Coping strategies and food insecurity experiences: the case of female-headed Agricultural households in Liberia

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Abstract

Purpose:

Realities of food insecurity are more pronounced with a specific focus on women in developing countries. The need to understand the varied food insecurity experiences among female-headed agricultural households in such contexts provided the rationale and motivation for this study.

Design: The study employed a quantitative cross-sectional approach, drawing on the binary logistic regression to determine the influence of socioeconomic status on household coping mechanisms in response to food insecurity in a stratified random sample of 509 female-headed agricultural households in Liberia.

Findings: The results revealed that most respondents experienced food insecurity reflected in inadequate food availability, an inability to eat nutritious food and the necessity to skip meals. In response, they employed coping strategies such as borrowing money, selling assets, and reducing health expenses, which were influenced by socioeconomic characteristics such as gender, education, and marital status.

Practical implications: The study illustrates the multi-layered and complex context of food insecurity among women. From these findings, the study proposes the consideration of such dynamics to inform practical and relevant mitigatory policy approaches to the target demographic.

Social implications: With food insecurity being a social problem, the study identifies its social impact by documenting the participants' lived experiences. Thus, the study contributes to a deeper understanding of food insecurity across different segments of society.

Originality/Value: The study draws its originality from understanding how food insecurity impacts female-headed households, highlighting the often-ignored gender dynamics of food insecurity in developing nations and aggregating the coping strategies and food insecurity expenses.

Keywords: Coping Strategies; Food Insecurity; Female-headed agricultural households; Liberia

Paper type Research paper

1. Introduction

Food insecurity remains a significant social problem globally. Food insecurity is defined as "a situation that exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and active and healthy life" (FAO *et al.*, 2013). FAO *et al.* (2023), through a metric known as the Prevalence of Undernourishment (PoU), estimate that 783 million people-9.8% of the global population faced hunger in 2022. A notable 38.2% of this figure is concentrated in Africa. While food insecurity is common among the elderly, persons with disabilities and children, it is generally associated with low income and indicates poverty (Food Insecurity, 2016). The statistics on food insecurity present an acute case for concern worldwide. Between 2019 and 2022, there was a surge in the percentage of individuals experiencing food insecurity from the pre-COVID-19 pandemic level of 7.9% to 9.2% (FAO *et al.*, 2023).

According to Abbasi *et al.* (2016), food insecurity occurs across a severity scale. At the lower end of the scale, individuals face uncertainty in obtaining food through socially accepted means. At the most severe end, individuals cannot get enough to eat due to insufficient resources, causing them to experience physical and psychological consequences of food insecurity. Determinants of food insecurity vary, and they can be categorised in different ways. These can be social, economic, and environmental factors (Drammeh *et al.*, 2019). Elements such as material and social deprivation, disorder, social cohesion and residential location play an integral role in influencing the prevalence of food insecurity (Carter *et al.*, 2012).

As a social problem, food insecurity affects different segments of the population, with children, women and other population groups experiencing it differently (Ahmad *et al.*, 2021). Notably, in the case of children, their physical well-being is adversely affected due to the surge in food prices (Headey and Ecker, 2013). Similarly, women comprise a significant portion of the global population sub-groups that are negatively affected by food insecurity, highlighting the multifaceted nature of this issue. This is evidenced by the UN Women Report (2022), which highlights a percentage gap in food insecurity skewed against women and an increase from 1.7% in 2019 to more than 4% in 2021, owing to the Russia-Ukraine war. Further corroboration of this phenomenon is provided in a CARE (2022) report, which observes a 4.5 times increase in women experiencing food insecurity worldwide. Such evidence strengthens the hypothesis that women are at a greater likelihood of experiencing food insecurity in contrast to men when exposed to similar shocks.

While this evidence points to the global situation, a need remains to understand how women, especially in developing countries, experience food insecurity and coping mechanisms. This necessity is further underscored through the recognition that food insecurity, although a global phenomenon, affects individuals differently, informing their individual, varied coping mechanisms. Therefore, this study was conceived to test this hypothesis, focusing on women in developing countries. Its scope was to determine the coping strategies and food insecurity experiences of female-headed agricultural households in Liberia. Its questions focus on identifying the food insecurity experiences of these households, analysing the various coping mechanisms they employ against food

insecurity, establishing socioeconomic status's influence on these coping strategies, and proposing policy interventions to improve the coping capabilities of these households in response to food insecurity.

