SOCIO-ECONOMIC DETERMINANTS AFFECTING RURAL HOUSEHOLDS' FOOD SECURITY IN TANZANIA: A CASE OF KILWA DISTRICT

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by the Open University of Tanzania a dissertation entitled: ***"Socio-economic Determinants Affecting Rural Households' Food Security in Tanzania: A Case of Kilwa District",*** in partial fulfillment of the requirements for the Degree of Master of Arts in Gender Studies of the Open University of Tanzania.

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DECLARATION

I, **Veronica Stephen Baluwa**, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other University for the similar or any other award. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in partial fulfillment of the requirements for the Degree of Master of Arts in Gender Studies (MAGS).

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Signature

06/10/2025

……..

Date

DEDICATION

This work is dedicated to my lovely and supportive family. Their emotional and spiritual supports throughout my research with busy schedules have given me strengths to accomplish my research in a very peaceful way. May our Almighty's God bless you all.

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ABSTRACT

The study titled “Socio-economic Determinants Affecting Rural Households' Food Security in Kilwa District” aimed to assess the awareness of food insecurity and identify the social and economic factors influencing its persistence. Guided by Sen’s Food Entitlement Theory, the study employed a mixed research approach combining quantitative and qualitative methods. Using purposive and simple random sampling, data were collected from 398 households, selected through Yamane’s formula. Questionnaires were administered to gather information on food security, and data were analyzed using descriptive statistics and binary logistic regression with SPSS, while qualitative data were thematically analyzed. Findings revealed that 68.8% of households in rural Kilwa experience food insecurity, while only 31.2% are food secure. Male-headed households were found to be more food secure than female-headed ones, and 64% of respondents were aware of their food insecurity status. The regression results showed that social determinants such as age, education level, marital status, and household size significantly affected food security. Similarly, economic factors including cultivated land size, household income, off-farm income, and access to credit also had adverse effects. The study concludes that food security in rural Kilwa is shaped by intertwined social and economic constraints, worsened by limited institutional support and outdated farming practices. It recommends enhanced government and stakeholder efforts to fund agricultural intensification, promote livelihood diversification, and improve economic opportunities to strengthen rural food security.

Keywords: *Social and economic determinants, food security, Food Entitlement Theory*.

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LIST OF ABBREVIATIONS

FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
HIV	Human Immunodeficiency Virus
ILO	International Labor Organization
IWDA	International Women's Development Agency
NBS	National Bureau of Statistics
NGOs	Non-Governmental Organizations
SADC	Southern African Development Community
SDGs	Sustainable Development Goals (SDGs)
UN	United Nations
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
URT	United Republic of Tanzania
USAID	United States Agency for International Development
WFP	World Food Programme
WHO	World Health Organization

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE STUDY

1.1 Chapter Overview

This study assesses socio-economic determinants affecting rural households' food security in Kilwa District, Lindi, Tanzania. In Tanzania, socioeconomic determinants have an intricate impact on household food security. Economic conditions, societal structures, and resource access all play critical roles. This research assesses these determinants, unraveling their effects on rural households' food security and providing essential insights for tailored interventions in Tanzanian communities.

1.2 Background to Study

The global history of food security has roots in America since 1812, triggered by the Caracas earthquake in Venezuela on March 26, 1812 (Morgan et al., 2022). As a result, the United States became actively engaged in international food aid, sending wheat flour to Venezuela (Kramarz & Kingsbury, 2021). During the Second World War, the USA confronted food crises, prompting the establishment of the Food and Agriculture Organization in June 1943 through the United Nations Conference on Food and Agriculture, aimed at bolstering food security (Armstrong, (2023). Various socio-economic determinants have influenced food insecurity, affecting access to food resources for rural communities (Lokuruka, 2020).

Similarly, rural household food insecurity in Tanzania has been significantly influenced by various socio-economic inequalities, such as disparities in income and education (Kitole & Sesabo, 2024). Global efforts to address determinants affecting food and nutrition security are at the forefront of international agendas. The 2030

Agenda for Sustainable Development, ratified by the United Nations General Assembly on September 25, 2015, strives to "eliminate hunger and ensure that all individuals, especially those in impoverished and vulnerable situations, including infants, have access to safe, nutritious, and adequate food throughout the year" (Agwor et al., 2022).

Despite these efforts, ensuring food security remains an ongoing challenge for people worldwide (Barrett, 2021; Wudil et al., 2022). The likelihood of food insecurity is linked to socio-economic determinants (Mwanga, 2019). In Tanzania, rural areas experience higher levels of household food insecurity than urban areas (Randell & Shayo, 2022). On the other hand, households tend to be food secure when they are part of the formal sector or have a member who receives wages, salary, or earns an income from business (Ntwalle, 2019; Aikaeli et al., 2024; Jamaldin & Laurent, 2025).

Over the past four decades, the collective efforts of United Nations agencies, including the Food and Agriculture Organization (FAO), World Health Organization (WHO), International Fund for Agricultural Development (IFAD), and the World Food Programme (WFP), have played a role in tackling global factors influencing food and nutrition security. Despite international efforts, food and nutrition security is still prevalent globally. The WFP 2023 reported that 45% of the world's population is food insecure. The situation has been exacerbated by key issues such as rising food prices and socio-economic challenges (Grote et al., 2021). After years of deterioration, food insecurity also increases (Tariqujjaman et al., 2023). According to the FAO, over 9% of the world's population was undernourished in 2020 (Verma

& Saxena, 2021; Chichaibelu et al., 2023). This situation is expected to deteriorate further (Chichaibelu et al., 2023). The ramifications of socio-economic factors in Tanzania are a cause for serious concern, as they directly contribute to increased levels of food insecurity (Mwanga, 2019). A low socio-economic status can impact food security (Mavole et al., 2016). Additionally, reports indicate a prevalence of food insecurity in low-income households.

Food and nutrition problems persist in the United States, affecting over 44 million people annually. Canada, a large country with a highly diverse agricultural sector, faces similar challenges despite its wealth (Seligman et al., 2023). Approximately 12% of the population in Canada lives in poverty and experiences food shortages. According to the Canadian Income Survey data, families facing food insecurity increased from 16% in 2021 to 18% in 2022 (Tarasuk & Fafard St-Germain, 2022). The United States and Canada grapple with food insecurity and have been influenced by socio-economic challenges (Sheehy & Chen, 2022; Chai, 2024). This has also been the case in Tanzania; it has been reported that food insecurity is severe due mainly to the effects of multiple socio-economic determinants, including low educational attainment, income, and unemployment (Assenga & Kayunze, 2020).

In recent years, interest in food insecurity has surged in high-income countries, yet its recognition in Europe is still developing. Progress is being made towards achieving SDG 2 of Zero Hunger, which includes addressing food insecurity and all forms of malnutrition (Sporchia et al., 2024). Despite serious challenges experienced in the past few years, the estimated number of moderately or severely food-insecure people declined by 4.1% between 2021 and 2022 (Zereyesus et al., 2022; Shebanina

et al., 2024). Food insecurity is observed across the general population, with higher rates identified in specific groups with low socio-economic levels, namely low educational attainment, low or unstable income, and/or employment (Shebanina et al., 2024). In Tanzania, low socioeconomic status can affect food security due to economic barriers that inhibit the ability to buy nutritious food (Mberwa & Mwakibete, 2024). It is further reported that f*ood insecurity is* prevalent in *low-income* households.

As found in other industrially developed countries like the United States, United Kingdom, and Japan, there is evidence that food and nutrition insecurity, stemming from limited resources, exists in Australia (Yılmaz & Günal, 2023). The Foodbank Hunger Report 2023 paints a concerning picture, with 3.7 million households reporting food insecurity in 2022 (Australia, 2023). Food insecurity is a significant concern for child and family services organizations, as it can have negative impacts on outcomes for children in the short and long term.

Australian communities more susceptible to food insecurity include single-parent households, young people, and those facing socio-economic challenges, such as unemployed individuals and low-income earners (Bowden, 2020). The consequences of socioeconomic determinants in Tanzania are of grave concern and directly linked to high food insecurity (Haule, 2022). Previous studies revealed a strong relationship between employment Inc, home, and food insecurity (Atuoye et al., 2021).

In the Caribbean, there has been significant progress as both food insecurity and the prevalence of undernourishment decreased from 40.3% to 37.5% and from 7.0% to

6.5%, respectively, between 2021 and 2022 (Surendran-Padmaja et al., 2024). Despite this overall progress, the Caribbean sub-region experienced a notable increase in hunger, rising from 14.7% in 2021 to 16.3% in 2022, attributed to socio-economic challenges (Baquedano et al., 2021). In Tanzania, socio-economic disparities have been identified as determinants affecting household food and nutrition security (Rashid et al., 2024). For instance, the increase in hunger in 2023 was linked to socioeconomic challenges, including income, education, and household size (Mamkwe et al., 2023; Mberwa & Mwakibete, 2024).

From 2021 to 2022, there was progress in reducing hunger in Asia, with a slight decrease in the prevalence of moderate or severe food and nutrition insecurity from 8.8% to 8.5% (WHO, 2023). However, Western Asia experienced a rise in the proportion of severely food insecure individuals, indicating persistent challenges for those with lower socio-economic status and unstable income (Azimi & Rahman, 2024). Similarly, in Tanzania, household size and income have been identified as socio-economic determinants affecting rural households' food security (Mavole et al., 2016; Chen et al., 2024). These determinants influence food security and the demand for food in some regions of the country.

Africa is widely regarded as the world's most food- and nutrition-insecure continent, and this has been a serious problem for many years (Dada et al., 2021), with an estimated PoU of 222 million in 2016 (Adeyeye et al., 2023). In 2020, up to 264.2 million people (24.1%) in sub-Saharan Africa were undernourished, the highest prevalence in the world (Ewune et al., 2022). From a regional perspective, vulnerable populations in sub-Saharan Africa are the most at risk of increased food

and nutrition insecurity due to the conflict and associated lower socio-economic levels. Food security for rural households in Tanzania has been shaped by various socio-economic determinants, including economic disparities and educational inequalities (Banks, 2016; Mwanga, 2019). These determinants have played a significant role in determining access to and the availability of food resources.

Food insecurity is prevalent in the SADC region; according to the SADC (2022), an estimated 55.7 million people were food insecure (Vyas-Doorgapersad, 2024). The prevalence of food insecurity in SADC countries remains high, with the Democratic Republic of the Congo (DRC), with 25.9 million, and South Africa, with 14.4 million people, making up 72% of the food insecure population (Rwigema et al., 2023). In Zimbabwe, around 3.8 million people are food insecure, while in Madagascar, the figure is approximately 2.1 million (Narvaez & Eberle, 2022; Plan, 2024). Severe weather-related and socio-economic shocks have exacerbated this high prevalence of food insecurity. Similarly, in Tanzania, socio-economic shocks prolong and worsen the severity of acute food insecurity (Mberwa & Mwakibete, 2024). This is because they reduce households' ability to maintain food security.

Food insecurity impedes economic development in rural communities and households across many East African countries (Lokuruka, 2020). According to the live WFP (2023) and FAO (2023), Uganda has a population of 42.7 million, and 9.5 million have insufficient food. With a population of 51.4 million, 12.1 million face insufficient food consumption in Kenya. In Rwanda, with 14.1 million people, 2.9 million face inadequate food consumption, and 31.6. Food insecurity has fluctuated in the region, driven by socio-economic challenges such as low educational

attainment, unstable income, and employment. Similarly, in Tanzania, the education level of the household head and income are essential drivers of food insecurity among Tanzanian households (Tumaini, 2017; 2020). Additionally, it is reported that determinants such as age and marital status are essential in influencing food security in rural settings of Tanzania.

Tanzania is known for its rich and diverse agricultural resources among the East African countries. It employs a large portion of the population and contributes 31% of the national Gross Domestic Product (GDP) (Domitian, 2024). Despite its rich in agriculture resources, the country is experiencing a severe food insecurity crisis, particularly in rural areas (Lokuruka, 2020; Bonatti et al., 2021). It is ranked 94th out of 125 countries in the Global Hunger Index Report 2023 (GHI, 2023). Socioeconomic characteristics of individual households have been identified to be among the basic determinants influencing the food security status of households (Mavole et al., 2016). The household sizes, age, access to credit services, and employment have been reported to affect rural households' food insecurity (Assenga & Kayunze, 2020). Despite studies on food and nutrition security in Tanzania, there are unknown reasons for the persistence and actual increase of food and nutrition insecurity.

The Tanzanian regions experience different prevalence levels of insufficient food consumption. The highest prevalence of inadequate food consumption has been reported in Kaskazini Pemba (26%), Lindi (19%), Simiyu (17%), and Dodoma (15%) (Tobias et al., 2022; Lukiko & Sokoni, 2023; Mbwana & Bundala, 2023). This high prevalence of food insecurity has been exacerbated by socioeconomic

challenges (Thobias et al., 2022; Lukiko & Sokoni, 2023). A study among rural households in Tanzania found that household income, farming technologies, the education status of the household head, and household size are essential determinants influencing food security (Mavole et al., 2016; Massawe, 2017; Tumaini, 2017; Assenga & Kayunze, 2020).

Lindi, a region on Tanzania's southeastern coast, faces severe household food insecurity, as do many other parts of the country (Sakamoto et al., 2023). Recognizing the pivotal role of food security in sustainable development (El Bilali et al., 2019), bearing significant consequences for individual and community well-being and productivity (Lokuruka, 2020), the government of Tanzania, in collaboration with development partners, has undertaken food security projects in the Kilwa District to guarantee rural households' food security.

