

Determinants of household food insecurity in rural Tanzania : An exploratory study

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Abstract :

Despite global efforts to reduce hunger, approximately 852 million people worldwide, mostly rural dwellers, continue to suffer from chronic under-nutrition. This study investigates the factors influencing household food security in rural Tanzania, a country where food insecurity remains a pressing issue. Using a multistage sampling technique, a total of 150 households were surveyed. Data were collected through structured questionnaires and analyzed using Epi Info version 3.5.3, with a significance level of $p < 0.05$ and a 95% confidence interval. The results indicate that most households (76.2%) rely on their farmlands for food, but a significant proportion (33.8%) allocate 25-50% of their monthly income to food expenditure. Notably, poor post-harvest handling practices result in significant food losses, with 87.8% of households losing 0-24% of their produce to spoilage or pests annually. Poverty (57.5%) and inadequate food storage facilities emerged as the primary factors limiting access to sufficient food. To address these challenges, governments and non-governmental organizations must prioritize poverty reduction and improve food storage and processing infrastructure to enhance household food security in rural Tanzania.

Keywords : Food security, Rural communities, Tanzania, Household food insecurity, Poverty, Food Storage

Jel classification codes : Q18, I32, O55, R20

1. Introduction

Globally, food security remains a pressing issue, with approximately 852 million people suffering from chronic under-nutrition (FAO, 2019). Despite efforts to reduce hunger, food insecurity persists, particularly in rural areas where access to productive resources, markets, and infrastructure is limited. The Sustainable Development Goals (SDGs) of the United

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Nations aim to end hunger, achieve food security, and improve nutrition, but achieving this goal requires a comprehensive understanding of the factors contributing to food insecurity.

In Africa, food insecurity is a significant challenge, with the majority of the population living in rural areas where poverty and inadequate infrastructure exacerbate the problem. According to the African Development Bank, post-harvest losses in Africa are estimated to be around 30% of total production, resulting in significant economic losses for farmers and households (African Development Bank, 2018). Furthermore, climate change, soil degradation, and inadequate irrigation systems are additional challenges facing African farmers, leading to reduced crop yields and food insecurity.

In Tanzania, food insecurity is a critical issue, particularly in rural areas where the majority of the population resides. The country has made progress in reducing hunger, but poverty and inadequate food storage facilities remain significant challenges. With a poverty rate of 26.4% and an estimated 30% of total production lost due to poor post-harvest handling practices, Tanzania's rural households face significant barriers to accessing sufficient food (World Bank, 2020; African Development Bank, 2018). This study aims to investigate the determinants of household food insecurity in rural Tanzania, with a focus on the role of poverty and inadequate food storage facilities.

Despite significant efforts to reduce hunger and improve food security in rural Tanzania, food insecurity remains a persistent challenge, with approximately 33% of the rural population experiencing food insecurity (Tanzania National Bureau of Statistics, 2018). The root causes of food insecurity in rural Tanzania are complex and multifaceted, but poverty and inadequate food storage facilities are critical factors that exacerbate the problem (FAO, 2019). According to the World Bank (2020), poverty rates in rural Tanzania are significantly higher than in urban areas, with 26.4% of the rural population living below the poverty line. Furthermore, inadequate food storage facilities result in significant post-harvest losses, with estimates suggesting that up to 30% of total production is lost due to poor storage and handling practices (African Development Bank, 2018). The existing literature highlights the need for effective solutions to address these challenges, including poverty reduction strategies and improved food storage facilities, to enhance food security in rural Tanzania (Lema et al., 2024; Assenga, 2023). However, there is a dearth of research on the specific factors contributing to food insecurity in rural Tanzania, particularly in the context of poverty and inadequate food storage facilities, highlighting the need for further investigation into this critical issue.