2. Theoretical Background

The critical realism theoretical framework guided this study. As a theory, critical realism is based on the premise that reality possesses inherent forces and mechanisms, evidenced by its capacity to cause or make things to occur (Lawani, 2021). It offers scholars insights into how individuals interpret and contextualise their experiences and their correspondence to objective social structure's facilitating and constraining effects (Houston, 2010). In the same way, the theory enables the identification of causal mechanisms and their underlying conditions rooted in the deeper layer of actual reality that influences individual agency's perception of the social phenomena under study (Park and Peter, 2022).

Critical realism was, therefore, a suitable theoretical underpinning for this study as it exemplified the purpose of the study, which was to develop an understanding of food insecurity among women based on their experiences, which then informed their coping strategies. Critical realism's premises are cognisant that no two experiences are the same. In the study context, critical realism guided the rationale towards understanding the various food insecurity experiences of female-headed agricultural households in Liberia and the varied copied strategies.

There is evidence to show the varied outcomes of manifestations of food insecurity in different gender groups, with a significant portion of literature showing that women experience the adverse effects of food insecurity more intensely than men, especially in low-income countries (Broussard, 2019). This can be traced to various root causes, which can be categorised differently. As Van Dijk and Nkwana (2021) argue, they can be social, economic and political. Ghale *et al.* (2018) categorise them into four critical dimensions of analysis: legal, psychological, material, and socio-cultural. In their study on the role of policy frameworks in enhancing the food security outcomes of women in rural South Africa, Van Dijk and Nkwana (2021) found that lack of access, non-representation and low economic capacity stood in the way of rural women's attempts to achieve food security for themselves and their families. Paradoxically, almost half of the labour force in Africa's agricultural sector consists of female farmers (African Union, 2017).

Understanding food insecurity among women requires a less regimented, rigidly structured approach. It involves moving beyond the present indicators to include the personal, subjective, and individual experiences of food insecurity (Headey and Ecker, 2013). Villacis *et al.* (2023) identify the use of such indicators in determining food insecurity at the household level in Nigeria. They observed that these indicators, when paired with machine learning techniques, gave reliable estimates of food insecurity in Nigeria. This is further corroborated by Onori *et al.* (2021), who employed the Food Insecurity Experience Survey (FIES) in India and found that it appropriately measured individual women's experiences concerning food insecurity. Such experience-oriented analysis approaches amplify the recognition and capture of personal food insecurity experiences, not letting them disappear in the pursuit of large data. In this line, research

further shows that food insecurity in low-income contexts results in further socio-psychological effects on women, such as acute clinical depression (Mark *et al.*, 2021) and gender-based violence (Abrahams *et al.*, 2022).

Globally, the analysis of the association between gender and food insecurity presents noticeably meaningful observations, significantly skewed towards women (Broussard, 2019, Felker-Kantor and Wood, 2012). This is increasingly amplified in low-income countries, which are characterised by a considerably higher number of barriers to women's food security, with further evidence of this phenomenon showing in female-led households (Silvestri *et al.*, 2015). The gravity of such female experiences with food insecurity is further pronounced with disruptions, such as the COVID-19 pandemic, where a decline in economic activity and opportunities triggered a rise in food insecurity, with women experiencing the greater brunt of it (Negesse *et al.*, 2020, Josephson *et al.*, 2021).

The motivation for this study can consequently be drawn from a variety of aspects raised in this paper. First is the need to understand the dynamics behind food insecurity in female-led households in Liberia, given that women form a significant proportion of the labour and production components of Sub-Saharan Africa's food outputs. Secondly, as far-reaching as food insecurity is, this study realises how it manifests across different sub-groups within communities. This raises the need to appreciate the multi-layered dynamics in how it manifests for different people and the varied ways they respond to it, significantly from a gender perspective focusing on female-led households in Liberia.

3. Methodology

This section outlines the data source and context, variable identification and measurement, data analysis and the ethical considerations. Furthermore, the methodological overview describes the variables incorporated into the binary logistic regression model.

3.1 Data Source and Context

The study utilised data from the Food and Agricultural Organisation (FA0) from a household survey conducted in Liberia between September 22nd and October 4th, 2021. The period within which this survey was undertaken is significant strategically because it investigates food contexts between evolving seasons of plenty (rainy season) and scarcity (dry season). As such, the information it generated highlights how crop cycles affect the evolution of meal composition in households as seasons change. Besides, since most developing countries are dependent heavily on rain-fed agriculture for food production, this study on Liberia was timely.