Despite the numerous initiatives and projects implemented to improve food security in Tanzania, the situation remains uncertain in the rural areas of Kilwa District, located in the Lindi Region. While efforts have been made at national and regional levels, there is a notable gap in research concerning the socio-economic factors that influence household-level food security in these communities. Addressing this gap is crucial for designing targeted interventions that respond to the unique challenges faced by rural households in Kilwa.

1.3 Statement of the Problem

Tanzania faces significant challenges with food insecurity, particularly affecting rural households due to economic constraints limiting their access to nutritious food

(Kalloka et al., 2021). The food-insecure population in Kilwa is approximately 13,000, and the causes of food insecurity impact the population through malnutrition, vulnerability, and stunted children (KDC, 2022). These effects are felt at individual, family, community, and national levels (Sarr et al., 2024). This issue contributes to broader societal issues, including economic decline, educational setbacks, social instability, psychological impacts, and environmental degradation, exacerbating poverty (Bonatti et al., 2021). In regions like Lindi, food insecurity has risen steadily, necessitating regular food aid from national reserves (Sakamoto et al., 2023). Research indicates a 19% prevalence of household food insecurity in rural Lindi, likely influenced by socio-economic determinants (Keding et al., 2012; Ngongi & Urassa, 2014).

Efforts by both government and private sectors to alleviate food insecurity in Tanzania have not fully addressed the challenge, with many households still struggling to meet dietary needs, posing risks to health and well-being (Njuga, 2023). This persistent issue affects the future workforce, leads to chronic school absences among children, and increases healthcare costs while reducing productivity (Njuga, 2023). Initiatives such as awareness campaigns on smart climate agriculture and efficient agricultural schemes aim to improve food security and boost agricultural productivity among rural households in the region. Addressing socio-economic constraints is crucial for achieving these goals and fostering economic transformation (Ndiyoi et al., 2014; Schindler et al., 2016; 2017).

Despite food security awareness campaigns at district and regional levels, challenges persist in achieving food security among rural peasants in Tanzania. In Kilwa

District, many rural households still struggle to access sufficient food, necessitating regular food aid from national reserves. While Tanzania has seen extensive national-level studies on food security (Mwanga, 2020; Agriculture & Food Security Journal, 2023), there is a clear absence of targeted research focusing on Kilwa District in Lindi Region, especially regarding socio-economic determinants at the household level. This research aims to comprehensively assess these determinants and contribute to addressing food insecurity in the district.

1.4 Research Objectives

The main and specific objectives are presented in this section:

1.4.1 Main Research Objective

The main objective of this study is to investigate the socio-economic determinants affecting rural households' food security in Kilwa District, Lindi, Tanzania.

1.4.2 Specific Objectives

To address the study's main objective, the specific objectives are:

i. To assess people's awareness of household food insecurity
ii. To examine the effects of social determinants influencing persistence of household food insecurity.
iii. To assess the effects of economic determinants influencing persistence of household food insecurity.

1.5 Research Questions

The study seeks to answer the following questions:

i. What is the people's awareness of household food insecurity?

ii. What are social determinants influencing persistence of household food insecurity?
iii. What are economic determinants influencing persistence of household food insecurity?

1.6 Significant of the Study

This study will underscore the significance of comprehending socio-economic dynamics in rural areas in informing food security policies. Policymakers can employ insights to devise bespoke strategies that tackle the fundamental causes of food insecurity. The findings will bolster evidence-based policy formulation, promoting sustainable enhancements in the well-being of rural households. Consequently, the study will be valuable for policymakers striving to implement impactful interventions.

The study holds profound significance for both academicians and researchers. Through an in-depth assessment of the complex interplay between socio-economic dynamics within rural communities, this research offers valuable insights into the multifaceted challenges related to food security. Understanding the nuanced determinants that affect access to adequate and nutritious food among rural households contributes to academic discourse. As such, it is a pivotal contribution to the scholarly efforts to improve food security and promote socio-economic equity in rural areas.

This research will equip food security practitioners with essential information concerning the socio-economic determinants influencing food security among rural

households. Empowered by this understanding, practitioners can craft more precise interventions to address community-specific needs, thereby enhancing the efficacy of food security efforts. These findings will serve as a valuable resource, guiding practitioners and community members towards evidence-based solutions to tackle food insecurity in Tanzania.

CHAPTER TWO

LITERATURE REVIEW

2.1 Chapter Overview

This chapter presents studies by various researchers on the global determinants of food security, focusing on Africa and Tanzania. It includes conceptual definitions, theoretical and literature reviews, research gaps, and the conceptual framework. The literature review is guided by specific objectives, addressing social and economic determinants influencing household food security.

2.2 Conceptualization of Key Terms

In the context of this study, the following terms and concepts were defined.

2.2.1 Food Security

Food security refers to the continuous access to sufficient, safe, and nutritious food, ensuring the well-being of individuals and households in both acquisition and distribution (Van Berkum et al., 2018; Brouwer, 2021; Gu et al., 2024). It encompasses four key dimensions (availability, access, utilisation, and stability) which must be addressed to achieve meaningful outcomes (David, 2024; Ibrahim et al., 2023; Opoku Mensah et al., 2024; Qazi & Al-Mhdawi, 2025). In this study, food security implies sustained access to sufficient and nutritious food at the household level.

2.2.2 Concept of Household and Household Food Security

Household food security refers to the sustainable availability and accessibility of nutritious food (Kachler et al., 2023; Kandel, et al., 2024; Pickerill et al., 2024;

Schäfer et al., 2025). In the context of this study, it involves ensuring access to food of sufficient quality, regardless of its source; whether produced, purchased, imported, or received as food aid. Accessibility often determines a household's ability to provide for its members (Dominic et al., 2023).

2.3 Theoretical Review

Amartya Sen's entitlement theory, stemming from his analysis of famines, forms the foundation of this research. The theory highlights that food security is influenced not just by food availability but also by entitlement systems that are vital in bridging the gap between food availability and access. This theoretical framework not only forms the foundation of the study but also offers a perspective for understanding household food security within broader social and economic contexts.

2.3.1 Food Entitlement Theory of Food Security

In the late 20th century, the Indian economist Amartya Sen introduced a significant reorientation in the study of famines with his food entitlement theory in the 1980s (Rahman & Pingali, 2024). Works like 'Poverty and Famines' (1981) challenged the prevailing hypothesis of food availability decline, which assumed that total food availability decline is the central cause of all famines (Tezanos-Vázquez, 2024). Sen's theory shifts the focus from supply-side factors to demand-side factors, emphasizing the food entitlements of the population (Sen, 1986; Wang et al., 2024; Tezanos-Vázquez, 2024).

Sen (1984) defines entitlements as a set of alternative commodity bundles that a person can command in a society using the totality of rights and opportunities he or

she faces. This encompasses all legal sources of food, identified by Sen (1981) as 'production-based entitlement' (growing food), 'trade-based entitlement' (buying food), 'own-labour entitlement' (working for food), and 'inheritance and transfer entitlement' (receiving food from others) (Asare et al., 2024; Mildred, 2024; Musonza & Hlungwani, 2024). It includes everything a person possesses that can contribute to putting food on the table, whether in food or non-food materials. In Sen's theory, access to food also encompasses considerations of wealth or poverty, privilege or underprivileged, gender, and other relevant factors.

2.3.2 Relevancy of the Theory

The Food Entitlement Theory offers critical relevance in comprehending the social and economic determinants affecting household food security by spotlighting individuals' entitlements to food and their ability to obtain it, as described below.

2.3.2.1 People's Awareness of Household Food Insecurity

The relevance of the Food Entitlement Theory in assessing people's awareness of household food insecurity lies in its ability to provide a framework for understanding the underlying causes and dynamics of food insecurity (Simelane & Worth, 2020). According to this theory, individuals' access to food is influenced by various determinants such as income, employment, social support systems, and government policies (Aziz et al., 2020). By applying the Food Entitlement Theory, researchers can examine how these determinants affect individuals' ability to obtain an adequate and nutritious diet (Simelane & Worth, 2020). Additionally, this theory can help identify interventions and policies to address the root causes of food insecurity and

improve access to food for vulnerable populations.

2.3.3.2 Relevance of Food Entitlement Theory on Social and Economic Determinants on Influencing Persistence of Household Food Insecurity

Entitlement theory's significance in grasping the persistence of household food insecurity is rooted in its profound understanding of the complex interplay between social and economic determinants and how they impact individuals' access to food, as described below.

(a) Food Entitlement Theory on Social Determinants on Influencing Persistence of Household Food Insecurity

Food Entitlement theory provides valuable insights into the persistence of household food insecurity by highlighting the complex interplay between social determinants and individuals' access to food (Aziz et al., 2020). Within this framework, disparities in income distribution, employment conditions, and access to social safety nets significantly influence households' entitlements to food (Ogunniyi et al., 2020; 2021).

Furthermore, determinants such as gender inequality, limited access to education and healthcare, and social exclusion exacerbate food insecurity by restricting individuals' ability to earn income and access resources (Leddy et al., 2020). Understanding these dynamics enables targeted interventions to address the root causes of social disparities affecting food access. By integrating entitlement theories into policy frameworks, governments, and organizations can develop more comprehensive

strategies to alleviate and prevent household food insecurity (Abenwi et al., 2020).

(b) Relevance of Food Entitlement Theory on Economic Determinants Assessing the Persistence of Household Food Insecurity

Food Entitlement theory contributes significantly to assessing the persistence of household food insecurity by focusing on economic determinants within the broader social context (Muzerengi et al., 2021). The theory explores how both tangible assets, such as land, equipment, money, and animals, and intangibles, such as employment opportunities, labor power, access to credit and market, livelihood diversification, food price inflation, technological advancement, infrastructure advancement, knowledge and skills, and access to education directly influence a household's economic well-being and, consequently, its food security status (Massawe, 2017; Tumaini, 2020; Van Staveren, 2021). By examining the social structures that shape economic conditions, entitlement theory provides valuable insights into the root causes of persistent food insecurity.

Moreover, this theory highlights the impact of economic disparities on vulnerable populations (Sen, 1986; Badolo & Kinda, 2014; Grimaccia & Naccarato, 2019; Dula et al., 2024; Iyakaremye & Kabanda, 2024; Parfitt, 2024; Megasari & Sahid, 2025). The interplay between social and economic determinants becomes evident as entitlement theory scrutinizes issues like social safety nets, job markets, and wealth distribution (Bapuji et al., 2020; Davidescu et al., 2024; Nae et al., 2024). Understanding this dynamic relationship enables policymakers to design targeted interventions that address the systemic economic challenges contributing to the persistence of food insecurity among households.

2.4 Empirical Literature Review

The review is focused on communities' awareness and determinants that influence food security among households from a global to local perspective. It is presented under the concept of people's awareness of household food security and social and economic determinants influencing food security in households from a global to a local perspective.

2.4.1 People's Awareness of Household Food Security

Efforts to increase awareness regarding household food security are gaining traction worldwide, with many initiatives and campaigns making notable progress (Muhammad et al., 2023). Among these initiatives, the World Food Programme's (WFP) "Zero Hunger" campaign has involved more than 80 million individuals globally, fostering an understanding of sustainable food production and nutrition (Peters et al., 2022). These endeavors have reached millions through diverse platforms, including social media, local workshops, and educational initiatives (Bande, 2021; Peters et al., 2022). Nevertheless, despite these commendable achievements, significant challenges persist, with an estimated 2 billion people worldwide still grappling with moderate to severe food insecurity (Onyeaka et al., 2024). In Tanzania, recent endeavors to enhance awareness regarding household food security have shown encouraging outcomes, as more than 70% of rural communities have noted enhanced comprehension through focused initiatives (Kazungu & Kumburu, 2023).

Efforts by international agencies to promote awareness of household food security globally have been extensive and impactful (Aryal et al., 2022; Woodhill et al., 2022). According to the Food and Agriculture Organization (FAO), collaborative

initiatives led by international agencies have reached over 100 countries, disseminating vital information and resources (Canton, 2021; Peterson et al., 2021). These efforts have engaged millions of individuals worldwide, with educational campaigns, workshops, and online platforms providing practical dissemination tools. The United Nations World Food Programme (WFP) has reached approximately 300 million people annually through awareness-raising activities (Srivastava et al., 2021). Furthermore, in Tanzania, partnerships with local NGOs have facilitated the widespread distribution of essential information, reaching an estimated 5 million nationwide (Lauwo et al., 2022).

Research on the level of awareness of people on household food security in the United States of America has revealed diverse perspectives and varying degrees of understanding. A study conducted in the United States by Jay (2023) delved into the awareness levels among urban populations, highlighting the challenges faced in ensuring food security. Additionally, a study by Shafiee et al. (2023) focused on the awareness of household food security issues in Canada and shed light on the cultural and contextual factors influencing public perception. These empirical studies collectively contribute to a nuanced understanding of the awareness landscape regarding household food security across different regions in America.

In the context of Europe, the literature on the level of awareness regarding household food security has been limited; notable studies by Penne and Goedemé (2021) in Turkey and European-wide by Coleman-Jensen et al. (2022). However, specific studies addressing awareness at the household level within individual European countries are scarce. Understanding these dynamics is crucial for designing effective

strategies to improve awareness and promote household food security across the continent.

In Australia, a study by Godrich et al. (2022) investigated awareness levels in urban areas, revealing insights into the challenges Australians face in maintaining food security. Another cross-national study by Crawley (2024) compared awareness levels in Australia and New Zealand, highlighting similarities and differences. Furthermore, Pettman et al. (2022) study specifically examined the rural communities in Australia, contributing to a nuanced understanding of regional variations in awareness. These empirical studies provide valuable insights into Australia's multifaceted nature of awareness regarding household food security.