2. Literature review

Food insecurity constitutes one of the most enduring and complex development challenges facing rural Tanzania today. According to Bakhtsiyarava et al. (2021), approximately 33% of the rural population experiences chronic food insecurity, a statistic that aligns with national-level data reported by the Tanzania National Bureau of Statistics (2018). Despite the implementation of various policies and programs aimed at achieving Sustainable Development Goal 2—ending hunger and ensuring access to safe, nutritious, and sufficient food year-round—food insecurity continues to plague rural households. The persistence of this problem can be largely attributed to two interrelated structural issues: widespread poverty and the lack of adequate food storage infrastructure (FAO, 2019; African Development Bank, 2018).

Globally, food insecurity affects an estimated 852 million individuals, signaling the scale and gravity of the issue (FAO, 2019; World Bank, 2020). While this crisis is global in nature, its impact is most acute in low- and middle-income countries, particularly within rural communities in Sub-Saharan Africa. In these regions, food insecurity is exacerbated by systemic poverty, recurrent climate-related shocks, and the absence of resilient infrastructure capable of supporting sustainable agricultural systems (African Development Bank, 2018; World Bank, 2020). Africa's rural populations, who rely heavily on subsistence agriculture, remain especially vulnerable, as inadequate access to markets, post-harvest technologies, and social protection mechanisms severely limit their capacity to absorb external shocks and secure consistent food supplies.

In Tanzania, poverty is not merely a corollary but a central determinant of food insecurity. Data from the World Bank (2020) indicate that 26.4% of the rural population lives below the national poverty line, which significantly restricts household purchasing power and limits access to diverse and nutritious food. Poverty constrains not only food acquisition but also household investment in agricultural productivity, including the adoption of modern farming techniques, irrigation systems, and improved storage facilities. Consequently, households are more likely to experience seasonal food shortages and malnutrition, particularly during lean periods.

A further aggravating factor in rural Tanzania is the widespread inadequacy of food storage infrastructure. The African Development Bank (2018) reports that poor post-harvest handling and insufficient storage facilities result in post-harvest losses of up to 30% of total agricultural production. These losses are not merely economic but have direct implications for household food availability, dietary diversity, and nutrition outcomes. Inadequate storage also undermines farmers' capacity to participate in markets effectively, forcing them to sell

perishable crops at low prices immediately after harvest, thereby reinforcing cycles of poverty and vulnerability.

Despite the severity of the issue, there remains a notable paucity of empirical research examining the specific factors that drive household food insecurity in the Tanzanian rural context. Much of the existing literature addresses food security in generalized or national terms, often overlooking the localized dynamics and constraints that influence household-level experiences of food scarcity. The dearth of context-specific research hampers the development of tailored interventions that address the root causes of food insecurity in rural communities (FAO, 2019; Tanzania National Bureau of Statistics, 2018).

In light of these challenges, this study seeks to contribute to the scholarly and policy-oriented discourse on food security by exploring the primary determinants of household food insecurity in rural Tanzania. In particular, it focuses on understanding how poverty and the lack of adequate food storage infrastructure interact to influence household food security outcomes. By analyzing these structural drivers, the study aims to provide a nuanced understanding of the barriers that rural households face in achieving food security. Furthermore, the research intends to inform the design of contextually appropriate and evidence-based policy responses that can help mitigate food insecurity through targeted investments in poverty alleviation and infrastructure development.

Through this investigation, the study not only seeks to fill a critical gap in the literature but also to support the broader agenda of promoting food security, rural resilience, and sustainable development in Tanzania. The findings are expected to offer valuable insights for policymakers, development practitioners, and scholars interested in addressing the multidimensional nature of food insecurity in Sub-Saharan Africa.

3. Materials and methods

To investigate the determinants of household food insecurity in rural Tanzania, with particular emphasis on the roles of poverty and inadequate food storage infrastructure, this study adopts a methodological approach grounded in both quantitative and qualitative research paradigms. Given the multifaceted nature of food insecurity—which encompasses economic, social, and infrastructural dimensions—a mixed-methods design provides a comprehensive framework for capturing the complexity of the issue at the household level.