The unit of observation for the study is the agricultural households in Liberia, with the female heads of these households from both the urban and rural settings as the primary unit of analysis. The rationale for focusing on these women is because of their role as primary caregivers and their responsibilities in managing food availability, preparation and ensuring all household members have access to food (Rankoana, 2022, Lufuke *et al.*, 2023). However, this role often precludes women from taking part in other meaningful socioeconomic activities (Ahn *et al.*, 2020, Jayachandran, 2021). Nevertheless, this

demographic has a lot of promise with regard to delivering information that is specific to vulnerability of households (Abdullah *et al.*, 2019, Jung *et al.*, 2017). Consequently, the study considered female heads of agricultural households irrespective of their marital status since they are likely to encounter distinct challenges in relation to food insecurity.

3.3 Variable Identification and Measurement

The research variables under consideration are household socioeconomic characteristics, including the household head's current marital status, educational level, residence type, primary source of income, source of drinking water and the nature of sanitation amenities utilised. Emphasis is also placed on food insecurity experiences and coping strategies in response to food insecurity, which were assessed using a 30-day recall period. The 30-day timeframe was necessary because typical family budgets are often monthly. Besides, this timeframe minimises recall bias, a major shortcoming of retrospective studies, while allowing the study to identify environmental and economic indicators of food security.

According to the study, food insecurity is the situation where a household lacks adequate food elements to meet their nutritional requirements. The study identifies 19 coping strategies indicating how different households responded to a lack of food. Grouping and quantifying these variables was done using a coping strategy index developed based on empirical evidence (Drysdale *et al.*, 2019, Maxwell *et al.*, 2008, Shakeel and Shazli, 2021) and specific socioeconomic contexts in Liberia. As such, the study established three levels of severity (least, moderate and most severe) depending on their impact on the well-being of families. For example, actions that did not affect the well-being of a household in the long term were the least severe. These included selling off of non-essential items and borrowing food stuff from friends and family. Moderate responses included reducing budgets for health and education, which were indicative of higher levels of distress. These actions portend difficulties in these households' future and reduce their ability to grow themselves out of the debilitating circumstances in which they find themselves. Most severe strategies include turning to crime and selling off essential and remaining assets, and have the potential to cause an irreparable breakdown of households.

Ideally, these levels indicate progression from the threat of food insecurity to situations where it is imminent and conforms to FIES (Food Security Inexperience Scale). Higher scores represent greater food insecurity, while lower scores are indicative of the reverse. By matching coping strategies to food insecurity stages as identified by FIES, the study illustrates the complexities in trends as households navigate evolving intricacies of food surplus and scarcity.

3.4 Data Analysis

The research employed descriptive statistics, including frequency tables, to illustrate the data on socioeconomic factors, food insecurity experiences, and household food insecurity coping strategies over 30 days. Furthermore, the research employed binary logistic regression to ascertain the effect of socioeconomic status on household coping strategies against food insecurity. The model's dependent variable represented households' adoption of specific coping strategies. Each of the nineteen (19) coping

strategies was treated as separate binary variables. In categorising the binary variable, "1" indicated a negative response (No) to adopting the coping strategy. At the same time, "2" corresponded to a positive response (Yes), which related to the adoption of a particular coping strategy. The binary nature of the variable made it possible to establish the likelihood of adopting each coping approach based on socioeconomic factors. The logistic regression model was represented as follows:

$$\log\left(\frac{1-p}{p}\right) = \beta 0 + \beta 1(Gender) + \beta 2(MaritalStatus) + \beta 3\,(Education) + \beta 4\,(Residence)$$

Where:

- p is the probability of adopting a specific coping strategy.
- $\beta 0$ is the intercept of the model.
- $\beta 1, \beta 2, \beta 3 \ldots, \beta 4$ are the coefficients representing the changes in the log odds of adopting the coping strategy for a one-unit change in the corresponding independent variable.

3.4.1 *Description of Variables included in the binary logistic regression model*

Table 1 presents the regressors included in the binary logistic regression model to investigate the socioeconomic factors influencing the coping strategies employed by female-headed agricultural households in Liberia in response to food insecurity.

The coping strategy is the dependent variable in the binary logistic regression. It encompasses nineteen (19) coping strategies utilised by female-headed agricultural households in Liberia. Furthermore, the coping mechanisms are categorised into three severity levels: least severe, moderately severe, and most severe. The independent variables include the gender of the household head, which is a categorical variable. In this study, socio-cultural factors in Liberia may affect whether gender influences the coping strategies positively or negatively. The other categorical variable is marital status, which details if the household head is single, married or divorced. The influence of this variable on marital status may be positive or negative. Education, with categories representing the years the household head has received, is expected to positively influence effective coping strategies, as more years of education could facilitate better decision-making.

