral households had low access to resources such as climate information, education and income, making them more vulnerable to food insecurity than their agropastoral counterparts.From the descriptive statistics, it was difficult to gauge the influence of various variables on vulnerability to food insecurity. As a result, regressions were carried out. A simultaneous equation model (SEM), estimated through a two-stage least squares approach, was applied to establish the determinants of household vulnerability to food insecurity. The SEM estimation showed that both socio-economic and climate factors influence household VFI. The variables that were found to have a positive and significant influence at $p \leq 0.05$ include land size, household size and rainfall for Makueni County, and gender of the household head, access to climate information and off-farm activities for Kajiado County. This implies that, for Makueni County, households with large land holdings, large household sizes and higher rainfall are less vulnerable to food insecurity. Similarly, for Kajiado County, female household headship, off-farm opportunities and access to climate information are fundamental to reducing household vulnerability to food insecurity. Moreover, herd size was shown to influence VFI in both counties, with a negative and significant influence at $p \leq 0.05$. Thus, due to diminishing grazing resources, large herd sizes have shown to increase VFI. A regression model using time series data was estimated to capture the temporal aspects of climate that would otherwise not be captured by descriptive statistics and the SEM. Data for Kajiado and Makueni Counties for a

period of 31 years were used to establish inter-temporal effects of climate and non-climate related parameters on household VFI. Descriptive statistics on the data set suggested that climate variability (rainfall), livestock offtake, maize production, stocking rate, and beef and maize prices influence household food security. GLS regression results established that livestock offtake had a positive and significant influence ($p \leq 0.05$) on household security for both counties. In Kajiado County, rainfall, mean annual temperature and maize price were significant at ($p \leq 0.05$). For Makueni County, beef price and stocking rate significantly ($p \leq 0.05$) influenced household food security.From the results of this study, government policies for Kajiado and Makueni Counties need to promote improved livestock breeds as a means of destocking and enhancing livestock performance. In Kajiado County, access to climate information, creating micro-industries, targeting women based organisations, and promoting micro-climates through agroforestry and reforestation would improve livelihoods and reduce household VFI. Similarly, for the agropastoral households in Makueni County, promoting agroforestry and reforestation programmes, facilitating access to land, maintaining correct stocking rate, improving beef prices through improved marketing and managing household sizes would lead to reduced VFI.