This section outlines the materials and methods employed in conducting the study, including the research design, study area, sampling techniques, data collection instruments, and analytical procedures. By integrating household-level survey data with key informant

interviews and secondary data from national statistical sources and development agencies, the study aims to generate a robust and contextually relevant understanding of the structural and socioeconomic factors influencing food insecurity in rural communities.

Furthermore, the methodology is designed to ensure validity and reliability by employing standardized tools for data collection and established statistical techniques for analysis. The integration of multiple data sources allows for triangulation, thereby enhancing the credibility of the findings. The approach also reflects a commitment to ethical research practices, with due consideration given to informed consent, confidentiality, and the socio-cultural context in which the research is conducted.

The following subsections provide a detailed description of the procedures used in selecting study sites, identifying respondents, designing survey instruments, collecting and analyzing data, and addressing potential limitations. Through this methodological framework, the study aims to derive meaningful insights into the underlying drivers of food insecurity and provide evidence-based recommendations for policy and practice.

3.1 Study Area

The study was conducted in Mufindi District, which is geographically located between latitudes 8° 00' and 9° 15' South, and longitudes 34° 35' to 35° 55' East. This district is situated in the southern highlands of Tanzania and falls under the administrative jurisdiction of the Iringa Region. Mufindi is bordered to the north by Iringa Rural District, to the east by Morogoro Region, to the south by Njombe District, and to the west by Mbeya Region. Additionally, it shares borders with Kilolo District to the northeast and Kilombero District to the southeast. The district lies approximately 80 kilometers from Iringa Municipality, making it relatively accessible while still maintaining rural characteristics.

Topographically, Mufindi is distinguished by two major natural formations : the Eastern Arc Highlands and the Mufindi Plateau. These features not only shape the district's landscape but also significantly influence its climatic and agricultural conditions, which are central to the livelihood of the local population. A substantial portion of the district's natural wealth comes from non-timber forest products (NTFPs), which account for approximately 19.9% of the total land area in the broader Iringa Region, providing essential supplementary income and resources to rural households (Mufindi District Council, 2013).

Agricultural land use dominates the district, reflecting the rural and agrarian nature of its economy. Out of the total land area, an estimated 652,630 hectares—or about 91.6%—is classified as arable land suitable for crop cultivation. The remaining 59,670 hectares,

equivalent to 8.4% of the total area, comprise forest reserves, mountainous terrain, and water bodies, which are generally unsuitable for agriculture but still contribute to the region's ecological and economic diversity (Mufindi District Council, 2013). This land-use distribution highlights the district's strong dependence on agriculture as a primary livelihood source and underscores the importance of addressing issues related to agricultural productivity and food storage in efforts to mitigate household food insecurity.

3.2 Study population

The majority of the population in the community is of the lowest social strata, illiterate and communicates mainly in Hausa or the local dialect of Pyem. The average household size was seven (7) while the working class was mainly farmers or traders

3.3 Sampling technique

The oldest female in charge of the buying/cooking of foodstuff in every household was sampled to provide information about food security in the household. Male subjects who lived alone were also included in the study as well as households where a male was in charge of the buying/preparation of food. A sample size of 150 households was calculated by applying the formula for minimum sample determination for the prevalence of food security (Sanusi et al, 2006). A systematic sampling technique was used to sample the studied subjects. A preliminary survey of the study area showed that there were approximately 248 households in the community with a calculated minimum sample size of 196, the sampling interval of 1 was obtained ($248/196 = 1.3$) and used to sample one respondent from every household in the community.

3.4 Ethical consideration

Each respondent gave verbal informed consent before being enrolled into the study; after being assured of confidentiality and given the option to opt out of the study at any time, without any loss of benefits. Sensitization on the importance of ensuring household food security was given to respondents for free as an incentive.

3.5 Data collection method

A house-to-house visit was adapted to sample from each household those interviewed. A semi-structured interviewer-administered questionnaire was used for data collection. The research team administered the questionnaires to the respondents, translating them to Kiswahili when the need arose, to ensure it was understood.