Additionally, the residence type is a categorical variable that classifies the household heads into either permanent residents or recent migrants not forcefully displaced. Its effect on coping strategies is expected to be either positive or negative depending on factors such as resource accessibility. Finally, the source of income is a categorical variable and is classified based on the primary activities contributing to the household income. For this variable, stable or higher income is expected to influence the capacity to adopt effective coping strategies positively. These variables are adequate for the binomial logistic regression analysis and align with the study's objective.

3.5 Ethical Considerations

The data used in this research was collected and provided by FAO. As a reputable organisation, FAO adheres to stringent ethical standards in collecting respondent data. In analysing the data, we have maintained the confidentiality and anonymity of the respondents in the dataset. Also, the data has only been utilised for the sole purpose of this study. In reporting the findings, the priority is on an accurate and transparent depiction of the findings to avoid misrepresenting the data. Finally, the interpretation of the findings takes cognisance of the cultural, social and economic contexts within which the data was collected.

4. Results

The findings on socioeconomic characteristics (see Table 2) revealed that the female-headed agricultural households in Liberia were predominantly married (44.8%), with a significant proportion being single or never married (29.5%) and a minority no longer married (25.7%). Regarding education, the majority had none or did not complete primary school (66.8%). In comparison, some had only religious or informal education (19.6%), and a minority completed primary school (12.4%) or higher education (1.2%). The residence type was majorly permanent residents (97.1%), with a minority being recent migrants not forcefully displaced (2.9%).

The majority of the respondents engaged in agricultural production and trade (72.7%) as their primary source of income. Despite this, food insecurity remains a challenge due to the small-scale and subsistence nature of most agricultural activities conducted by these households, which do not yield sufficient produce to meet all their food needs. However, the rest derived income from non-agricultural employment (15.8%), public employment (2.9%), income from non-work sources such as charity, remittances from family members living elsewhere, welfare transfers and humanitarian aid (2.4%), or other sources such as forestry or bush products (2.0%).

Regarding the source of drinking water, most respondents (42.8%) rely on a public tap, suggesting that there is a dependence on communal water sources, which might be because of infrastructural and accessibility challenges. As well, 34.6% utilise water from a protected well, further implying a lack of piped water infrastructure. Besides, 8.3% use water from the river, underscoring that some households use water whose quality could adversely impact their health and nutrition. Some respondents use water from a private tap (7.5%), unprotected wells (3.1%), and spring water (2%). The implication is that most households have a challenge accessing clean drinking water, likely due to infrastructural challenges or financial constraints that limit their ability to secure access to safe and reliable piped water. Thus, the households' vulnerability to water quality issues could expose them to waterborne diseases and foodborne illnesses, which could further exacerbate food insecurity.

In terms of the sanitation amenities utilised, 34.4% of respondents rely on traditional pit latrines with no water, while 30.8% rely on open defecation. The implication is that there is an urgent need to improve the sanitation infrastructure due to the health risks associated with inadequate sanitation amenities. Additionally, 24.8% of them utilise flush latrines, indicating varying levels of access to modern sanitation. The use of communal latrines (2.2%) and open pits (7.5%) further underscores the need to enhance sanitation access and reduce health risks associated with inadequate sanitation amenities.

4.1 Food insecurity experiences over a 30-day period

The food insecurity experience (FIES) results (see Figure 1) reveal distinct patterns of concern related to food access and consumption. Food diversity, a critical component of nutritional adequacy, refers to the variety of different foods consumed over a certain period, contributing to a balanced intake of nutrients necessary for good health. In agricultural communities, reliance on a limited set of crops or food items can result in a diet lacking in essential micronutrients, thus exacerbating the risk of health issues, including malnutrition and related diseases. A substantial majority of respondents expressed worry about not having enough food (90.6%), an inability to eat nutritious food (93.7%), and a tendency to consume only a few kinds of foods (95.5%) or skip meals altogether (89.2%) due to financial constraints. There is a possibility that the surveyed households largely depend on subsistence farming such that they are unable to have surplus produce for sale, leading to their inability to purchase additional food supplies.

Meanwhile, more extreme experiences such as having no food at all (26.1%), going to sleep hungry (14.7%), or going a whole day without eating (12.8%) were less commonly reported, reflecting a lesser but still concerning degree of acute food deprivation. Consistent with the results, Ozioko *et al.* (2020) found that female-headed households in Nigeria were more food insecure and employed coping strategies such as consuming a few kinds of foods and reducing food consumption altogether. Similarly, in Malawi, Dunga and Dunga (2017) established that due to the low economic status of female-headed households, they employed more coping strategies in response to food shortages as compared to male-headed households. Thus, the findings underscore that Liberia's food insecurity experiences and coping strategies reflect the trends observable in other developing regions of Nigeria and Malawi. This highlights the need for targeted interventions to address concerns of food insecurity in not only in Liberia but also other countries in the African continent eliciting similar trends.

