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Original Article

Impact of Gender Differences in the Prevalence of Food Security among Rural Households in Kenya

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ABSTRACT

Gender inequality in access to productive and economic resources has been a significant issue in sub-Saharan Africa, particularly in Kenya, where rural households face varying levels of food security. While existing research has extensively examined the general determinants of food security among rural households in Kenya, there is a significant gap in understanding how these determinants differ by gender. Utilizing Kenya Intergrated Household Budget Survey (KIHBS) 2015/16 data and a binary logistic regression model, the study seeks to examine the impact of gender differences on the prevalence of food security among rural households in Kenya, while controlling for a set of household demographic and socio-economic characteristics. The findings revealed significant gender disparities, with female-headed households exhibiting higher food security scores compared to male-headed households. This is attributed to women's greater involvement in household food management and decision-making processes. The findings further revealed that the education status of the household head and household size are important determinants of food security among female-headed households while the education status of the household head, household size, access to credit and income are important determinants of food security among male-headed households. Given the findings of the study, it is evident that gender differences significantly influence food security among rural households in Kenya. The study therefore recommends that policy makers should incorporate gender-specific considerations into the design of food security policies and reforms.

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INTRODUCTION

Achieving gender equality by 2030 is a key objective of the United Nations Sustainable Development Goals (SDGs) (United Nations, 2022). Gender equality is not only a fundamental human right, but also a necessary tool and foundation for sustainable development for a given country. The 2012 World Development Report on gender equality and development highlights that failing to acknowledge the roles, differences, and inequities between men and women poses a significant risk to the success of agricultural development efforts (World Bank, 2012). Gender disparities significantly impact food security, particularly in rural areas where agricultural productivity, resource access, and nutritional outcomes are closely tied to the roles and resources available to different genders. Globally, women bear a disproportionate burden of food insecurity despite their substantial contribution to food production (WFP, 2022). Women produce between 60 to 80 percent of food in many developing nations and oversee half of global food production; yet, they face a significantly higher risk of severe food insecurity compared to men, with a disparity of nearly 27 percent (WFP, 2022).

Women play a critical role in food production and preparation but often encounter barriers such as limited access to land, credit, and agricultural inputs (FAO, 2010). Disparities in various factors such as income and employment opportunities further affect food security, as women may have fewer economic resources to ensure adequate household food supplies (Quisumbing et al., 2015). Addressing these disparities through improved access to resources for both men and women is essential for enhancing food security and fostering sustainable development (World Bank, 2023).

In 2021, about 32 percent of women worldwide were moderately or severely food insecure, compared to about 28 percent of males, a 4-percentage point difference, up from 3 percentage points in 2020. However, in 2022 the global level food insecurity gap between men and women narrowed substantially as about 28 percent of adult women were moderately or severely food insecure, compared to about 25 percent of men, and about 11 percent of women were severely food insecure, compared to about 10 percent of men. The disparity in the prevalence of moderate or severe food insecurity between men and women shrank from about 4 percentage points in 2021 to about 3 percentage points in 2022, while the gap in severe food insecurity shrank from 3 to 1 percentage point (FAO, 2023; IFAD, 2023; UNICEF, 2023; WFP, 2023 & WHO, 2023).

Kenya has made notable progress in various development sectors, yet food security remains a pressing issue. The country's reliance on agriculture, coupled with frequent climatic shocks, exacerbates food insecurity. The Global Food Security Index places Kenya 82nd out of 113 countries (Economist Impact, 2022). Approximately 10 million people in rural areas suffer from chronic food insecurity, and about 29% of the population does not meet their minimum nutritional needs (KNBS, 2018). Food security is a critical dimension of human well-being, reflecting the affordability, availability,

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accessibility, and utilization of food necessary for an active and healthy life (Ejiohuo et al., 2024). It is an essential indicator of a nation's overall development and stability, impacting public health, economic productivity, and social cohesion.