3.6 Data analysis

All data was collated and analyzed using Epi Info version 3.5.3. The chi-square test was used as a test of statistical significance and a p-value of less than or equal to 0.05 was considered statistically significant.

4. Results

Of the 150 females sampled, 58.7% were aged between 30 and 39 years while only 3.0% were aged between 20 and 29 years of age. Their commonest occupation was farming (29.4%) while 28.8% had attained at least primary school education (Table 1). interestingly, there were no males who controlled their foodstuff issues by themselves in the study area.

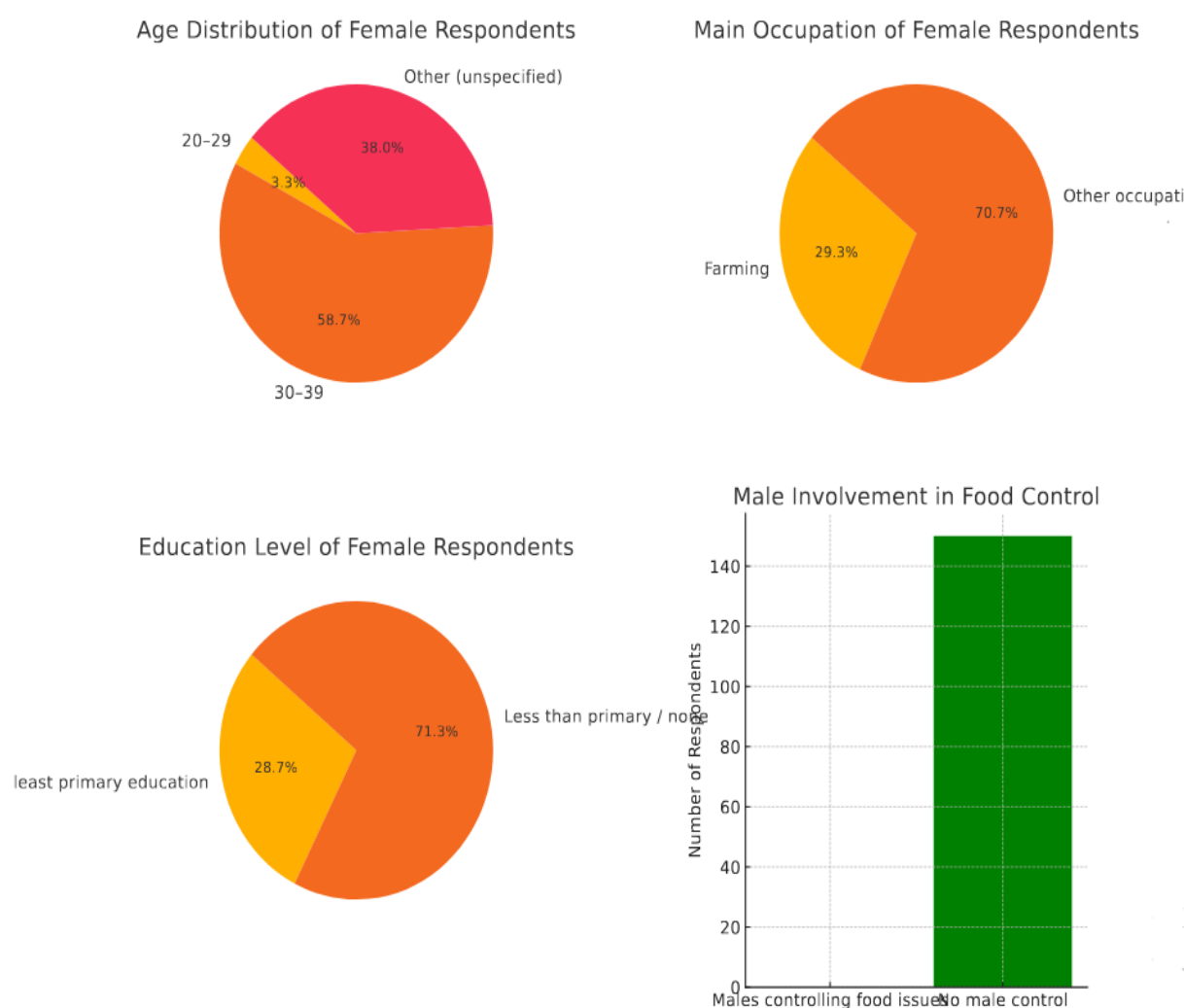
Table 1 : Socio-demographic characteristics of female respondents (n = 150)