4.*2 Household food insecurity coping strategies over a 30-day period*

The coping strategies employed over 30 days by households facing food insecurity were categorised into three levels of severity: Least Severe, Moderately Severe, and Most severe. Based on the results in Table 3, among the least severe strategies, the most prevalent were selling household assets or goods (83.3%), followed by spending savings (84.1%), and purchasing food on credit or borrowing food (65%). The moderately severe category revealed a significant reliance on reducing health expenses and begging (both 54%). In comparison, other strategies, such as withdrawing children from school (3.7%) and harvesting immature crops (2.2%), were less common. The most severe strategies were less frequently reported, with engaging in illegal or degrading income activities (2.2%), selling the last female animals (4.5%), and migrating with the entire household (6.7%). The findings demonstrate a hierarchical pattern of coping mechanisms, reflecting the escalating severity of strategies as food insecurity becomes more acute and underlines the multifaceted nature of household responses to food scarcity. The results are consistent with the insights from Melese *et al.* (2021) which revealed that household members, particularly female individuals in Southern Ethiopia, are prone to food

shortage and starvation and are likely to employ coping strategies such as relying on less preferred and less expensive foods as well as borrowing food.

Similarly, Kairiza and Kembo (2019) confirmed that female-headed households are prone to food insecurity and are highly likely to employ short-term coping strategies instead of long-term adjustments of food production patterns or income earnings. Further, an earlier study by (Norhasmah *et al.*, 2010) also confirmed that women in Malaysia from households that were experiencing food insecurity resorted to food-related coping strategies that involved food rationing and stretching and non-food-related coping strategies that involved an adjustment to their lifestyle through measures such as reducing the expenditure of school-going children. Female-headed households tend to seek immediate, short-term solutions to food insecurity, possibly due to the lack of resources and support systems. This calls for targeted policies that encompass immediate relief for food insecure households and offer long-term solutions that address the underlying causes of food insecurity.

4.3 Influence of Socioeconomic Characteristics on Household Coping Strategies in Response to Food Insecurity

The logistic regression model was employed to identify significant associations between socioeconomic factors (education, gender, marital status, and residence) and the 19 coping strategies. Table 4 illustrates that the household head's education level significantly influenced the decision to reduce health expenditure (p-value = 0.023) and beg as a coping strategy (p-value = 0.023). It implies that the heads of households with lower levels of education are likely to reduce healthcare expenses and resort to begging, possibly due to a lack of awareness of credit options and limited exposure to alternative income-generating activities to navigate food insecurity.

Besides, gender was significantly associated with the likelihood of borrowing money (p-value = 0.020) and moving children to a cheaper school (p-value = 0.033). The implication is that female-headed households are more prone to vulnerabilities such as lower income, prompting them to borrow money and cut education costs to manage or mitigate food insecurity. The findings are in line with extant literature (Jung *et al.*, 2017, Nnaji *et al.*, 2022, Dzanku, 2019) suggesting gender differences in reporting and experiencing food insecurity with women heading households likely to adjust the household financial and educational strategies in response to food insecurity.

Further, the household head's marital status significantly influenced the propensity to borrow money (p-value = 0.000) and to transfer children to a cheaper school (p-value = 0.001). This means that the absence of a partner could be associated with reduced household income, leading to reliance on borrowing money and cutting down on education costs to cope with food insecurity. These findings align with those of Chai (2023), who identified a significant association between marital status and food insecurity outcomes within households, with the negative consequences of food insecurity being more pronounced among unmarried individuals than those who were married.

Additionally, the place of residence emerged as a highly significant factor in the decision to borrow money (p-value < 0.001), transfer children to a cheaper school (p-value < 0.001) and sell productive assets (p-value < 0.001). In this context, it means that despite the majority

composition of permanent residents as compared to migrants (see Table 2), there was still constrained access to resources in these households which could have influenced their decision to borrow money, transfer children to less expensive schools and sell their assets in response to food insecurity. The insights from the relationship between socioeconomic characteristics and household response to food insecurity underscore the need for targeted policy intervention that considers the specific vulnerabilities indicated by each socioeconomic category. These targeted policies could be in the form of gender-oriented food insecurity support mechanisms and educational programs for promoting financial literacy and sustainable agricultural practices.