In Kenya, a predominantly rural nation with agriculture as a primary livelihood source, food security is of paramount concern. Rural households, heavily reliant on agriculture, are particularly vulnerable to food insecurity due to various socio-economic, demographic, and environmental factors (Herrera et al., 2021). Among these factors, the gender of the household head is a crucial determinant, affecting access to resources, decision-making, and overall household welfare. While food security is a general household problem, research has shown that female-headed households often experience higher levels of food insecurity compared to male-headed households (Akalu & Wang, 2023). However, emerging evidence suggests that these households may sometimes achieve better food security outcomes compared to male-headed households, raising important questions about the interplay between gender and food security (Adjei-Mantey et al., 2022).

While existing research has extensively examined the general determinants of food security among rural households in Kenya, there is a significant gap in understanding how these determinants differ by gender. The specific impact of gender differences on the prevalence of food security has not been adequately explored. This study aims to bridge this gap by investigating the role of gender in shaping food security outcomes among rural households in Kenya, focusing on how male-headed and female-headed households experience and manage food security differently. Understanding these dynamics is crucial for designing gender-sensitive policies that promote equitable access to food and resources, ultimately enhancing the overall food security of rural communities in Kenya.

Literature Review

The empirical literature on the determinants of food security among rural households reveals a significant gap in studies focusing on the determinants and prevalence of food security among rural households in Kenya from a gender perspective. Several studies conducted in Kenya and other developing countries only gave a connection between the predictor variables and the dependent variable (food security) and failed to say anything about the disparities in the prevalence of food security among distinct male and female headed households.

For example, studies conducted outside Kenya, Sekhampu (2013) and Omotayo and Aremu (2020) in South Africa; Abafita and Kim (2014) in Ethiopia; Mango et al. (2014) in Zimbabwe; Siddique and Muhammad (2019) in Nigeria; Abdullah et al. (2019) in Pakistan; Udaykumar et al. (2022) in India; Kolog et al. (2023) in Ghana, have primarily examined the determinants of food security among rural households in general terms, without analyzing how these determinants vary between male-headed and female-headed households. This lack of gender-specific analysis limits the understanding of how food security outcomes vary based on the gender of the household head thus impeding the formulation of targeted policies and interventions that address these disparities effectively.

Similarly, research conducted within Kenya, such as Mutinda (2015) and Mutea et al. (2019), has focused on the general determinants of food security and explored the relationship between food security and livelihood characteristics, respectively, without delving into gender-based disparities. This suggests a need for more empirical studies that consider how food security determinants and outcomes differ between male-headed and female-headed households.

The reviewed literature indicates that while the general factors influencing food security are well-documented, there is a pressing need for targeted research that examines gender-specific disparities.

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Therefore, this study aims to address this gap by investigating the impact of gender differences on the prevalence of food security among rural households in Kenya. By focusing on the gendered aspects of food security, this research seeks to provide a more detailed understanding of how food security challenges and determinants vary between male-headed and female-headed households. This will contribute to the development of more effective, gender-sensitive policies and interventions to improve food security outcomes for all rural households.

Research Methodology

Econometric Estimation Technique

In this study, we examine how the gender of the household head influences food security in rural Kenya. To achieve this, we estimate the effects of gender of the household head on rural Kenya household's food security status, controlling for a set of household demographic and socio-economic characteristics.

The pooled binary logistic model for this study is specified as follows;

$$\Pr(Z_i = 1) = F(X_i\beta + \varepsilon) \quad (1)$$

Where Z_i represent the binary dependent variable food security (Zi=1 if the household is food secure, and Zi=0 if the household is food insecure), β identifies the vector of parameters to be estimated, X_i is the vector of predictor variables that influence household food security, ε represent the unobserved predictors not included in the model, and F(.) represents a logistic distribution function that ensures estimated probabilities range between 0 and 1.