Empirical literature on household food security awareness in the Caribbean has revealed distinct insights across various nations (Plummer et al., 2022; Daley et al., 2023). A study by Campbell et al. (2021) explored awareness levels in urban areas of Jamaica, shedding light on the challenges residents face. Research by Rahman (2022) focused on rural communities in Barbados, contributing to a nuanced understanding of context-specific factors influencing awareness. The studies contribute to understanding household food security awareness in the Caribbean, emphasizing the importance of household food security.

In the context of Asia, studies on the level of awareness of household food security reveal a diverse landscape shaped by varying socio-economic and cultural factors. For instance, research conducted by Li et al. (2020) in China emphasizes the influence of rapid urbanization on awareness levels, as urban populations may experience different challenges in ensuring food security compared to their rural

counterparts. In India, studies by Katoch (2024) underscore the significance of educational initiatives in enhancing awareness, especially in rural areas where access to information may be limited. Additionally, cultural practices and dietary preferences contribute to nuanced perceptions of food security in different Asian regions (Bordoloi & Das, 2025). Understanding these contexts is essential for crafting effective awareness campaigns tailored to the specific needs of diverse Asian communities.

In Sub-Saharan Africa, particularly in Nigeria, Scholars have identified factors such as poverty and inadequate education as significant contributors to low awareness levels (Ogunniyi et al., 2021). Research by Yemane and Tamene (2022) in Ethiopia explores the influence of agricultural practices and resource access on household food security awareness. These empirical studies collectively contribute to understanding the complex factors influencing household food security awareness levels in Sub-Saharan Africa.

Southern African Development Community (SADC) studies on household food security awareness shed light on various determinants across member countries (Kasililika-Mlagha, 2021; Hlongwane, 2023). A study by Mukwedeya and Mudhara (2023) in Zimbabwe explores economic instability and agricultural practices influencing awareness levels. In South Africa, Tambe et al. (2023) emphasize the role of socioeconomic disparities and access to resources in shaping household food security awareness. These empirical studies contribute to understanding the determinants of household food security awareness in the SADC region, emphasizing the need for targeted interventions that address diverse social and

economic factors. Empirical literature on household food security awareness in East Africa reveals distinct determinants across countries in the region (Ndolo, 2019). In Kenya, Kiboi et al. (2022) highlight the role of access to education and awareness in influencing household food security. The studies contribute to understanding the complex factors influencing household food security awareness in East Africa.

The empirical literature on household food security awareness in Tanzania provides valuable insights into the determinants across the country (Aboagye-Darko & Mkhize, 2025). Masanja et al. (2023) investigated factors such as income levels, education, and agricultural practices influencing awareness levels in urban and rural settings. These empirical studies collectively highlight that awareness is not uniform and is often influenced by social and contextual factors. In Kilwa District, where rural livelihoods are closely tied to subsistence farming and informal economies, low levels of awareness may hinder the adoption of sustainable food practices and limit the effectiveness of food security interventions. Therefore, examining the depth and drivers of household food security awareness in Kilwa is essential for designing targeted strategies that address both informational gaps and the broader socio-economic conditions that perpetuate vulnerability.

2.4.2 Social Determinants Influencing Household Food Security

Assessing social determinants influencing global household food security necessitates a thorough understanding of various elements shaping food access and utilization (Leroy et al., 2015). These determinants encompass access to information, resources, education and awareness, gender dynamics, income disparities, and cultural practices. Analyzing these elements helps identify both barriers and

opportunities for achieving food security worldwide (Calicioglu et al., 2019).

In the United States, about 13.5 million households (10.2%) experienced food insecurity at some point throughout 2021 (Toossi & Jones, 2023). Social determinants are among the determinants associated with food insecurity in the USA. Bastian et al. (2022) conducted a scoping review in the USA to investigate the social determinants influencing food insecurity. The study found an association between social determinants and food insecurity (Bastian et al., 2022).

In Europe, social determinants such as income disparities and cultural preferences significantly impact dietary quality and food security (Petrescu-Mag et al., 2019). European scholars found that the lack of knowledge about food insecurity is characterized by increasing social inequalities (Grimaccia & Naccarato, 2022). However, the scholars did not identify social constraints hindering access to appropriate and sufficient food. Therefore, this study seeks to identify the social constraints hindering household food security.

In Australia, discrepancies in social resources may lead to disparities in both the availability and affordability of food, thereby impacting the overall food security of various population segments (Schneider et al., 2023). Studies show that people with less money, less education, insecure working conditions, and poor living conditions are more likely to experience food insecurity (Gallegos et al., 2022). Fry et al. (2025), examining the association between social determinants and food insecurity, found that unemployed people, single-parent households, low-income earners, rental households, and young people are more vulnerable to food insecurity than others.

In Latin America and the Caribbean, the prevalence of moderate-to-severe food insecurity experienced the fastest growth compared to other regions, surging from 22.9% to 31.7% (Santos et al., 2022). The notable incidence of food insecurity is influenced significantly by social inequalities, such as the gender gap (Hernández-Vásquez et al., 2022). Scholars have identified education, age, and the gender of the household head as substantial contributors to food insecurity (Karpyn et al., 2021), while others have reported that household-level employment status is not associated with food insecurity (Santos et al., 2022).

In Asia, the challenge of undernourishment is significant, impacting approximately 552 million people (Zhou et al., 2019). Numerous regional studies have extensively explored the social determinants of household food security. Khan and Sadozai (2024) highlighted the crucial roles played by determinants such as livestock ownership, monthly income, family size, family structure, and the age and education of the household head in shaping household food security. Furthermore, Kumar and Mohanasundari (2025) emphasized that elements like place of residence, dependency ratio, social capital, employment status, and educational attainment significantly positively impact household food security.

Sub-Saharan Africa faces significant challenges in feeding its growing population, with various determinants influencing household susceptibility to food insecurity. Studies by Zhou et al. (2019) and Beyene et al. (2023) highlighted that larger family sizes and smaller cultivated land sizes are associated with higher household food insecurity. Research in Zimbabwe by Madududu et al. (2021) showed that the household head's age, education level, and the household labor force's size positively

affect food security. Further studies by Mukwedeya and Mudhara (2023) and Mupaso et al. (2024) confirmed a positive and statistically significant relationship between education and food security. Conversely, Malik and Shah (2025) found a negative correlation between larger family sizes and food security. These findings provide valuable insights into the complex dynamics affecting food security in Sub-Saharan Africa, informing future policy and intervention strategies.

In the scholarly exploration of Southern African Development Community (SADC) countries, researchers underscore the pivotal role of social dynamics in shaping food security (Bulawayo et al., 2019; Nkomoki et al., 2019; Militao et al., 2023; Adefila et al., 2024). A notable study in Mozambique revealed that households with lower income, less educated heads, and engagement in informal work faced heightened vulnerability to food insecurity (Militao et al., 2023; Adefila et al., 2024). Similarly, research in Zambia unveiled that higher education levels of the household head, increased livestock income, secure land tenure, larger land size, and group membership positively influenced the likelihood of achieving household food and nutrition security (Nkomoki et al., 2019).

In East African countries, food security is shaped by myriad social determinants, creating a nuanced landscape of challenges and opportunities. An examination in Uganda employing logistic regression analysis highlighted the significant associations between food security status, household heads' education, job status, and household income (Mokari-Yamchi et al., 2020). Additionally, Ndagire (2021) underscored the influence of socio-demographic determinants, including age, education level of the household head, and a household's possession of a non-

agricultural income source, on household food security. In Kenya, scholars such as Panchol (2021) have reported that social determinants such as low education levels contribute to unemployable skills influenced by deep-seated cultural beliefs and practices. This collective body of research contributes significantly to understanding the intricate interplay of social elements affecting food security dynamics in the East African context.

In Tanzania, diverse social determinants significantly impact food security. Research findings highlight that the marital status of the household head serves as a demographic determinant, while socio-economic determinants encompass household size, area of residence, and non-agricultural income (Mwanga, 2019). A study conducted in Iringa and Morogoro further revealed that the age and education level of the household head, along with engagement in non-farming activities, significantly influence household food access security (Tumaini, 2017). These insights contribute to a comprehensive understanding of the multifaceted social dynamics shaping food security in Tanzania.

In Chamwino, the review indicated that household size, land size cultivated, total annual household income per adult equivalent, and the age of the household head positively influenced food security. Conversely, in Bukoba, a study found that an increased household size and low income negatively affected food security, leading to heightened demand for food (Mavole et al., 2016). These contrasting findings underscore the importance of localized research to understand how social dynamics operate within specific communities. Therefore, examining the social determinants in Kilwa District is essential to uncover context-specific challenges and

opportunities, enabling the development of targeted interventions that address the unique needs of rural households and enhance their food security outcomes.

2.4.3 Economic Determinants Influencing Household Food Security

Food insecurity is a pressing issue in the United States, particularly in low-income communities where income shocks can affect numerous families (Coleman-Jensen et al., 2019). A study revealed that approximately 11 percent of households faced food insecurity due to insufficient income and resources for obtaining food. Another investigation found associations between household food insecurity, low educational attainment, and low household income (Seligman et al., 2023). Studies in Mexico highlighted that low income and high unemployment rates among low-income populations exacerbate difficulties in meeting basic household food needs (Coleman-Jensen et al., 2022; Éliás, 2025).

In Europe, the Member States have witnessed widening gaps in employment, income, poverty, inequalities, and youth employment. Loopstra's study (2020) emphasizes that food insecurity in Europe is influenced by low household incomes, driven by under-employment, low wages, and unemployment. Despite lower food prices in Turkey compared to most EU countries, unfair household income distribution poses a significant obstacle to food accessibility (Penne & Goedemé, 2021). Other scholars have revealed that increasing unemployment and falling wages are strong statistical determinants of growing food insecurity (Loopstra et al., 2020).

Food insecurity in Australia is influenced by various determinants, including low or unstable employment, limiting households' access to food (McKay et al., 2019).

Doery et al. (2024) highlighted the heightened risk among Aboriginal and Torres Strait Islander populations due to low income and unemployment. Kleve et al. (2021) expanded this understanding, associating housing tenure, income levels, and employment changes with household food security. Rigney (2022) further supported these findings, emphasizing the significant impact of income, educational attainment, and employment status on household food insecurity.

As of 2020, the Caribbean region exhibited a high prevalence of moderate or severe food insecurity, reaching 71.3%, the highest among Latin American subregions (Martinez-Brockman et al., 2023). In Trinidad, a Regression analysis study identified a significant influence of monthly household income on food expenditures (Ramdhanie et al., 2017). A broader analysis across Latin America and the Caribbean revealed that food insecurity was positively associated with the death of an income-earning household member, reduced family income, and job loss within the household (Hernández-Vásquez et al., 2022).

In Asia, approximately 2.8 million people, constituting nearly 40 percent of the population, experience food insecurity, with notable disparities between high- and low-income earners (Howitt et al., 2023). Research in rural Bangladesh identified that determinants such as land tenure, income generation, access to markets, and credit significantly reduced the risk of food insecurity (Wei et al., 2021; Shah et al., 2022). Moreover, studies from Pakistan and Kazakhstan found associations between wealth, food inflation, household size, education of the household head, annual income, and agricultural income with food insecurity (Ahmar, et al., 2022; Duisenbekova, et al., 2023).

Addressing food insecurity is a key global concern in sub-Saharan Africa (SSA). Research focusing on economic determinants affecting household food security in Sub-Saharan countries revealed significant variations in the impact of high food price inflation between high- and low-income earners (Wudil et al., 2022). In South Africa, low household income, high unemployment rates, total livestock units, access to and use of credits, and implications on land access were identified as significant determinants of household food insecurity (Tambe et al., 2023). Similarly, studies in Ghana found that access to credit, land size, and livestock ownership significantly influenced food security (Awoyemi et al., 2023; Asale et al., 2024; Akosikumah et al., 2025).

Economic determinants shape food security dynamics in Southern African Development Community (SADC) countries (Zhou et al., 2019). Research in Malawi underscores the nuanced impact of credit access, where formal credit and landholding size improve food security while informal credit exacerbates food insecurity (Salima et al., 2023). A tridimensional perspective of food security in Malawi reveals that credit access, land tenure, housing ownership, and cash crop adoption collectively influence food security (Ajefu & Abiona, 2020). In Zambia, increasing livestock income, secure land tenure, and larger land size are identified as determinants positively affecting household food and nutrition security (Nkomoki et al., 2019).

Studies in East Africa, covering Uganda, Kenya, and Rwanda, have probed into the determinants of household food insecurity. In Uganda, determinants such as food price inflation, income shocks, livestock units, and land ownership emerged as major

determinants (Barak, 2022; Mohamud, 2024). Kenyan studies reported similar findings, emphasizing the impact of food price inflation, income shocks, and livestock units (Mutea et al., 2022). In Rwanda, the research highlighted the significance of food price inflation, income shocks, and land ownership in rural and urban households (Nzeyimana, 2021).

The variation in food security across ecological zones and administrative regions in Tanzania, as mentioned by Ngongi and Urassa (2014), is subject to scrutiny. Despite asserted national and household-level initiatives to improve food security, Massawe's (2017) emphasis on multiple determinants contributing to household food insecurity in Tanzanian communities raises questions. The purported significance of household income, primary economic activities, access to markets, credit accessibility, and ownership of assets and land, as identified by Massawe (2017), prompts skepticism regarding the determinants of food security status in households.

Assenga and Kayunze (2020) applied multiple linear regression to posit that larger cultivated land size and higher total annual household income per adult equivalent significantly improve food security. Additionally, Ochieng et al. (2022) supported the idea that ownership of land, access to credit, and support, combined with advanced agricultural technologies, could enhance agricultural production and productivity. However, a degree of skepticism is warranted due to concerns about the applicability of these findings to diverse socio-economic contexts and the limitations associated with relying exclusively on regression analysis to address multifaceted issues such as food security. Therefore, this calls for further

investigations, particularly in Kilwa, to explore economic determinants influencing rural household food security.