5. Discussion

The study revealed that most respondents worry about not having enough food, being unable to eat nutritious food, consuming only a few kinds of foods, or skipping meals altogether. The findings corroborate a similar study by Harvey *et al.* (2014), which reported that farmers reduce the size of their meals, cut back on the number of times they eat throughout the day, alter their diet or supplement their food sources to mitigate the impacts of insufficient food availability. Weldemariam *et al.* (2023) also reported changing their eating habits in the form of reducing portion sizes and eating less-preferred foods, selling their assets, working each day for a wage, and receiving remittances as food shortage coping strategies. The study results also showed that having no food at all, going to sleep hungry, or going a whole day without eating were less common. This could be attributed to the females' ability to acquire alternative means of providing food for their households. The variation in the responses across these dimensions offers insights into the multifaceted nature of food insecurity, highlighting the necessity for targeted interventions to address both general concerns about food adequacy and specific instances of acute deprivation.

The most prevalent and least severe strategies observed in the study were selling household assets or goods, spending savings, purchasing food on credit, or borrowing food. The implication is that female-headed households rely on temporary and unsustainable coping strategies to combat food insecurity. This underscores the necessity for policy interventions that align with the specific challenges faced by these households so that viable and sustainable coping strategies for food insecurity are implemented. Conversely, the observed significant reliance on reducing health expenses and begging in the moderately severe category aligns with Dean et al. (2020). The study by Dean et al. (2020) established that individuals with marginal, low, and very low food security are more likely to incur medical expenses. Withdrawing children from school and harvesting immature crops, were less common. This could be linked to improved households' food security through enhanced access to healthcare services, as Yazew et al. (2023) reported. By reducing their healthcare costs, there is a possibility that the households could be using the extra money for food purchases.

The findings that the most severe strategies were less frequently reported, with engaging in illegal or degrading income activities, selling last female animals, and migrating with the entire household, partially align with Yohannes *et al.* (2023). Yohannes *et al.* (2023) observed that less severe and severe coping strategies are utilised more often than very severe ones. The authors further established that severe and very severe coping

strategies, primarily characterised by the intake of nutritionally deficient meals, could likely affect the nutritional well-being and health of children, together with the entire family's happiness (Yohannes *et al.* (2023).

Along with this, extreme and/or very extreme coping mechanisms, such as moving children, migrating and begging, are highly stigmatised and peculiar behaviors that are uncommon in society (Yohannes *et al.*, 2023). Furthermore, selling productive and non-productive assets, buying seeds for the upcoming planting season, and using credit to buy food at a high interest rate are just a few examples of coping tactics that could significantly influence household finances (Yohannes *et al.*, 2023). The observed engagement in illegal activities by food-insecure individuals has been reported previously (Militao *et al.*, 2022). The current study concurs with Shakeel and Shazli (2021) regarding the low-frequency selling of livestock. The authors revealed that selling livestock was viewed as a severe coping mechanism because it was thought that livestock served as an essential social and economic shock absorber and assisted in alleviating rural poverty by offering assets and income to residents in areas susceptible to droughts (Shakeel and Shazli, 2021).

The findings on the significant associations between socioeconomic characteristics and coping mechanisms revealed that gender was significantly associated with the likelihood of borrowing money and moving children to a cheaper school. This concurs with Carranza and Niles (2019), who revealed that women tend to channel finances towards meeting necessities, including food, education, and healthcare. Such allocation of funds benefits the nutrition of children and the overall household. Schultz (2002), in a previous study, suggested close linkages between the health and schooling of children. The observation that marital status significantly influenced the propensity to borrow money and move children to a cheaper school could be attributed to the opportunity of married households to combine resources from several sources for household consumption (Asesefa Kisi *et al.*, 2018). The place of residence emerged as a significant factor in the decision to borrow money, move children to a cheaper school, and sell productive assets. These strategies were probably related to efforts by households to help circumvent and alleviate poverty and food insecurity, as elucidated by Farzana *et al.* (2017). The study findings on the significant association between education level and reducing health expenses and begging as a coping strategy align with Farzana *et al.* (2017), who employed financially compromising coping strategies. The same authors reported that educated women play a significant role or have a voice in family decisions, which may affect the level of food insecurity in the home and the adoption of coping mechanisms.

6. Conclusion and Policy recommendations

Realities of food insecurity are more pronounced when it is disaggregated along gender lines, with a specific focus on women in developing countries. The study employed a quantitative cross-sectional approach, drawing on the binary logistic regression to determine the influence of socioeconomic status on household coping mechanisms in response to food insecurity in a stratified random sample of 509 female-headed agricultural households in Liberia.