Previous studies have often combined data from both male-headed households (MHHs) and female-headed households (FHHs) and then estimated a gender dummy coefficient using a pooled regression approach. However, a significant drawback of the pooled regression approach is its assumption of a homogeneous slope coefficient, meaning it assumes that MHHs and FHHs experience the same effects of covariates on food security (Adjei-Mantey et al., 2022). This assumption may not hold in rural Kenya, where gender roles and access to resources differ significantly between male and female household heads. Therefore, this study runs separate logistic regressions for MHHs and FHHs to address this limitation. This method is considered superior as it accounts for how gender influences food security while considering other covariates affecting a household's likelihood of being food secure.

Following Kassie et al. (2014), separate regressions are run for MHHs if the gender of the household head is 1, and for FHHs if the gender of the household head is 0, as follows;

$$Z_m = F(X_m\beta_m + \varepsilon_m) \text{ if } g=1 \quad (2)$$

$$Z_f = F(X_f\beta_{f+} \varepsilon_f) \text{ if } g=0 \quad (3)$$

Where z represents food security, g denotes the gender of the household head (taking the value of 1 for MHHs and 0 for FHHs), and subscripts m and f represent male headed households and female headed households respectively. X_m and X_f are vectors of explanatory variables that influence food security, β_m and β_f are the coefficients to be estimated and ε_m and ε_f are stochastic error terms.

The gender food security gap is calculated as the difference in the mean predicted probabilities of food security derived from the aforementioned separate regression equations for male headed and female headed households.

Food Security Analysis

The 2015/16 Kenya Integrated Household Budget Survey includes a section on food security where respondents were asked eight questions about food-related behaviours or experiences over the past 12 months. This set of questions is deemed suitable for assessing food security among rural households in Kenya, as it aligns with the Food Insecurity Experience Scale (FIES) developed by the Food and Agriculture Organization (FAO).

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Based on the responses and the frequency of occurrence for each question, households were categorized into four levels of food security. Households were classified as food secure if respondents answered "no" to all eight questions (qa1 through qa8). Those classified as mildly food insecure had answered "yes" to any of the first three questions (qa1, qa2, or qa3). Households were considered moderately food insecure if respondents answered "yes" to any of the questions qa4, qa5, or qa6, and "no" to questions qa7 and qa8. Finally, households were classified as severely food insecure if respondents answered "yes" to either question qa7 or qa8.

For this study, only two categories of household food security were utilized: food secure if classified as such by the FIES, and food insecure encompassing all classifications from mildly, moderately to severely food insecure. This approach was chosen because the logistic regression statistical method used necessitates a binary dependent variable. Food security was coded as 1 if the household was classified as food secure and as 0 if it was classified as food insecure.

Data Source and Type

This study used the 2015/16 Kenya Integrated Household Budget Survey (KIHBS) cross section data collected by the Kenya National Bureau of Statistics (KNBS) over a 12-month period to capture seasonal variations. The survey sampled 2,400 clusters across Kenya, with 1,412 in rural areas and 988 in urban areas, initially targeting 24,000 households. However, due to missing values, the final sample included 21,773 households. Among these there were 13,092 rural households and 8,681 urban households. As this study focused on rural Kenya, only the 13,092 rural households were considered. However, it is important to note that Mombasa and Nairobi counties were exempted from the rural stratum as they were considered to be wholly urban.

Results and Discussion

Descriptive Statistics.

Table 1 and 2 presents summary statistics for qualitative and quantitative variables disaggregated by the gender of the household head.

Table 1: Summary Statistics for Qualitative Variables Disaggregated by Gender of the Household Head

	Female (990)			Male (2053)		
Variables	**Observation**	**Mean**	**Standard Deviation**	**Observation**	**Mean**	**Standard Deviation**
Married	990	0.364	0.481	2053	0.856	0.351
Single	990	0.506	0.500	2053	0.069	0.254
Never married	990	0.13	0.337	2053	0.075	0.263
Primary education	676	0.561	0.497	1785	0.517	0.500
Tertiary education	676	0.127	0.333	1785	0.123	0.328
Secondary education	676	0.259	0.438	1785	0.29	0.454
Graduate	676	0.046	0.209	1785	0.05	0.218
Postgraduate	676	0.001	0.038	1785	0.012	0.108
No education	676	0.006	0.077	1785	0.009	0.094
Credit access	990	0.04	0.197	2053	0.047	0.211
Income	990	0.056	0.229	2053	0.059	0.236
Social shocks	990	0.179	0.384	2053	0.161	0.368
Economic shocks	990	0.263	0.440	2053	0.270	0.444
Environmental shocks	990	0.533	0.499	2053	0.551	0.498