2.5 Research Gap

The empirical literature review revealed that studies across various regions globally, including the United States, Europe, Canada, Australia, the Caribbean, Asia, Sub-Saharan Africa, and regional blocs like SADC and East Africa, have examined awareness of household food security (Ogunniyi et al., 2021; Coleman-Jensen et al., 2022; Godrich at al., 2022; Daley et al.,2023; Mukwedeya & Mudhara, 2023; Shafiee et al., 2023; Tambe et al., 2023; Crawley, 2024; Katoch, 2024; Bordoloi & Das, 2025). However, limited research focuses explicitly on household-level awareness within individual countries.

In Tanzania, while studies like those conducted by Aboagye-Darko and Mkhize (2025) and Masanja et al. (2023) offer valuable insights, there is a need for more comprehensive research covering all rural districts to understand regional variations. Furthermore, ongoing research on government and NGO efforts to improve awareness and eradicate household food insecurity needs further exploration to assess effectiveness and identify areas for improvement. Therefore, there is a clear need for more targeted research addressing the awareness gaps at the household level and evaluating intervention efficacy across different global regions.

The empirical literature review reveals a research gap in understanding the influence of diverse social determinants on household food security outcomes in Sub-Saharan Africa, particularly in the Southern African Development Community (SADC) and

East Africa (Zhou et al., 2019; Mokari-Yamchi et al. 2020; Beyene et al., 2023; Militao et al., 2023; Adefila et al., 2024). While studies have explored determinants such as household size, educational attainment, and income disparities, there remains limited investigation into their specific impact on food security (Zhou et al., 2019; Beyene et al., 2023; Militao et al., 2023; Mokari-Yamchi et al., 2020). The review underscores the necessity for comprehensive research covering all rural districts in Tanzania to understand the determinants influencing rural household food security (Mavole et al., 2016).

Although existing research provides valuable insights into social determinants like household size, education level, and non-agricultural income, there is a constraint regarding geographical coverage. Conducting studies in all rural districts would enable a nuanced understanding of how social determinants vary across regions and communities within Tanzania, thereby furnishing crucial data for targeted interventions and policy formulation. Moreover, studies need to assess the relative significance of each identified factor in influencing rural household food security, facilitating effective prioritization of interventions.

While existing studies have highlighted the importance of determinants such as household income, access to credit, and land tenure in shaping food security dynamics in Sub-Saharan Africa (Wudil et al., 2022; Tambe et al., 2023; Awoyemi et al., 2023; Salima et al., 2023) there remains a dearth of research specifically exploring the applicability of these findings to different local contexts particularly Tanzania. Moreover, concerns about the limitations associated with relying solely on social science methodologies to address multifaceted issues like food security

underscore the necessity for more nuanced feminist research methodologies and targeted inquiries (Ngongi & Urassa, 2014; Massawe, 2017; Assenga & Kayunze, 2020). Therefore, there is a clear need for further research to delve into the complex interplay of economic determinants affecting household food security, particularly in underrepresented regions of Tanzania, in order to develop more effective and context-specific interventions.

2.6 Conceptual Framework

The conceptual framework, incorporating Food Entitlement Theory, serves as a comprehensive analytical tool for understanding household food insecurity. Rooted in economics and social theory, it focuses on individuals' entitlements to food and their capabilities to access it, highlighting the role of social and economic determinants such as income, employment, land ownership, social status, and market access. The theory reveals structural inequalities and systemic barriers by emphasizing people's rights and entitlements to food. This insight helps policymakers and practitioners design interventions addressing socio-economic disparities, empowering individuals to secure an adequate and nutritious diet.

Integrating the entitlement theory into a conceptual framework offers a holistic approach to analyzing household food insecurity. It enables researchers to explore information dissemination and the socio-economic determinants that shape individuals' access to food. Considering the interplay between awareness, behavior change, and structural determinants, this framework facilitates a deeper understanding of the complex dynamics driving household food insecurity. It also informs the development of targeted interventions and policies to improve food

security outcomes for vulnerable populations.

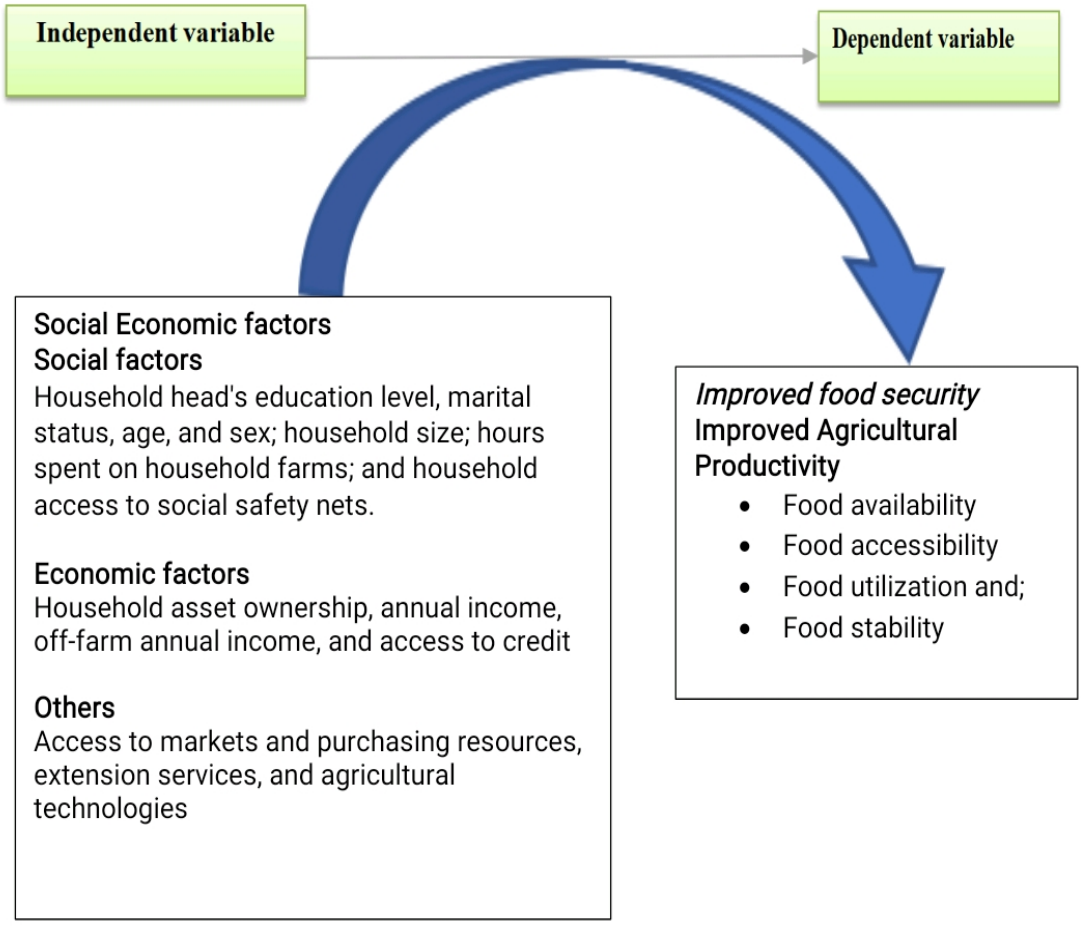

Figure 2.1: Conceptual Framework of the Study

Source: Researcher, (2024)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Chapter Overview

This chapter outlines the methods applied to the research analysis, focusing on the study's methodology. It discussed research philosophy, study location, study population, sampling procedures, inclusion and exclusion criteria, secondary data sources, primary data sources, data collection methods, validity and reliability, qualitative data rigor, data analysis and presentation, and ethical considerations.

3.2 Research Philosophy

Research philosophy refers to the underlying beliefs and assumptions that shape a researcher's approach to study and knowledge creation, guiding how data about a phenomenon should be gathered, analyzed, and utilized (Hoda, 2024; Paudel, 2024). The study adopted a pragmatic philosophy, emphasizing practicality and endorsed integrating qualitative and quantitative methods (Feilzer, 2023).

Pragmatism was particularly well-suited to evaluating the socio-economic determinants affecting rural households' food security in Tanzania, as its flexibility enabled a practical examination of the complex challenges involved in addressing food insecurity (Ngwamba & Nojiyeza, 2023). This philosophy acknowledged the unique strengths of different research methods. It advocated using qualitative and quantitative approaches to comprehensively assess the socio-economic barriers to achieving adequate food security within this study's context.

3.2.1 Research Design

According to Kumar and Praveenakumar (2025), research design refers to the

systematic setup of conditions to facilitate data collection and analysis, ensuring relevance to the study's objectives and cost-effectiveness. It serves as the foundational framework within which the research process is carried out. In this study, a cross-sectional design was employed. This design refers to a research approach in which data is collected from a specific population simultaneously (Mali et al., 2025).

The design also incorporated qualitative and quantitative methods to capture a snapshot of people's awareness of household food insecurity and thoroughly assess the socio-economic barriers to adequate food security at a specific time. The cross-sectional design was particularly suited to achieving the study's objectives, as it facilitated the simultaneous collection of data from a diverse sample of participants, including rural households, agricultural experts, and extension officers, within a defined timeframe.

3.2.2 Research Approaches

A research approach is the procedure the researcher selects to collect, analyze, and interpret data (Kumar & Praveenakumar, 2025). This study employed a mixed-methods approach, which refers to the integration of both qualitative and quantitative research methods in a single study (Taherdoost, 2022; Kumar & Praveenakumar, 2025) to present a more coherent picture of the unique case of rural household food security in Kilwa and to provide a thorough and nuanced understanding of how to address household food insecurity. The study examined broad trends and statistical relationships by combining survey-based quantitative data on aspects such as public awareness of food insecurity and household food security patterns (Budiawati et al.,

2024). Concurrently, qualitative methods, including interviews, provide detailed insights into individuals' awareness, experiences, perceptions, and the contextual socio-economic barriers to adequate food security.

3.3 Study Location

In research, a study location refers to a study area, which can be a specific site, neighborhood, community, district, region, or city of interest to a student or researcher (Liu et al., 2024; Kumar & Praveenakumar, 2025). The purpose of selecting such a location is to identify a particular problem and recommend solutions to it (Offenloch et al., 2025). The choice of this area is critical and is informed by the importance of the information it is expected to provide (Kumar & Praveenakumar, 2025).

The study was conducted in Kilwa District in the Lindi region of southern Mainland Tanzania (Figure 2). The Kilwa district has rich, fertile soils and experiences a dry tropical semi-arid climate with a unimodal rainfall pattern, characterized by a dry season from May to December and long rains, locally referred to as "*masika*," from January to April. The district was selected because, for many years, it has been one of the districts in the Lindi Region producing sufficient food annually, yet food shortages have persisted among households.

There has also been ongoing uncertainty regarding the rising demand for food aid from 2020 to 2023. Furthermore, to the authors' knowledge, no research has been conducted on the determinants determining food security in the district despite the reported shortages. The Risks and Disasters Report recommended an empirical study

to investigate the determinants contributing to the persistence of food insecurity in the district (KDC, 2022). This empirical study on the socio-economic determinants affecting food security in rural households was conducted in Kilwa District. The study aimed at tailoring interventions to the district's specific needs, making them more effective.

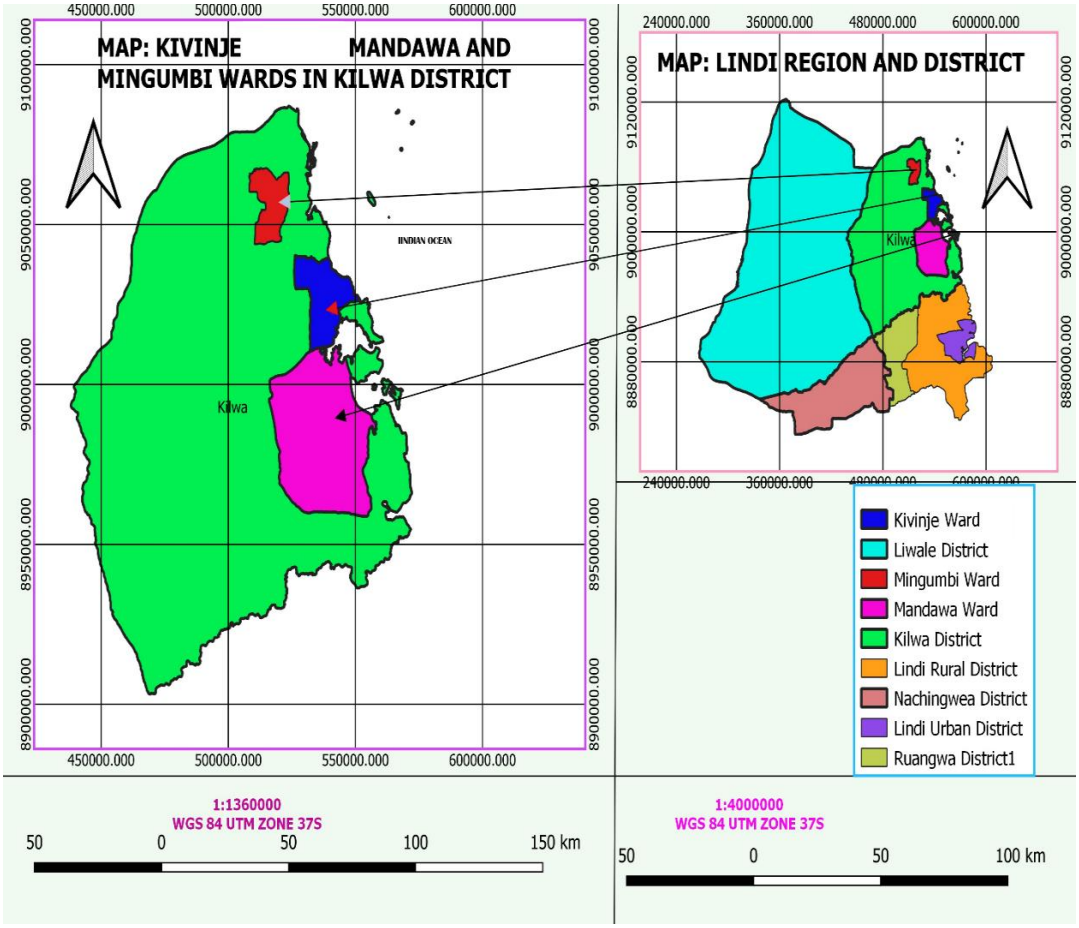

Figure 3.1: Map of Kilwa District showing Study Area

Source: Field Data, (2025)

3.4 Study Population

Study population is a subset of the target population from which the sample is actually selected (Hossan et al., 2023; Hu, 2024; Benck, 2025). The target population for this study consisted of rural households in Kilwa District, Tanzania. The

population under the study is 297,676 (145,343 males and 152,333 females) across 72,152 households, which formed the focus of this study (URT, 2022). The population sample for this study was drawn from the heads of the households in Kilwa District. In this study, the household was treated as the sampling unit, defined as a group of people eating from the same pot, cultivating the same land, and recognizing the authority of one person, the household head, who was the ultimate decision-maker of the household (Li et al., 2020). The study population consisted of 72,152 households (Table 1).