Results from the analysis indicated that owing to financial constraints, most female-led household expressed concern about inadequate food availability, an inability to eat nutritious food, a limited variety of food available for consumption, or having to skip meals altogether. There were also indications of more extreme experiences, such as having no food, sleeping hungry, or going a whole day without eating. The most prevalent coping strategies employed by these households included borrowing money, selling assets, and reducing health expenses, which were influenced by socioeconomic characteristics such as gender, education, and marital status.

Drawing from the study's results above, it is imperative that the framing of policy targeting food insecurity be more inclusive and less rigidly structured. This is premised on the fact that food insecurity does not manifest homogenously across communities and societies. Food insecurity exhibits itself differently across various strata such as age, region or environment, and, as this study proves, across gender and economic status. Consequently, responses to food insecurity will also be defined along these lines.

Policy response should consider how food insecurity impacts different strata and subgroups within communities and address it along such lines. Food insecurity must be recognised not only as a political, economic and technical problem but also as a social problem, which creates different lived experiences for different people. Often, policy responses to social issues neglect the role of the public, and in this case, women, in crafting effective policy responses. The outcome is the omission of understanding significant realities of the situation, leading to policy failure, as the policy did not reflect the reality of the relevant stakeholders. Women's voices should be prominent in this, as it will further policy receptiveness and acceptance among its target beneficiaries.

Thus, it is pertinent for policymakers to implement gender-oriented policies to navigate food insecurity. The target of these policies needs to be on empowering female-headed agricultural households with knowledge about sustainable agricultural practices, facilitate credit access and promote alternative income-generating activities to boost food availability and diversity. Besides, policies intended to address food insecurity, particularly among this demographic, should promote investments in water and sanitation infrastructure to address the challenges of accessing clean drinking water and inadequate sanitation amenities, which are often indirect drivers of food insecurity.

Further, an equally prominent issue that such gender-oriented policy responses raise is the use of data. While policy relies significantly on hard, quantitative data, such variety in food insecurity experiences underpins the importance of qualitative data for an incisive, in-depth understanding of such situations, which hard data cannot fully explain. Qualitative data adds a human dimension to understanding these experiences with food insecurity and their response to it. This understanding will further assist in generating more responsive and effective policy outputs, avoiding the inefficiency of blanket policy approaches.

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Table 1: Description of variables and expected outcomes

Variable	Description	Expected outcome (±)
Coping strategy (dependent variable)	Categorical index capturing 19 different household responses to food insecurity. Categorised into three severity levels: least severe, moderately severe, and most severe.	
Independent variable		
Gender	Gender of the household head (categorical)	±
Marital Status	The current marital status of the household head (categorical)	±
Education	Educational level of the household head (categorical)	+
Residence type	The type of residence status of the household head (continuous)	±
Source of income	The main source of household income (categorical)	+

Source: Authors

Table 2: Socioeconomic characteristics of households

		Frequency	Percent
Household head's current marital status	Single, never married	150	29.5
	Married	228	44.8
	No longer married	131	25.7
	Total	**509**	**100**
Educational level	None or did not complete primary school	340	66.8
	Religious or informal education only	63	19.6
	Completed primary school	6	12.4
	Completed higher education (university, college) degree	6	1.2
	Total	**509**	**100**
Residence type	Permanent resident	494	97.1
	Recent migrant not forcefully displaced	15	2.9
	Total	**509**	**100**
Main source of income	Agricultural Production and Trade	370	72.7
	Non-Agricultural Employment	80	15.8
	Public Employment	15	2.9
	No Income Source	14	2.8
	Income from Non-Work Sources	12	2.4
	Other Sources of Income (Forestry or Bush Products)	10	2.0
	Total	**509**	**100**
Source of drinking water	Canal or other surface water	1	0.2
	Other safe source	6	1.2

	Private tap from piped water	38	7.5
	Protected well	176	34.6
	Public tap	218	42.8
	River	42	8.3
	Spring water	10	2
	Unprotected well	16	3.1
	Total	**509**	**100**
Toilet facilities used	Communal latrine (with or without water)	13	2.6
	Flush latrine (toilet with water)	126	24.8
	None – bush	157	30.8
	Open pit (hole in the ground for excrement without water, roof or wall)	38	7.5
	Traditional pit latrine (no water)	175	34.4
	Total	**509**	**100**