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Table 1 above presents a comparative analysis of various demographic and socio-economic variables used in the econometric model estimation regarding the gender of the household head. In terms of marital status, the data revealed that the percentage of married female household heads stood at 36.4 percent, significantly lower than 85.6 percent observed among male household heads. The statistics further revealed that about 50.6 percent of female household heads were single while male household heads exhibited a lower 6.9 percent. Similarly, the data showed that 13 percent of female household heads and 7.5 percent of male household heads were never married. The higher percentage of married male household heads may be attributed to the fact that men have historically been designated as household heads within married couples. Additionally, men are also more likely to remarry after divorce, separation, or death of a spouse while women are more likely to remain single thus heading their households (Berenji, 2022).

The mean percentages analysis of the education status among household heads revealed significant differences between genders across various educational levels. For primary education, a slightly higher proportion of female household heads, about 56.1 percent, had attained this level compared to about 51.7 percent of male household heads. This disparity underscores the impact of implemented targeted policies and initiatives specifically aimed at increasing access to education for girls, resulting in a higher proportion of female household heads completing primary education (Psaki et al., 2022). In tertiary education, the mean percentages were closely aligned, with about 12.7 percent of female household heads and 12.3 percent of male household heads attaining this level. Similarly, secondary education attainment was slightly lower among female household heads at 25.9 percent compared to male household heads who stood at 29 percent. This trend is supported by a study by Aslam and Kingdon (2012), which has documented that while secondary education rates have improved for both genders, male students often have a slight edge due to socio-economic factors that favour boys' education in many rural settings.

For graduate education, about 4.6 percent of female household heads had attained graduate education, a percentage slightly lower than 5 percent observed among male household heads. Similarly, postgraduate education attainment was notably low for both genders, with female household heads at 0.1percent and male household heads at 1.2 percent. The prevalent low attainment for graduate and post graduate education among household heads across both genders may be attributed to obstacles in funding tuition fees, as well as difficulties in balancing family responsibilities along with academic pursuits especially in rural communities which are often characterized by lower average incomes and limited economic opportunities. However, the attainment is lower for female household heads compared to male household heads. This disparity can be attributed to traditional gender roles that place a greater burden of the household including caregiving responsibilities on women, limiting their time and resources for pursuing higher education (Cerrato & Cifre, 2018). Additionally, a small percentage of both female and male household heads, approximately 0.6 percent and 0.9 percent respectively, had not received any formal education.

In terms of credit access, approximately 4 percent of female headed households and 4.7 percent of male-headed households had access to credit. This observation is in agreement with Allen et al. (2016) who found low credit access rates for both female and male led households. The lower credit access rate for female-headed households corroborates with Roy & Patro (2022) assertion that despite the efforts and progress in promoting financial inclusion among rural women, there still exists significant gender disparities in financial inclusion. For income levels, about 5.6 percent of female headed households and 5.9 percent of male-headed households reported receiving both labour and non-labour income.

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Looking at shocks to household welfare, 17.9 percent of social shocks occurred in female-headed households, while only 16.1 percent were observed in male-headed households. In terms of economic shocks, female-headed households accounted for 26 percent, slightly lower than the 27 percent observed in male-headed households. This may be attributed to the fact that male-headed households oftenly engage in economic activities that are highly vulnerable to market fluctuations and shifts in economic policies (Agarwal, 2018). In contrast, female-headed households often rely more on diverse and potentially more stable income sources, such as informal trade or small-scale agriculture, which provide some degree of protection against economic volatility (Quisumbing et al., 2017). Additionally, approximately 53.3 percent of female-headed households experienced environmental shocks, in contrast to about 55.1 percent of male-headed households. The higher percentages prevalent in both male and female headed households indicate that environmental shocks are a widespread issue impacting households food security regardless of the gender of the household head.