Table 3.1: Population of Kilwa District by Sex, Sex, Household Size and Average

District	Year	Population			Sex Ratio	Number of Household	Average Household Size
		Both Sexes	Male	Female			
Kilwa	2022	297,676	145,343	152,333	95	72,152	4.1

Source: URT, MoFP, NBS &PO-FP, OCGS, (2022)

3.5 Sampling Procedure

This section outlines the sampling techniques and sample size used in the study. The researcher employed both purposive sampling and simple random sampling techniques to determine the sample size.

3.5.1 Sampling Techniques

In the context of this study, the researcher employed both purposive sampling and simple random sampling.

(a) Purposive Sampling

Purposive sampling was conducted at the District level to select wards. In this case, three wards were purposively selected. The selected wards (Mandawa, Kivinje, and

Mingumbi) in Kilwa District were chosen due to their history of experiencing food shortages. They represent communities that have faced significant challenges in accessing adequate and nutritious food, making them suitable sites for investigating the socio-economic factors influencing household food security. Moreover, purposive sampling was employed at ward and district levels to select respondents strategically positioned to provide relevant information on the issue.

At the district level, this included the District Executive Director (DED) and the District Agricultural, Livestock, and Fisheries Officer (DALFO), the District Agricultural Irrigation Officer, the District Community Development Officer, Community Development Officers from NGOs of Mpingo Conservation Development Initiatives (MCDI), Action Aid and Tanganyika Christian Refugees Services (TCRS) in Kilwa District. The ward level included the Ward Executive Officers (WEOs), Ward Agricultural Extension Officers, and Ward Community Development Officers.

(b) Simple Random Sampling

Four villages from three wards (Mandawa, Kivinje, and Mingumbi) were randomly drawn using the village register as a sampling frame. The selected villages were Mavuji and Mchakama in the Mandawa ward, Matandu village in the Kivinje ward, and Mingumbi village in the Mingumbi ward. The four villages were randomly sampled to determine the number of households. Only the heads of households were interviewed in each sampled household. The questionnaires were administered individually, and the head of the household, whether a man or a woman, was interviewed. The purpose of using the simple random sampling technique was to

select the heads of households and avoid bias. This approach enhanced the generalizability of the findings and minimized bias in participant selection, thereby increasing the reliability and validity of the research outcomes (Kanaki & Kalogiannakis, 2023).

3.5.2 Sample

This study determined the sample size using Yamane's formula, a statistical method especially suited for finite populations (Muyembe et al., 2023). This formula utilizes the total population size and a specified margin of error to estimate the required number of respondents, thereby balancing precision with practical constraints (Hasan & Kumar, 2024). By employing this method, the study ensured that the sample represented the target population and was feasible within the available time and resources (Yamane, 1973, cited in Uakarn et al., 2021). A sample size of 398 households, determined using Yamane's formula, was selected for participation in the study (Table 2). The sample size estimate was calculated using the following formula, as outlined by Yamane (1973);

$$\mathrm{n} = \frac{N}{1 + N.e^2}$$

Where n = sample size;

N = population size of the household in Kilwa District (72,152)

□ = error term (0.05) reliability level of 95%.

Therefore;

$$\mathrm{n} = \frac{72{,}152}{1 + 72{,}152 * 0.05^2}$$

n = 398 of the households

Therefore, the sample size was 398 households in Kilwa District.

Table 3.2: Household Sampled for Questionnaire Administration

Household	**Mandawa Ward**		**Kivinje Ward**	**Mingumbi Ward**	**Total Sample**
	Mavuji Village	Mchakama Village	Matandu Village	Mingumbi Village	
Total number of Households	1049	2499	379	392	**4319**
Household sampled	97	230	35	36	**398**

Source: Field Data, (2024)

A total of 20 individuals were sampled for qualitative data collection, as recommended by Subedi (2021). This was a convenient number of participants for qualitative research and was appropriate for this research (Subedi, 2021). Researchers conducted interviews to evaluate the efforts made by the government and NGOs (specifically Mpingo Conservation Development Initiatives (MCDI), ActionAid, and Tanganyika Christian Refugees Services (TCRS)) in raising awareness and eradicating household food insecurity in Kilwa District. This approach ensured thorough exploration while considering the population and context of the study.

3.6 Inclusion and Exclusion Criteria

In this study, inclusion and exclusion criteria were established to select participants who truly represented rural households in Kilwa District affected by food security issues. Inclusion criteria included residency, agricultural involvement, and economic status. Exclusion criteria removed participants who did not meet the study's objectives or could distort results, such as recent migrants. Clearly defining these

criteria ensured that the survey gathered data that accurately reflected the social and economic determinants influencing food security in Kilwa, thereby enhancing the validity and reliability of the findings.

3.7 Secondary Data Source

This study employed secondary data sources, utilizing relevant data from published or existing studies to fulfill research objectives (Pandey & Pandey, 2021). In this study, secondary data was obtained through the review of various existing documents, including previous research findings, reports relevant to the study's theme, as well as reports from appropriate authorities such as the Ministry of Agriculture, Lindi Region, Kilwa District Authority, other government reports, NGO publications, and policy documents. This diverse approach offered a thorough insight into the topic and enhanced the depth of data analysis. Secondary data sources provided valuable context and background information, strengthening the findings from primary data collection and serving as a means of data triangulation to deepen the researcher’s insights and build upon existing knowledge.

3.8 Primary Data Source

Primary data is the information collected fresh for the first time and thus original in the research area (Cheong et al., 2023). They could either be quantitative or qualitative data. This study gathered quantitative and qualitative data from sampled rural households using questionnaires and interview guides. The questionnaires were used to collect data on households’ demographic characteristics, food security awareness, and social and economic determinants of rural households’ food security in Kilwa District. Additionally, interview guides were employed to collect in-depth

qualitative information from key informants about all aspects of the study, including assessing people's awareness and perceptions, the contextual socio-economic barriers to adequate food security, and the efforts made by the government and other players (NGOs) to raise awareness and combat household food insecurity in the district.

3.9 Data Collection Methods

Methods In the context of this study, the primary data collection tools were questionnaires and interview guides.

3.9.1 Questionnaires

Questionnaires were the main tool for primary data collection; they were employed to gather quantitative data on households' demographic characteristics, food security awareness, and social and economic determinants related to food security. They included both structured and semi-structured formats (closed-ended and open questions). Structured questionnaires were primarily used to collect measurable data for testing statistical hypotheses, making them suitable for statistical analysis in this study. Open-ended questionnaires allowed for the inclusion of respondents' views, ideas, and opinions through free explanation, as suggested by Kircher and Zipp (2022). As indicated in Table 2, three hundred ninety-eight household heads from the study area participated in questionnaire administration across the four villages. The questionnaire method was chosen for its effectiveness in gathering information about household characteristics and its ability to collect data quickly.

3.9.2 In-depth Interviews

A key informant interview is a qualitative research method to obtain in-depth information from key informants (Kyomugisha, 2025). A key informant person is

an individual who has specialized knowledge and insights, is accessible, and is willing to discuss the issue under the study concerned (Kyomugisha, 2025; Tusabe et al., 2025). According to Tusabe et al. (2025), qualitative methods are often more appropriate for capturing people's social and institutional context than quantitative methods. An in-depth interview was conducted with 20 key informants, each lasting an average of 40-80 minutes.

It aimed to obtain qualitative insights from them on various aspects of the study, such as people's awareness and perceptions, the contextual socio-economic barriers to adequate food security, and the efforts made by the government and other players (NGOs) to raise awareness and combat household food insecurity in the district. Employing a sample of 20 participants in qualitative research strikes an effective balance between depth and manageability, often leading to thematic saturation and the generation of robust findings (Braun & Clarke, 2021; Goriss-Hunter & White, 2024; Ahmed, 2025). This approach also allows for flexibility in refining interview questions and adapting to emerging themes, thereby enhancing both analytical clarity and methodological rigor (Ahmed et al., 2025; Lim, 2025).

In this study, key informants from the district level included the District Executive Director (DED) and the District Agricultural, Livestock, and Fisheries Officer (DALFO), the District Agricultural Irrigation Officer, the District Community Development Officer, the Head of Section from Risk and Risk Management, Community Development Officers from NGOs of Mpingo Conservation Development Initiatives (MCDI), Action Aid and Tanganyika Christian Refugees Services (TCRS) in Kilwa District. From the Ward level, key informants included

Ward Executive Officers (WEOs), Ward Agricultural Extension Officers, and Ward Community Development Officers from three surveyed Wards. In contrast, at the Village level, key informants included Village Executive Officers (VEOs) from four Villages surveyed. Therefore, this method applied to all objectives of this study since all important supplementary information was asked.

3.9.3 Doccumentary Review

In this analytical approach, the researcher employed documentary review to gather relevant information for the study, recognizing that no single source could offer a fully comprehensive and complete perspective (Yusuph et al, 2024; Lim, 2025). This method involved extracting data from a range of written materials, including academic journals, books, and official reports from institutions such as the Ministry of Agriculture, Lindi Region, Kilwa District Authority, other government bodies, non-governmental organizations, and policy documents. These sources were instrumental in investigating the socio-economic determinants influencing food security among rural households. Additionally, electronic sources such as the Internet were utilized to supplement the data, whereby data collection was guided by specific variables aligned with predefined research objectives.

3.10 Validity and Reliability

Reliability and validity are crucial and essential aspects in evaluating any measurement methodology used for data collection in quality research. It ensures that the research tool, whether a questionnaire or assessment, accurately captures the intended information without biases or errors (Sürücü & Maslakci, 2020). Reliability pertains to the consistent performance of a method in measuring something over

time. It is fundamental to research and measurement, guaranteeing dependable and consistent results across various studies (Izah, 2023). In this study, reliability was ensured by comparing the data obtained in the pilot study with those from the final analysis.

3.10.1 Validity

The study used a well-aligned, simple, and concise research instrument tailored to the objectives and variables. The validity of this study was intended to measure the suitability of the instruments used, the content, and the concept of food security among rural households (Kolog, 2023). This study's research tools included questionnaires and interview guides for key informant interviewers, which aligned with specific objectives. Data collection proceeded with a pilot test to pre-test interviews, the questionnaire, and the interview guide for KII. This eliminated any ambiguous and unclear questions, thus refining the tools and guides for the study process (Borku et al., 2024). Content validity was maintained by ensuring that the instruments measured all social and economic determinants and their impact on food security.

3.10.2 Reliability

Reliability assesses how consistently a method measures something; a measurement is deemed trustworthy when it consistently produces the same result under identical conditions using the same techniques (Kolog et al., 2023). To ensure the reliability of the qualitative data, the researcher worked alongside experts from diverse fields, including agriculture, irrigation, risk and risk management, community development, gender studies, nutrition, and planning. These experts shared their insights and

observations on the research and offered suggestions for improvement. Data processing underwent multiple revisions, including running regression analyses, utilizing Excel, performing chi-square tests to obtain accurate information, and employing mixed methods to validate findings across different approaches, enhancing the results' reliability (Ahmed, 2024).

3.11 Qualitative Data Rigor

To ensure rigor in the study, dependability, trustworthiness, confirmability, and transferability were prioritized to maintain reliable findings (Ahmed, 2024; Bang, 2024; Kumar et al., 2025). To ensure dependability, the study documented processes, used peer reviews, and employed member checking to validate findings while adapting to changes in the research context (Kocaman et al., 2025). Trustworthiness was ensured through extended participant interaction, reflexivity, data triangulation, transparent sampling, peer debriefing, and member verification, ensuring accuracy and objectivity (Abidin et al., 2024).

Open-ended interviews ensured data credibility and confirmability, with members checking for transcript accuracy and triangulation to align data from multiple sources, minimizing errors and enhancing research accuracy (Haug et al., 2024). In the context of the research under study, all four components of qualitative data rigor employed included dependability, trustworthiness, confirmability, and transferability.

3.11.1 Dependability

Ahmed (2024) highlights methods for establishing dependability and ensuring consistent research findings. These include keeping a detailed research log that

thoroughly documents methodological choices, data collection methods, and analytical steps. This meticulous record-keeping facilitates audit trails and enables other researchers to replicate the study (Ahmed, 2024; Subrahmanyam, 2025). In this research, the investigator maintained a reflexive field diary throughout the process, capturing personal experiences, biases, and assumptions that could influence the collection and interpretation of data.