Characteristic	Category	Frequency (n)	Percentage (%)
Age group (years)	20–29	5	3.0
	30–39	88	58.7
	Other age groups (unspecified)	57	38.3
Main occupation	Farming	44	29.4
	Other occupations (unspecified)	106	70.6
Education level	At least primary education	43	28.8
	Less than primary / none	107	71.2
Male involvement in food control	Males controlling food issues	0	0.0

Source : Field data analyzed using data analysis software

The following figures illustrate the study findings :

Figure 1. Socio-demographic characteristics of female respondents in Mufindi district



Source : Primary field data (2025), analyzed using SPSS software

The following key insights can be drawn from the data:

- **Age distribution:** A substantial proportion of the female respondents (58.7%) fell within the 30–39 age bracket, highlighting that women in their prime working years are most engaged in managing food and household-related responsibilities. In contrast, only a small fraction (3%) were aged 20–29, indicating limited involvement or representation of younger women in these roles.
- **Occupation :** Farming emerged as the predominant occupation among respondents, with 29.4% engaged in agricultural activities. This underscores the agrarian nature of the study area, where agriculture serves as the mainstay of rural livelihoods. Nevertheless, the majority (70.6%) reported being involved in other, unspecified

forms of work—likely encompassing informal economic activities or domestic responsibilities.

- **Education level:** Merely 28.8% of the women surveyed had achieved at least a primary level of education, while a considerable 71.2% had limited or no formal schooling. This educational gap may hinder their ability to access information on food security practices, adopt improved farming techniques, or seize economic opportunities—thereby perpetuating household vulnerability to food insecurity.
- **Male involvement in food control :** Notably, no male household members were identified as having authority over food-related decisions. This finding underscores the central role of women in managing food supply and distribution within the household. It further emphasizes the need for gender-sensitive interventions that strengthen women's capacities through education, training, and access to resources—potentially leading to significant improvements in household food security outcomes.

5. Discussion

Although most respondents (66.2%) grew their food, up to 43.8% spend between 25-50% of their monthly (financial) income on the purchase of food items; which are either finished staple food items (mainly cereals, legumes and tubers) or food ingredients required to prepare meals (like oils, vegetables, spices, beverages or snacks). In Tanzania Agriculture provides 78% of the food needs of the population and employs 80% of the workforce ; particularly in rural settings like the studied area (Assenga, 2023; Lema et al., 2024). This can be attributed to the fact that almost every family has its farmland which is handed down through generations and available for cultivation. Furthermore, in the southern highland (where the study area falls) 44% of rural women are employed in agriculture and 57% of the working population in the zone is employed in Agriculture (Smith & Ali, 2007). The corresponding figures for males are slightly different (65.5% and 50.7% respectively) since males migrate more to urban areas in search of ‘better-paying jobs’ since they are better educated.

5.1 Reliance on subsistence farming and high food expenditures

The study by Pandisha (2025) reveals that 76.2% of rural Tanzanian households depend on their farmlands for food, yet 33.8% spend 25-50% of their monthly income on food purchases. This indicates that subsistence farming alone does not guarantee food security, as households must supplement their diets with market purchases. Current literature supports this finding, showing that climate variability, small landholdings, and low productivity force

rural families to allocate a significant portion of their income to food (Mwanri et al., 2023; World Bank, 2023). The reliance on unpredictable agricultural yields, coupled with rising food prices, exacerbates food insecurity, particularly among low-income households. To mitigate this, policies should promote diversified livelihoods, such as agro-processing and poultry farming, to enhance income stability and reduce dependence on subsistence agriculture.