Table 2: Summary Statistics for Quantitative Variables Disaggregated by Gender of the Household Head

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
Household size	990	4.683	2.618	1	28
	2053	4.692	2.499	1	15
Food prices	990	162.502	330.141	3.333	5000
	2053	183.905	436.090	0	5000
Age	990	47.946	18.132	16	98
	2053	43.52	15.181	15	98

In Table 2, the first row for each variable represents data for female-headed households, while the second row represents data for male-headed households. It is observed that the least number of individuals in female-headed households was 1, while the highest was 28. In male-headed households, the least number of individuals was 1, while the highest was 15. The descriptive statistics further revealed that the age of the household head in male-headed households deviated from its mean (43.52 years) by 15.181, with the majority being about 43 years of age. The youngest male household head was 15 years old, while the oldest was 98 years. Alternatively, the age of the household head in female-headed households deviated from its mean (47.946 years) by 18.132, with the majority being about 47 years of age. The oldest female household head was 98 years old, while the youngest was 16 years. Furthermore, it was revealed that food prices in male-headed households deviated from their mean (KES 183.905) by 436.090, with the lowest price being KES 0 and the highest price being KES 5,000. Additionally, food prices in female-headed households deviated from their mean (KES 162.502) by 330.141, with the lowest price being KES 3 and the highest price being KES 5,000. This smaller standard deviation suggests a more consistent pattern of food costs, reflecting more stable budgeting and resource management practices in female-headed households.

Empirical Results and Discussion

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Table 3: Logistic Regression Results on the Impact of Gender Differences in Prevalence of Food security among Rural Households in Kenya

VARIABLES	(1) FHH	(2) MHH
Householdsize	-0.0867*	-0.0997***
	(0.0502)	(0.0250)
Food prices	0.000256	-3.81e-05
	(0.000258)	(0.000136)
Married	0.382	-0.130
	(0.295)	(0.223)
Single	0.417	-0.390
	(0.323)	(0.339)
Primary education	-1.059**	0.482
	(0.421)	(0.302)
Tertiary education	-0.636	0.548*
	(0.459)	(0.332)
Secondary education	-0.839**	0.263
	(0.426)	(0.309)
Postgraduate	-6.118***	1.381**
	(1.087)	(0.546)
No education	-0.713	0.518
	(1.215)	(0.667)
Social shocks	-0.0428	-0.0748
	(0.283)	(0.185)
Environmental shocks	-0.107	-0.127
	(0.222)	(0.139)
Credit access	0.297	0.464*
	(0.447)	(0.259)
Age	0.00342	-0.00381
	(0.00733)	(0.00443)
Household Income	0.404	0.994***
	(0.385)	(0.215)
Constant	-0.454	-0.983***
	(0.524)	(0.360)
Observations	2,461	2,461

Table 3 presents the effects of gender of the household head on rural Kenya households food security status, controlling for a set of household demographic and socio-economic characteristics. Columns 1 and 2 present the coefficients associated with the logistic regression model for the Female headed households (FHH) and Male headed households (MHH) respectively**.**

An increase in household size in both male and female headed households significantly decrease the probability of these households being food secure by about 8.67 and 9.97 percent respectively. The level of dependency within the household serves as a robust indicator of the household's food security status (Mutisya et al., 2016). As household size increases, so does the demand for food and other resources. In response to these heightened demands, households may resort to coping strategies such as reducing portion sizes and skipping meals. While these strategies may offer short term relief, they are often unsustainable and may actually worsen food security over the long run (Carranza & Niles, 2019).

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An increase in the age of the household head increase the probability of female headed households being food secure by 0.342 percent and decrease the probability of male headed households being food secure by 0.381 percent. This may be attributed to the cultural norms and gender roles prevalent in many societies which often shape the division of labour, decision-making processes, and access to resources within households (Gebre et al., 2021). In many cultures, older individuals, especially women, are often responsible for managing household resources, benefiting from established social networks, community support, and alternative income sources that contribute to better food security scores.