3.11.2 Trustworthiness

Trustworthiness in qualitative research refers to the degree of confidence one can place in the findings of a study (Flick et al., 2025). Marlina et al. (2025) highlight that, in assessing credibility, researchers consider whether the data and findings align with their claims by examining the data's quantity, depth, and scope and their observations and experiences throughout the study. This research ensured credibility, reliability, and validity through member checking. Following the administration of semi-structured questionnaires, the researcher shared key findings and interpretations with a subset of participants, allowing them to confirm the accuracy of the researcher's understanding and flag any potential misinterpretations.

3.11.3 Confirmability

In qualitative research, confirmability is the degree to which findings can be verified and are not merely the result of researcher bias (Bekmezci & Sürücü, 2025). Subrahmanyam (2025) emphasizes that confirmability reinforces the credibility of research findings by incorporating measures such as validation, a rigorous demonstration of the researcher’s objectivity, careful consideration of conflicting cases, and detailed explanations of methodological choices. This study enhanced

confirmability by adopting a reflexive approach; the researcher critically examined personal biases and preconceptions, ensuring that the data genuinely reflected the participants' perspectives. Moreover, the research process was meticulously documented to create a clear audit trail, enabling external reviewers to assess the correspondence between research decisions and the findings.

3.11.4 Transferability

Transferability in qualitative research refers to the degree to which findings can be applied to other contexts, settings, or populations (Drisko, 2025). To enhance transferability, qualitative researchers strive to provide rich, detailed descriptions of the study environment, participants, and methodologies (Flick et al., 2025). In this study, the researcher offered comprehensive explanations that enabled readers to judge how applicable the findings might be in comparable situations, thereby improving the overall transferability of the research.

3.12 Data Analysis and Presentation

Following data collection, the raw data were sorted, coded, verified, and categorized according to the wards surveyed. The data were then analyzed and presented in alignment with the themes and sub-themes derived from the objectives and research questions.

3.12.1 Data Analysis

This study used descriptive and inferential statistics and content analysis to analyze the data. For quantitative data concerning the first objective, “people’s awareness of food insecurity,” analysis was conducted using the Statistical Package for the Social Sciences (SPSS) software, version 26. This analysis summarized and described key

features of the data, including measures such as frequencies, percentages, and totals. These descriptive measures provided a comprehensive overview of the distribution and characteristics of the variables under investigation. In addition, inferential statistics, such as correlation analysis, were employed for objectives two and three.

Binary logistic regression was applied to assess the effects of specific social and economic characteristics on households' food security status in the study area. The parameters of the logistic regression model were estimated using the Maximum Likelihood Estimation (MLE) technique. A binary response function, classifying households as either food secure or food insecure, was defined and estimated using the logistic procedure. The food security status was quantified by assigning a value of one or zero, where one signified food security, and zero denoted food insecurity. Logistic regression was employed to model the probability of a household being classified as either food secure or food insecure. The fitted binary logistic regression equation is outlined below;

$FSSH = \beta_i + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \ldots B_{11}X_{11} + e \ldots.$

Where: FSSH= Food security status of households (food "1", food insecure "0");

β_i = The constant term;

$\beta_{1\text{-}11}$ =the co-efficient of the independent variables; representing the impact of each predictor variable on status of household food security,

X_1-X_{11} = represent the predictor variables related to different socio-economic characteristic and,

e = Error term.

X_1= Household head sex (1 = male, 0 = female)

X_2 = Age of household head (actual years)

X_3 = Education level of household head (actual years spent in school)

X_4 = Marital status of Household Head (1 = married, 0 = otherwise)

X_5 = Household size (actual number)

X_6 = Household access to social safety nets (1 = yes, 0 = otherwise)

X_7 = Hours spend in house farms (actual hours)

X_8 = Household farm size (actual hectares)

X_9 = Total annual income of household head (Tsh)

X_{10} = Total annual Off-farm income of household head (Tsh)

X_{11} = Household access to social safety nets (1 = yes, 0 = otherwise)

For the qualitative data, thematic analysis was used; the information collected was transcribed and organized into a consistent format. It was then identified, sorted into meaningful segments, and labeled. A coding framework was developed to identify key issues from field notes. Related and similar codes were grouped into broader themes and sub-themes. The coding process eliminated, combined, or subdivided codes, grouping them into broader themes and sub-themes. Repeating ideas and larger themes that connected the codes were identified and presented using quotations.

3.12.2 Data Presentation

The findings were presented chronologically to improve the reader's immediate understanding of the results.

(a)Quantitative Data

For quantitative data, descriptive statistics such as the mean, frequencies, and

percentages were presented using visual tools charts, graphs, and frequency tables to describe and summarise the data, as stated by Devore et al. (2021) and Kotronoulas (2023). Similarly, this study created charts, graphs, and tables to display data (frequencies and percentages) and ascertain the relationship between independent and dependent variables by being analyzed using SPSS software. Moreover, the quantitative data were presented in the findings section.

(b) Qualitative Data

For qualitative data, the analyzed information was quoted and presented as direct quotations and descriptive statements from participants to illustrate specific points or themes. The analyzed findings were presented in the findings section. These findings were used to support the quantitatively analyzed information in the form of quotes and statements. These methods efficiently communicated qualitative information (Dunlop et al., 2022).

3.13 Ethical Considerations

Ethical considerations were fundamental in this research to protect the rights and well-being of study participants and to uphold the integrity of the research process (Haneef & Agrawal, 2024). Researchers considered ethical issues from the beginning to the end of conducting the survey.

3.13.1 University Clearance

In alignment with the ethical guidelines stipulated by the Open University of Tanzania (OUT), the researcher adhered to these principles throughout the study,

ensuring transparency and accountability in the research process. Before proceeding with the research, the researcher sought a clearance letter from the Directorate of Research, Consultancy, Publication, and Postgraduate Studies (DRCPPS) of the Open University of Tanzania. Permission to conduct the research was sought from The Open University of Tanzania, the Lindi Regional Commission Office, and the District Executive Officer of Kilwa District.

3.13.2 Confidentiality

This study prioritized safeguarding participants' rights and privacy by implementing measures such as omitting individual names from data collection forms, securing the data, and restricting access to identifiable information (Zhang et al., 2025). Respondents' rights were ensured by not including their names in the data collection process and avoiding their use in any publications associated with this research.

3.13.3 Anonymity

For ethical considerations, the researcher must ensure that participants' anonymity is maintained throughout the study and that they understand the research's purpose, procedures, and potential risks and benefits (Karunarathna et al., 2024). Researchers implemented stringent measures to maintain data storage confidentiality, including using security codes and restricting access to identifiable information. Once the data was collected, it was securely stored, and all provided information was treated with the utmost confidentiality. Access to identifiable details was strictly limited, and security codes were actively assigned to digital records to ensure the anonymity of participants.

3.13.4 Assent or Consent

Informed consent is a key ethical consideration in research; it guarantees the voluntary participation of the study subject (Vasco-Morales et al., 2024). In this study, the researcher ensured that informed consent was obtained from all participants, with a strong emphasis on maintaining their confidentiality, anonymity, and privacy. Informed consent forms were carefully used to ensure participants fully understood the study's aims, procedures, risks, and benefits before agreeing to participate. These forms stressed the voluntary nature of participation, giving participants ample time to review and ask questions. Written consent was documented for those who agreed, and researchers adhered strictly to these principles to protect participants' rights and maintain their privacy throughout the research.

3.13.5 Voluntary Participation

Before participating, participants were fully informed about the study's aims, methods, potential risks, and benefits. Emphasis was placed on voluntary participation, with no coercion or undue influence. Participants had ample opportunity to ask questions and withdraw from the study at any time without penalty. This commitment to voluntary participation was essential for ethical research practice, respecting individuals' autonomy and ensuring genuine, unbiased contributions to the study (Li, 2025).

3.13.6 Do not Harm Principle

The 'Do No Harm' principle was strictly adhered to, prioritizing participants' well-being and safety. This involved carefully evaluating and minimizing potential risks and discomforts (John & Wu, 2022). Participants were informed about how their

involvement might impact them, and measures were implemented to prevent adverse effects. The study was designed to avoid physical, emotional, or social harm, with any issues promptly addressed to ensure the participants' protection and uphold high ethical standards throughout the research.

CHAPTER FOUR

FINDINGS PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Chapter Overview

The results and discussion are classified into four categories. The first is the socio-demographic characteristics of the household heads. The second category involves household heads' awareness of food security. The third category focuses on social and economic determinants affecting food security in the Kilwa District.

4.2 Socio-demographic Characteristics of the Household Heads

In this study, 398 households were considered from four villages in three wards: Mandawa (Mchakama and Mavuji villages), Kivinje (Matandu Village), and Mingumbi (Mingumbi village). Table 4.1 presents the major socio-demographic characteristics of households covered in the study area. These characteristics relate to the relative frequency distribution of household heads by sex, age, education level, marital status, principal occupation, and household size of the respondents.

Table 4.1: Socio-Demographic Characteristics of Respondents

Variable		**Frequency (n=398)**	**Percent %**
Sex	Male	226	57.0
	Female	172	43.0
Age	21-30 years	45	11.3
	31-40 years	65	16.3
	41-50 years	90	22.6
	51 years and above	198	49.8
Education level	Primary	289	72.6
	Secondary	39	9.8
	Certificate	5	1.3
	Diploma	2	0.5

	No formal education	63	15.8
Marital status	Married	231	58.0
	Never married (Single)	10	2.5
	Divorced/Separated	89	22.4
	Widow	48	12.1
	Widower	20	5.0
Occupation	Farmer	291	73.1
	Off farm activities	60	15.1
	Employed	23	5.8
	Unemployed	24	6.0
Household size	1-2	156	39.2
	3-4	122	30.7
	5-6	85	21.4
	Above 6	35	8.8

Source: Field data, 2024

4.2.1 Distribution of Household Heads by Sex

Opinions were sought from male and female household heads on issues related to household food security. This was important because household food security is influenced by the roles played by men and women. Table 4.1 shows a larger percentage of men, 226 (57%), compared to 172 (43%) for women. The findings revealed that the study involved male- and female-headed households, with most households in the study area being male-headed.

Supporting existing findings, previous research has highlighted those female-headed households, though fewer in number, are disproportionately more vulnerable to food insecurity. This increased vulnerability is attributed to enduring gender inequalities that disadvantage female-headed households in accessing resources and opportunities (Makate & Makate, 2022). Furthermore, the gender of the household

head is a key factor influencing dietary diversity in rural households, as it plays a critical role in determining household food security outcomes and the ability to diversify livelihoods (Galabuzi et al., 2021). Understanding the roles and contributions of men and women to food security is crucial. Therefore, adopting a gender perspective on livelihood diversification is essential to comprehend how it affects the food security of female-headed households.

4.2.2 Distribution of Household Respondents by Age

In general, age is a fundamental measure of population structure. Social scientists have asserted that age holds particular importance within the age structure of a population, as several social relationships within the community depend on it. Table 4.1 shows the percentage distribution, with the minimum and maximum ages of household heads being 21 years and above, respectively. The study revealed that about half of 198 (49.8%) household heads were above 50 years old, while the remaining household heads were 50 years old and below or younger.

Approximately 90 participants (22.6%) were 41 to 50 years old, while 65 participants (16.3%) fell within the age range of 31 to 40. Only 45 (11.3%) of the heads were aged 21 to 30. The low percentage of youth in the sample may be attributed to the tendency of young people to migrate from rural to urban areas. This indicates that most of these farming households are old; this could contribute to their low productivity and food insecurity status. However, this result is inconsistent with the findings of Leung and Wolfson (2021), who did not observe activity among individuals aged 50 and above.

4.2.3 Households Heads' Level of Education

The level of education influences the adoption of improved agricultural technology and, consequently, farm productivity. Table 4.1 illustrates the distribution of educational levels among the household respondents. The findings from the household respondents revealed that out of 398 participants, 63 (15%) had not attended formal education at all and could not read or write. Approximately 298 (73%) of the respondents had completed primary school education, 39 (9.8%) had achieved a secondary education level, 5 (1.3%) had earned certificates, and 2 (0.5%) held diplomas.

These results imply that illiteracy was high among the respondents in the study area, which is a potential obstacle to the application of modern technology to various productive activities. The findings are consistent with many studies, including those cited by Mdoda et al. (2023), which suggested that the lack of education (a few years of schooling) hinders farmers from efficiently using production information. A less educated person acquires less information and, as a result, is a less effective producer, compromising their food security (Birhanu et al., 2021; Addai et al., 2022).

4.2.4 Households Heads' Marital Status

The family labor supply can explain the significance of marital status on agricultural production. Table 4.1 presents the percentage distribution of household respondents by marital status. It indicates that most household respondents in the study area were married, with approximately 298 (58%) of all household respondents being married, 10 (2.5%) were single, 89 (22.4%) were divorced, and 68 (17.1%) were

widows/widowers. The marital status of the head of household is an important determinant that influences food insecurity in rural households.

A study by Mengistu and Kassie (2022) reported that married household heads were more likely to be food secure. This suggests that the husband and wife contribute their labor and resources to enhance household food security. According to Dallmann et al. (2023) and Mwaura (2022), married household heads exhibit a higher incidence of food security than single, divorced, or widowed heads. This could be attributed to the fact that married households are likely to be larger and engaged in income-generating activities, contributing more to household income.

In contrast, while highlighting the importance of marital status in household food security, Tan et al. (2022) argued that households headed by unmarried individuals were more likely to be food secure than those headed by married individuals. This was attributed to the possibility that married households often have more members, which increases the number of mouths to feed, thus placing additional strain on resources.