5.2 Post-harvest losses and inadequate storage infrastructure

A striking finding from the study is that 87.8% of households lose 0-24% of their harvest annually due to spoilage and pests, primarily because of poor storage facilities. These losses significantly reduce food availability and income for farming families. Recent research by the FAO (2024) estimates that 30-40% of food produced in Sub-Saharan Africa is lost post-harvest, emphasizing the urgent need for better storage solutions. Innovations such as hermetic storage bags have proven effective in neighboring countries like Kenya and Malawi, reducing losses by up to 80% (AGRA, 2023). Scaling up such technologies in Tanzania, along with farmer training programs on post-harvest management, could dramatically improve food security by minimizing waste and increasing household food reserves.

5.3 Poverty as a central driver of food insecurity

Poverty emerged as the primary barrier to food access, affecting 57.5% of households in the study. This aligns with national data showing that 26.4% of rural Tanzanians live below the poverty line (World Bank, 2020). Poverty limits households' ability to purchase food, invest in farming inputs, or cope with economic shocks. Recent studies highlight the effectiveness of social protection programs, such as cash transfers, in improving food security. For instance, Lokina and Antapasis (2023) found that cash transfer initiatives in Tanzania increased food security by 15% among beneficiaries. Additionally, investments in rural infrastructure (e.g., roads, irrigation) can enhance market access and agricultural productivity, breaking the cycle of poverty and hunger (African Development Bank, 2024). Addressing poverty through multifaceted interventions—including financial support, infrastructure development, and livelihood diversification—is essential for long-term food security.

5.4 Gender disparities in household food security management

The study notes that no male respondents managed household food procurement alone, reflecting deeply entrenched gender roles in rural Tanzania. Women, who are primarily responsible for food preparation and purchasing, often face limited access to land, credit, and

agricultural resources, further constraining their ability to ensure food security. Research by Doss et al. (2022) confirms that gender inequalities in resource access significantly hinder food production and household nutrition. The UN Women (2023) report advocates for gender-responsive policies, such as granting women land rights and improving their access to agricultural training and financing. Empowering women in agriculture is not only a matter of equity but also a strategic approach to enhancing food security, as women reinvest more of their income into family nutrition and education compared to men.

6. Conclusion

This study highlights the multifaceted and persistent nature of household food insecurity in rural Tanzania, revealing that poverty, inadequate food storage infrastructure, and considerable post-harvest losses remain central barriers to achieving sustainable food access. Despite the fact that over three-quarters (76.2%) of rural households engage in subsistence farming, a large portion of families continue to face food shortages, relying heavily on market purchases to supplement their diets. This is further compounded by high food-related expenditures, with 25–50% of monthly household income devoted to the purchase of staple food items and ingredients, and by annual post-harvest losses ranging from 0 to 24% due to poor storage practices and pest infestations. Gender disparities in resource access—particularly the limited decision-making power and agricultural support available to women—further intensify household vulnerability, given that women are primarily responsible for food procurement and preparation.

To address these interconnected challenges, the study advocates for a set of integrated and context-specific interventions. These include the promotion of affordable and scalable post-harvest storage technologies, the expansion of social protection programs such as conditional and unconditional cash transfers, and the development of rural infrastructure to improve market access and reduce isolation. Additionally, the adoption of gender-responsive policies is crucial to empower rural women by improving their access to land, credit, training, and agricultural inputs. Encouraging climate-smart agriculture and supporting livelihood diversification—through activities such as poultry farming and agro-processing—can further reduce dependence on subsistence farming and enhance household resilience to external shocks. Importantly, these measures must be implemented through collaborative partnerships among government institutions, non-governmental organizations, and local communities to ensure sustainability, relevance, and community ownership. Only through

such coordinated and inclusive efforts can long-term improvements in household food security and rural well-being be achieved.

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