Access to credit increases the probability of both female and male headed households being food secure by about 29.7 and 46.4 percent respectively. This result indicates that credit access is crucial for improving food security outcomes for rural households. This result is consistent with Boltana et al. (2023) whose study found out that in both male and female headed households' credit is often used to obtain food products. However, increased access to credit has a greater impact on food security in male headed households than in female headed households. This could be explained by the fact that male household heads have potentially higher levels of financial literacy, greater control over financial resources and decision-making with regards to economic activities (Chiara, 2023). Additionally, they may have better access to markets and economic opportunities due to the prevailing gender norms and social structures.

Household income is seen to have a positive effect on the probability of a household being food secure for both male and female headed households. For female headed households, a one Kenya Shilling increase in income increase the probability of the household being food secure by about 40.4 percent ceteris paribus. On the other hand, in male headed households a one Kenya Shilling increase in income increases the probability of a household being food secure by about 99.4 percent. This may be due to the fact that given limited formal employment opportunities in the rural settings male household heads have better access to off farm employment opportunities which increase household income and subsequently improve food security (Bai et al., 2024). However, female household heads may encounter barriers to accessing formal employment due to factors such caregiving and home management responsibilities, limiting their ability to increase household income and enhance food security. This observation aligns with previous research by Duah Dwomoh et al. (2023) which highlighted the gender disparities in employment opportunities and their implications for household food security.

Social shocks reduce the probability of a household being food secure for both male- and female-headed households. In male headed households the probability of being food secure decreases by about 7.48 percent in the event of social shocks. Regarding female headed households, if a social shock occurs, the probability of that household being food secure decreases by about 4.28 percent. Similar results were reported by Knippenberg and Hoddinott (2019) whose findings revealed that female headed households may exhibit some resilience to social shocks, which can be attributed to stronger social support networks or coping mechanisms enhancing such households to smooth out their food consumption levels in the event of social shocks.

In the event environmental shocks occur, the probability of both female and male headed households being food secure decreases by about 10.7 and 12.7 percent respectively. This aligns with the findings of Nelson et al. (2018) who noted that environmental shocks often disrupt crop yields, damage infrastructure, and undermine livelihoods, particularly in rural and agrarian communities where households rely heavily on agricultural activities for food and income. However, these results also contradict findings by FAO (2019) and IPCC (2021) which highlight the disproportionate

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impact of environmental shocks on women, who often face heightened risks of food insecurity and malnutrition in the aftermath of environmental disasters.

The marital status of the household head had a positive but statistically insignificant effect on food security scores in female headed households. The analysis showed that the probability of a female headed household being food secure increases by approximately 41.7 percent when the household head is single and by approximately 38.2 percent when the household head is married. These findings suggest that households led by single female household heads have a slightly higher likelihood of being food secure compared to those led by married female household heads. This trend may be explained by the fact that that single female heads often benefit from targeted support programs or have developed more efficient resource management strategies, which enhance their food security (Bryan et al., 2023).

Looking at male headed households, the results indicated that the probability of a household being food secure decreases by approximately 39 percent when the household head is single and by about 13 percent when the household head is married. Research by Mokari-Yamchi et al. (2020) found that single male heads are less likely to receive social support from extended family or community networks compared to their female counterparts, making them more vulnerable to food insecurity. Furthermore, single male household heads may also have less access to support programs designed to aid single-parent households, which often prioritize women. According to a study by Madhavan et al. (2020), many food security programs are tailored specifically for single mothers, inadvertently excluding single fathers who may have similar needs. This lack of targeted support can exacerbate the economic pressures faced by single male heads, further reducing their food security. These findings align with existing literature that underscores the importance of family structure and support networks in ensuring food security. For instance, a comprehensive review by Balistreri (2017) emphasized on the importance of family structure and social support in enhancing food security among single parent households.