4.2.5 Distribution of Household Respondents by Occupation

The distribution of significant occupation types among household respondents is shown in Table 4.1. The distribution of occupations was similar across the four surveyed villages. Findings revealed that farming was the primary occupation of household heads, accounting for approximately 291 (73%). This aligns with the observations of Autio et al. (2021) and Olaitan et al. (2024), who noted that most African people base their production and consumption patterns mainly on land

resources due to a lack of knowledge to engage in other productive activities. The primary food and cash crops, ranked by the area planted, include maize, cassava, cashew, sorghum, paddy, sesame, coconuts, and cowpeas.

In the households surveyed, most large-scale agricultural production is aimed at generating cash. The second category of occupation, accounting for 60 (15.1%) of the respondents, was household heads engaged in fishing activities and petty business. The third group among respondents, accounting for about 24 (6%), was unemployed household heads, and only 22 (5.8%) were employed in formal institutions. This group mainly consisted of older individuals above 51 years old and those suffering from long-term non-communicable diseases, as well as some who are disabled.

4.2.6 Household Size

Household size is significant in food security. Table 4.1 shows the percentage distribution of household respondents by household size in the study area. The significance of household size in agriculture is determined by the availability of labor for farm production and the total area cultivated for different crops. Generally, the larger the family size, the more likely the farmer is to become successful, as the household has more labor to work on the farm.

However, this is only effective if all family members are old enough to perform farm work. This advantage is negated if the household consists mainly of young children who cannot contribute as family labor. The findings in Table 4.1 indicated that 156 (39.2%) household heads had an average of two people in the family, 122 (30.7%)

had three to four people, 85 (21.4%) had five to six people, and 35 (8.8%) had more than six people in the family.

Household size can significantly influence food security at the household level. Several studies have shown that food insecurity tends to increase as the household size grows (Mwanga, 2019), suggesting that households with more members experience a lower likelihood of food insecurity, provided these members actively contribute by working on the household farmland to support food production. Conversely, other researchers have reported that households with many members are more vulnerable to food insecurity than those with fewer members (Mavole et al., 2016; Coleman-Jensen et al., 2022).

4.3 Household Heads Awareness of Food Security

The level of awareness regarding food security is crucial to the well-being of households. This section explores household food security status, the extent of awareness, and the significance of food security among household heads and members in general.

4.3.1 Household Food Security and Sources

Household food security within the study area represents a significant concern, shaped by entitlement dynamics “the rights and abilities” that enable households to access food. Most families depend primarily on subsistence farming to meet their food requirements, with only a small proportion sourcing food from local markets.

4.3.1.1 Food Security Status of Household Heads

The findings reveal that food security varies significantly among the villages in the

district. Out of 398 households, only 124 (31.2%) are food secure, while 274 (68.8%) experience food insecurity (Table 4.2). Notably, more than twice as many household heads, regardless of gender, are food insecure. This pattern underscores the pivotal role played by household heads in ensuring food security. In line with Sen's entitlement theory, which asserts that “access to food is determined not solely by its availability but also by a person's entitlements, including the rights and opportunities to obtain food,” household heads, as primary decision-makers, greatly influence how these entitlements are managed (Domingo-Cabarrubias, 2023). By effectively navigating these entitlements, they can mitigate food insecurity and enhance their family's access to sufficient, nutritious food (Tessema, 2024).

Table 4.2: Distribution of Households via Food Security Status in the Study Area.

Participant Occupation	**Total n (%)**
Food security	124 (31.2%)
Food insecurity	274 (68.8%)
Total	398 (100%)

4.3.1.2 Household Food Sources

Figure 4.1 illustrates the percentage distribution of household food sources across the surveyed villages, revealing that 85% of households obtain food from their own farms, while only 15% rely on the market. This strong reliance on local food production echoes Suleiman’s (2018) findings that local production supplies approximately 90% of Tanzania’s food requirements. The findings highlight the predominance of self-production and reinforce a central tenet of Amartya Sen's entitlement theory: food security is determined not solely by the overall availability of food but by the entitlements “the rights and abilities” that enable households to

access it (Amato, 2020; Bowbrick, 2022). The study demonstrates that local production plays a pivotal role in shaping these entitlements, ensuring that households secure food supplies. Consequently, food entitlement is fundamental to achieving robust food security outcomes.

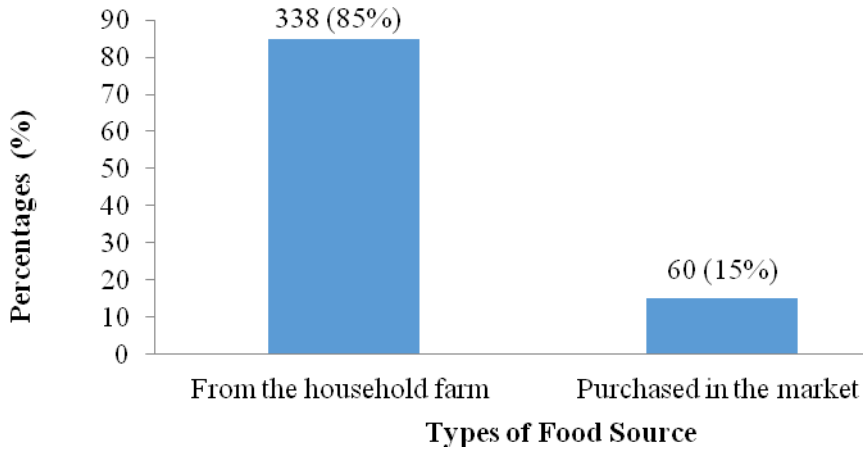

Figure 4.1: Sources of Food by Respondents

4.3.2 Food Security Dimensions of Rural Households

Food security is recognized as a fundamental human entitlement, encompassing the stable and sustainable availability, accessibility, and utilization of food (Onyeaka et al., 2024; Nontu et al., 2024; Obodai et al., 2024). The entitlement is closely linked to Amartya Sen's entitlement theory, which posits that individuals' ability to command resources, such as food, depends on their 'entitlement set.' Sen's theory underscores this concept by defining entitlements assets of commodity bundles that individuals can convert into resources, ensuring households have stable access to sufficient food in adequate supply to meet their nutritional needs (Onyancha, 2024). This perspective highlights the critical role of entitlements in addressing rural household food security, as explored in the discussion below.

4.3.2.1 Food Availability

Even though most respondents are farmers, the majority cultivate cash crops. Figure 4.2 illustrates that approximately 123 (31%) of the respondents are self-sufficient in food. In contrast, 131 (33%) have food but lack self-sufficiency, 92 (23%) rely on support from their neighbors, and 52 (13%) receive aid from the government, NGOs, and other development partners. This indicates a lack of self-reliance among the surveyed households, potentially increasing their vulnerability to food insecurity. An interview participant shared a confirming statement, stressing that,

> *"The lack of self-sufficiency among the surveyed households is a significant concern, as their heavy reliance on external support for sustenance could considerably increase the risk of food insecurity"* (IDI, Community Development Officer, January 2025).

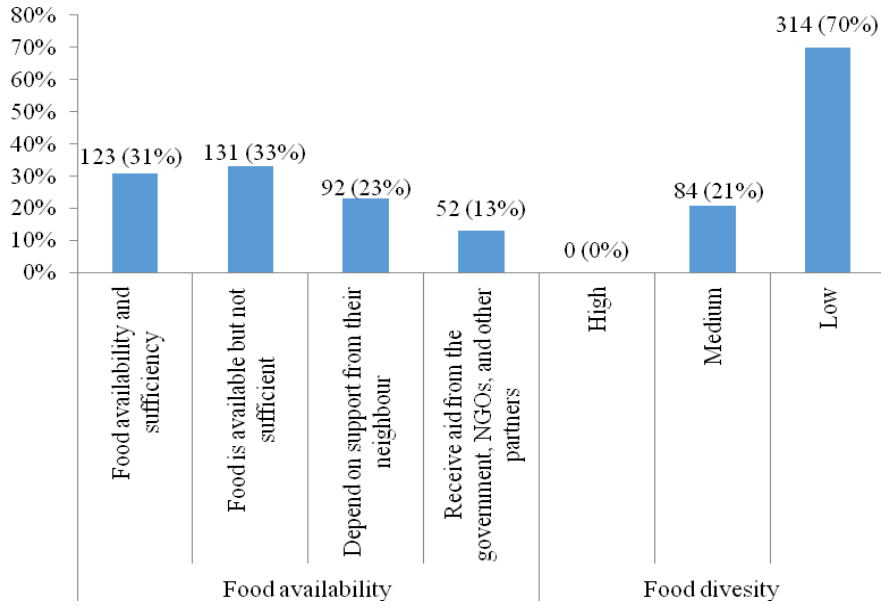

Figure 2.2: Food Availability and Food Diversity Status of the Household

Regarding food crop production diversity, the findings reveal that most households, 314 (79%), exhibit low food diversity, while only 84 (21%) demonstrate medium diversity. This implies that rural households have limited access to nutritious foods

required for a healthy diet and an active lifestyle. In terms of a corroborating comment, an interview participant stressed the following,

> "*Low food diversity poses a significant challenge to people's food security that limited access to a variety of foods often results in poor nutrition and an increased risk of malnutrition-related issues*" (IDI, Agricultural Officer, January 2025).

This finding aligns with other researchers, who observed that low food diversity might signify households' restricted access to a range of nutritious food items, potentially leading to food insecurity, poor health, and malnutrition (Mazenda & Mushayanyama, 2022; Waha et al., 2022; Nahar et al., 2024). This aligns with Amartya Sen's Food Entitlement Theory, which states that food insecurity arises from a lack of food access rather than availability (Dula et al., 2024). The theory highlights that food insecurity primarily affects individuals who cannot access sufficient food, often due to poverty, regardless of the overall availability of food. The theorist further asserted that food insecurity is not rooted in supply limitations but rather in demand challenges linked to poverty and the lack of 'entitlements' that enable people to access food markets effectively (García-Dastugu et al., 2025).

4.3.2.2 Food Accessibility

Table 4.3 shows that market food prices are unaffordable for most surveyed households, with 346 (87%) reporting difficulties affording food. Consequently, over 275 (69%) households experienced food shortages. These shortages were frequent, as 195 (49%) of households reported facing shortages more than twice in the past four years, while 167 (42%) stated they had rarely encountered such shortages during the same period.

Table 4.3: Food Access-related Issues

Food shortage affordability and shortage experience	Response	Percentages
Market price food affordability	Yes	52 (13%)
	No	346 (87%)
Food shortage experience in the last four years	Yes	275 (69%)
	No	123 (31%)
Frequency of food shortage per four years	Never	36 (9%)
	Rarely (two times in the past four years)	167 (42%)
	Often (more than two times in the past four years)	195(49%)

These findings suggest that food access is severely constrained in the study area. This aligns with the responses from key informants, who indicated that,

> "*Ongoing food insecurity issues among the surveyed households, is primarily driven by frequent food shortages and the unaffordability of market food price"* (IDI, Extension Officer, January 2025).

This aligns with findings from other studies, which identify high food costs as a significant factor contributing to food insecurity (Shafiee et al., 2022; Bozsik, 2022; Birhanu et al., 2023). According to Drewnowski (2022), high food prices hinder access to healthy foods, leading to increased undernutrition and food insecurity. Similarly, Cao and Nguea (2025) emphasized the connection between affordability, accessibility, and food insecurity. The findings and argument above are in line with. Further studies highlight the prevalence and frequency of food shortages as significant contributors to food insecurity (Sisha, 2020; Bjornlund et al., 2022; Mabuza & Mamba, 2022; Villacis et al., 2022). For example, Gujo and Modiba (2025) identified a strong link between inaccessibility to adequate food and food insecurity, particularly in African households. The findings and arguments presented

above align with Sen's entitlement theory, which fundamentally approaches food security from an access perspective (Dula et al., 2024; Iyakaremye & Kabanda, 2024; Musonza & Hlungwani, 2024; Peprah et al., 2025). The theory asserts that food insecurity primarily impacts those lacking adequate food access.

4.3.2.3 Food Utilization

This aspect of food security is shaped by individuals' health status, including hygiene and sanitation, water quality, and the safety and quality of food effectively utilized by the body (Dula et al., 2024). Figure 4.3 shows that 267 (67%) households reported experiencing illness, indicating that many of the population may not consume nutritious food. Additionally, most households reported not having access to safe water and healthy food. These findings highlight that food insecurity is a pressing issue within the surveyed population, particularly in food utilization. The lack of access to safe water, proper sanitation, and health crises further intensified food insecurity among rural households.

Similarly, Pienaah et al. (2025), in their study titled “The Role of Water and Energy in food security among smallholder farmers in Semi-Arid Ghana, found that households with ill members and those experiencing water insecurity were more susceptible to food insecurity compared to those without such challenges. This discourse aligns with Sen's entitlement theory, which emphasizes the quality and safety of food and its importance in ensuring health and nutrition for the population (Dula et al., 2024; Akakpo et al., 2025; Amaral et al., 2025; Simane et al., 2025).