Source: Authors

Table 3: Household food insecurity coping strategies over a 30-day period

Characteristics	Coping strategies	Frequency	Percent
Least severe	Selling household assets/goods (e.g., radio, furniture)	424	83.3
	Spending savings due to lack of food or money	428	84.1
	Selling more animals (non-reproductive) than usual	276	54.2
	Sending household members to eat elsewhere	57	11.2
	Borrowing food or relying on help from friends or relatives	143	28.1
	Purchasing food on credit or borrowing food	331	65
	Borrowing money due to lack of food or money	183	36
	Moving children to a less expensive school	97	19.1
Moderately severe	Selling productive assets or means of transport (e.g., sewing machine, bicycle)	141	27.7
	Withdrawing children from school due to lack of food or money	19	3.7
	Reducing expenses on health (including drugs)	275	54
	Harvesting immature crops (e.g., green maise) to eat	11	2.2
	Consuming seed stocks that were to be saved for the next planting season	23	4.5
	Decreasing expenditures on agricultural inputs (e.g., fertiliser, pesticide, fodder)	34	6.7
	Selling house or land	19	3.7
	Begging due to lack of food or money	275	54
Most severe	Engaging in illegal or degrading income activities (e.g., theft, prostitution)	11	2.2
	Selling last female animals	23	4.5
	Migrating with the entire household due to lack of food or money	34	6.7

Source: Authors

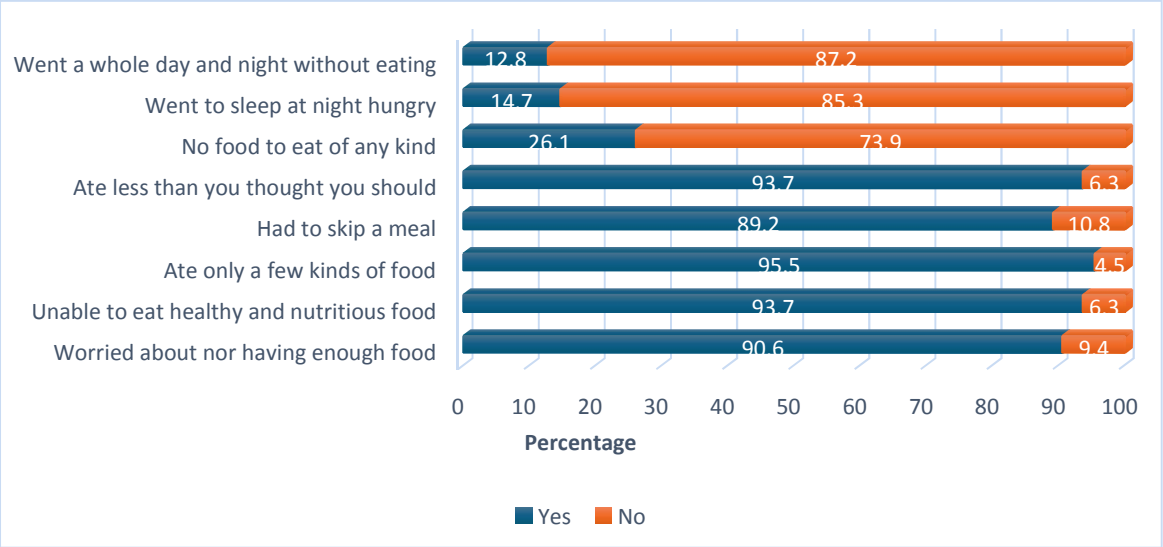
Table 4: Influence of Socioeconomic Characteristics on Household Coping Strategies in Response to Food Insecurity

Coping Strategies	Education (p-value)	Marital Status (p-value)	Residence (p-value)
Begging	**0.023***	0.460	0.610
Borrow money	0.780	**0.000***	**0.000***
Move children to cheaper school	0.360	**0.001***	**0.000***
Reduce health expenses	**0.023***	0.460	0.610
Sell productive assets	0.800	0.570	**0.000***
Borrow food/help from friends	0.220	0.560	0.670
Consume Seed Stocks	0.066	0.900	0.075
Decrease expenditure on agricultural inputs	0.340	0.280	0.430
Engage in illegal activities	0.320	0.800	0.120
Harvest immature crops	0.320	0.800	0.120
Migrate with entire household	0.340	0.280	0.430
Purchase food on credit	0.750	0.920	0.150
Sell house or land	0.570	0.910	0.900
Sell household assets	0.320	0.870	0.260
Sell last female animals	0.066	0.900	0.075
Sell more animals	0.270	0.680	0.710
Sell productive assets	0.800	0.570	Nan
Send members to eat elsewhere	0.240	0.360	0.460
Spend savings	0.640	0.420	0.440
Withdraw children from school	0.570	0.910	0.900

Key: An asterisk (*) next to a p-value indicates statistical significance based on a threshold of $p < 0.05$.

Source: Authors

Figure 1: Food insecurity experiences over a 30-day period



Source: Authors