Household head education level was negatively associated with the probability of female headed households being food secure. The negative coefficients observed for primary, secondary, tertiary education and postgraduate education levels suggest that higher educational attainment among female household head decreases the probability of those households being food secure. These results are in line with findings by Quisumbing et al. (2015) and Doss et al. (2018). These studies suggest that while education is generally regarded as a pathway to economic empowerment, the increased aspirations for socioeconomic advancement in female headed households that come in hand with higher education levels, potentially translate into increasing living costs thus reducing resources allocated towards food expenditures therefore worsening food security.

Finally, the education level of household heads was positively associated with the probability of male headed household being food secure. Specifically, tertiary education and postgraduate education demonstrated positive and statistically significant effects on food security outcomes for male-headed households. These results imply that higher levels of education contribute to improved food security outcomes in these households. This may be attributed to the fact that educated male heads are more likely to invest in agricultural technology and practices that improve food production and security (Mutenje et al., 2016). Studies such as Mutisya et al. (2016) have demonstrated the socio-economic benefits associated with higher education levels. Individuals with higher education levels often have access to better employment opportunities, higher incomes, and enhanced decision-making capabilities, which can positively impact household food security.

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Table 4: The Mean Predicted Probabilities of Food Security.

Household Type	Binary Logistic Regression Model
	Outcome Variable: Food Security (Binary)
Male-headed	0.211***
Female-headed	0.228***
Difference	0.017

As evident in table 4, Female-headed households in rural Kenya are more likely to be food secure than their male counterparts. For Female headed households, the outcome mean stands at 22.8 percent while for male headed households it stands at 21.1 percent, implying that, on average, approximately 22.8 percent and 21.1 percent of these households' exhibit food security, respectively. Thus, on average, the probability of a household being food secure decreases by about 0.0171 units when the household head is male compared to when the household head is female, while controlling for other variables in the model. This observation aligns with previous research by Yoosefi Lebni et al. (2020) and Felker-Kantor and Wood (2012) who also found that female headed households tend to be more food secure than male headed households, particularly in the rural setting. This may be attributed to women's greater involvement in household food management and decision-making processes.

Conclusion

Female headed households demonstrated higher food security scores compared to male headed households. The findings further revealed that education status of the household head and household size are significant determinants of food security among female headed households while education status of the household head, household size, access to credit and income are significant determinants of food security among male headed households.

However, both male and female headed households experienced a decline in food security as household size increases. Access to credit positively influenced food security in both male and female headed households, with a stronger impact observed in male headed households. Household income positively affected food security for both male and female headed households, with income increase associated with relatively higher food security probabilities in male headed households. Marital status negatively affected food security in a male headed household, while it had a positive influence in making a female headed household more food secure.

Social and environmental shocks negatively impacted food security for both female and male headed households with female headed households exhibiting some resilience to social shocks. Additionally, higher education levels among household heads were associated with reduced food security in female headed households, while they enhanced food security outcomes in male headed households. Age of the household head negatively impacted the probability of both male and female headed households being food secure.

Recommendation

Based on the study findings, several policy implications can be drawn. First, increasing access to educational resources for household heads is crucial, as education significantly influences food security for both female- and male-headed households. This can be achieved by providing adult/vocational training and resources that enhance agricultural practices, financial management, and decision-making skills. Such support will enable household heads to make informed decisions that directly contribute to improved food security. The government should enforce policies that focus on reproductive rights and guarantee universal access to family planning services which is crucial for managing household sizes at sustainable levels,

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which will in turn improve food security for both male and female headed households.

Access to credit plays a pivotal role in ensuring food security for male-headed households. Financial institutions should offer more accessible credit options with reduced collateral requirements and flexible repayment terms. Additionally, providing financial management training will help male household heads use credit effectively, thereby supporting income-generating activities that enhance food security. Income is also critical for improving food security among male-headed households. Policies should focus on promoting sustainable income opportunities through agricultural support, small-scale business development, and infrastructure improvements such as roads and market access. These measures will increase income levels and, consequently, food security.

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