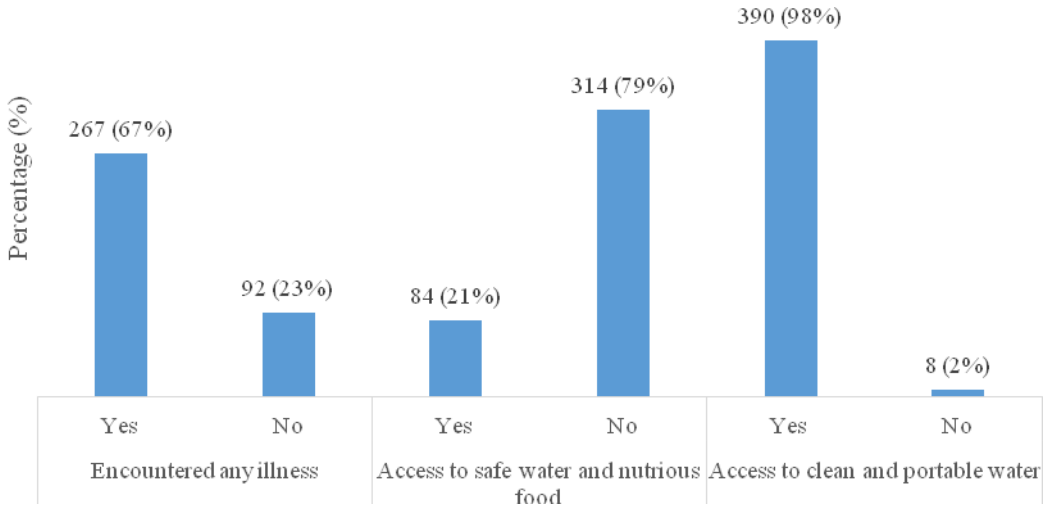

Figure 4.3: Food Utilization Related Issues

4.3.2.4 Food Stability

Food stability is closely connected to vulnerability, where various risk factors can adversely affect food availability or access (Onyeaka et al., 2024). As illustrated in Table 4.4, food stability emerged as a significant concern in the study area, with 199 respondents (50%) reporting inconsistent food availability. Additionally, 291 respondents (73%) indicated they had experienced a significant event within the past four years, with economic crises being the most commonly cited. Furthermore, most households, 378 (95%), reported being entirely unprepared to tackle future food instability crises, with no measures in place to mitigate such challenges. These findings suggest that economic instability is a major driver of food insecurity. In an interview with key informants, they disclosed that:

> "*Most households face food insecurity, even though the majority concentrate on cash crop production. The households' members surveyed are largely unaware of how to prepare for future crises. Therefore, it is essential to develop policies and programs targeting the root causes of food insecurity, including economic instability and lack of preparedness. Comprehensive interventions are needed to*

help individuals and communities build resilience and prepare for future crises" (IDI, Extension Officer, January 2025).

Table 4.4: Food Stability-related Issues

Food stability indicators	Response	N (%)
Encountered inconsistent food availability	Yes	199 (50%)
	No	199 (50%)
Encountered major events the past four years	Yes	291 (73%)
	No	107 (27%)
Varieties of events experienced.	Persistent drought	119 (30%)
	Economic crises	199 (50%)
	Declines in cash product prices	80 (20%)
Readiness for addressing future crises.	Nothing	378 (95%)
	Growing crops that are resilient to drought.	20 (5%)

Source: Field Data, 2025

Despite the challenges of food instability, the findings emphasize the need for a comprehensive approach to address food insecurity as a multifaceted issue. These findings align with Miladinov (2023), who highlighted food instability, characterized by unpredictable access to food, as a significant driver of food insecurity in many low-income countries. Food instability stems from various factors that hinder individuals' ability to plan meals and maintain a consistent supply of nutritious food (Ogwu et al., 2024).

Notably, Sen's entitlement theory underscores the critical role of access to food, asserting that even when food is available and stable, individuals may be unable to obtain it if they lack the necessary means (Obodai et al., 2024). The theory emphasizes that food stability and security can only be achieved through sustainable entitlements, enabling individuals to convert resources into food (Onyancha, 2024).

The theory further explained that famines do not occur because of insufficient food but because people lack access to adequate food (Onyancha, 2024).

4.3.3 Awareness of Food Security among Household Heads

The observations on the level of awareness among rural households in Kilwa District regarding food security are presented in Figure 4.4. The data indicate that 256 (64%) of rural households are familiar with the food security concept and its four basic components (adequacy, accessibility, stability of food supply, and sustainability of food procurement). In comparison, 124 (31%) had no awareness of it and its four fundamental components of food security. Additionally, 18 (5 %) have heard of food insecurity but lack a clear understanding. Most of those familiar with the concept of food security have experienced the consequences of food insecurity.

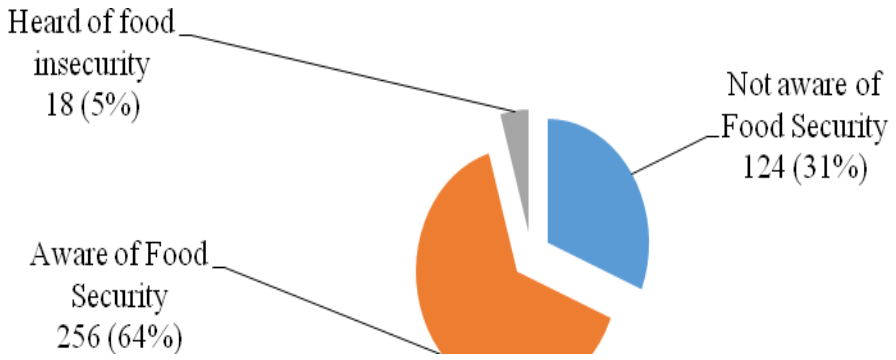

Figure 4.4: Household Respondents on Food Security Awareness

Interviews with key informants expressed that few organizations in the study area educate the community about food security. In line with the raising community awareness on food security, the respondent stated that:

> *"Currently, there are inadequate efforts by the government to address food insecurity in the study area. Effectively tackling food insecurity in rural households in Kilwa requires a collaborative approach involving*

> *government agencies, non-governmental organizations, civil society groups, and private sector actors. This intersectoral collaboration will enable stakeholders to combine their expertise, resources, and networks to implement holistic and sustainable solutions to food insecurity. Fostering coordination, innovation, and collective action through these partnerships will be very vital for strengthening food security initiatives and improving household food security in Kilwa"* (IDI, Community Development Officer, January 2025).

Furthermore, they emphasized the importance of regular knowledge-sharing and training sessions on food security to enhance understanding and awareness. Another informant echoed this sentiment, highlighting the need to promote community capacity building on food security:

> "*Enlighten food security at the community level is vital, as it in addressing household food insecurity, supports good health among their members, and encourages sustainable food production*" (IDI, Extension Officer, January 2025).

These testimonies highlight the significance of raising awareness about food security, as they emphasize the importance of producing food sustainably to attain food security. This finding corroborates Jay's (2023) assertion that literacy empowerment programs expand food entitlement and enhance households' capacity to secure food sustainably. It highlights the critical role of education and skill development in strengthening individuals' entitlements, arguing that knowledge and information are pivotal in accessing and effectively utilizing available resources. The findings align with Amartya Sen's Entitlement Theory, which posits that knowledge dissemination and capacity building bolster households' production capabilities (Kipchumba et al., 2025). These advancements expand their entitlements through improved trade opportunities and financial stability, thereby directly enhancing food security.

4.3.4 Awareness of Consequences for Household Food Insecurity

Figure 4.5 shows that 233 (59%) of the household participants were reported to be aware of the significant consequences of household food insecurity, 153 (38%) were unaware, and 12 (3%) had never heard of it. Some of those who are familiar with the concept of food security reported to have contacted the extension officers and have experienced food insecurity consequences

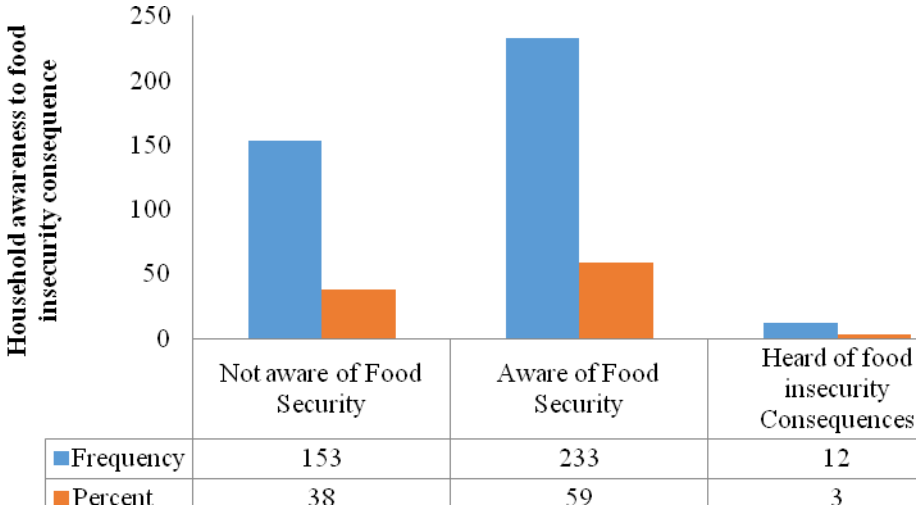

Figure 4.5: Household Respondents on Awareness of the Consequences of Food Insecurity

4.3.5 Coping Strategies for Household Food Insecurity

Most of the selected respondents 225 (56%) were aware of the various measures to combat household food insecurity and the reasons behind the high prevalence of food insecurity in the study area (Figure 4.6). To address food insecurity, households implemented various coping strategies. According to Figure 4.7, twenty percent (20%) of the households resorted to borrowing food or seeking assistance from neighbors. This indicates a reliance on social networks and community support during food insecurity. Additionally, about 18% reduced the number and frequency

of meals, potentially skipping breakfast, lunch, or dinner to extend their limited food supply.

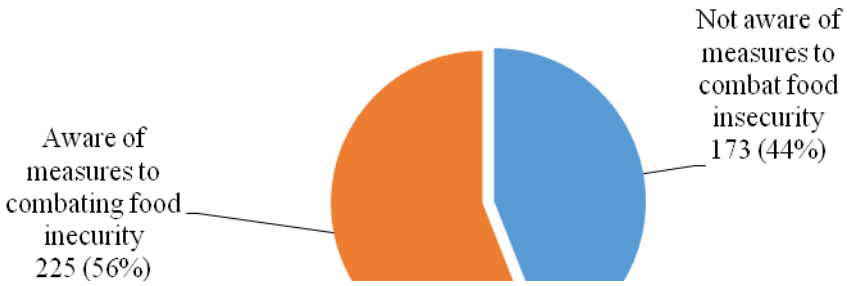

Figure 4.6: Household Respondents on Awareness of Combating Food Insecurity

Approximately 11% relied on less preferred, affordable food, 9% reduced portion sizes during meals, and 8% consumed foraged food, commonly known as *Ming'oko*. Notably, around 50% of the households combined multiple coping mechanisms such as borrowing, rationing meals, and cutting meal frequency.

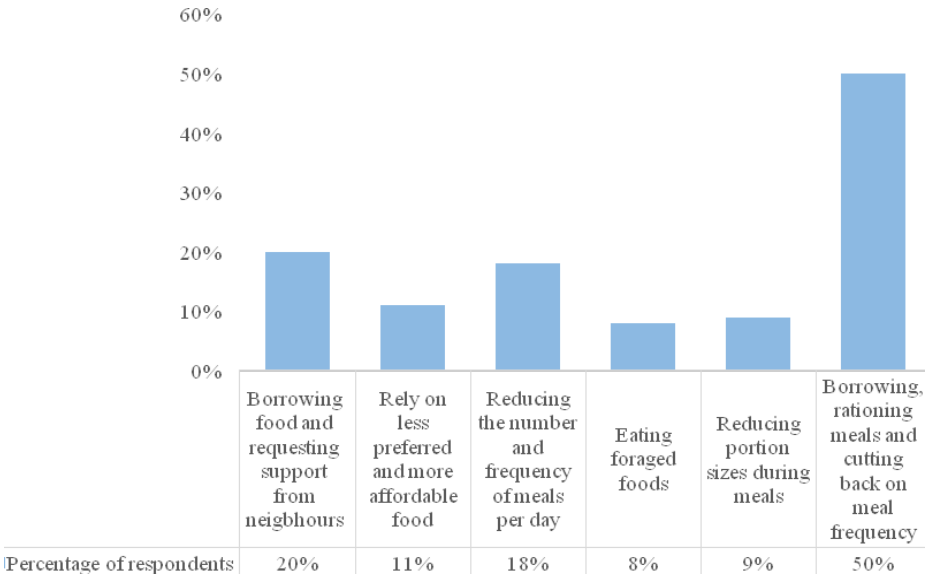

Figure 4.7: Coping Mechanism

Additionally, during the key informant interview, a participant stressed that.

> "*Some households resorted to selling assets to purchase food, borrowing money at high interest rates, depending either partially or entirely on aid, and sending household members elsewhere in town to work as housemaids. In extreme cases, individuals were compelled to adopt desperate measures such as begging*" (IDI, Agricultural Officer, January 2025).

The findings resonate with Moyo's (2024) observations, which indicate that starvation occurs when individuals' entitlement sets fail to provide adequate access to subsistence-level food. This perspective is consistent with Amartya Sen's Entitlement Theory, which asserts that complete entitlement failure often forces individuals to depend on transfer-based entitlements as an alternative means of sustenance (Arya et al., 2023; Moyo, 2024).

4.3.6 Access to Resources to Purchase Food

The study aimed to determine whether farmers possessed sufficient resources to ensure food security for their families. As shown in Figure 4.8, the findings revealed that 315 respondents (79.1%) lacked adequate financial resources, while 83 respondents (20.9%) reported they had sufficient financial resources. Consequently, most households were found to lack the financial capacity to provide food for their families. These findings align with the Heaton (2022) survey, which highlighted that most people in sub-Saharan Africa live on less than two dollars a day "a situation similarly reflected among the majority of the population in Kilwa". Similarly, Daniel (2024) and Mildred (2024) argued that limited financial resources significantly constrain households' ability to purchase food from the market. This perspective aligns with Sen's Food Entitlement Theory, which emphasizes the distinction between food availability and access, asserting that food may be readily available in

markets, yet individuals might lack the purchasing power to acquire it (Sunu, 2024; Akakpo et al., 2025).

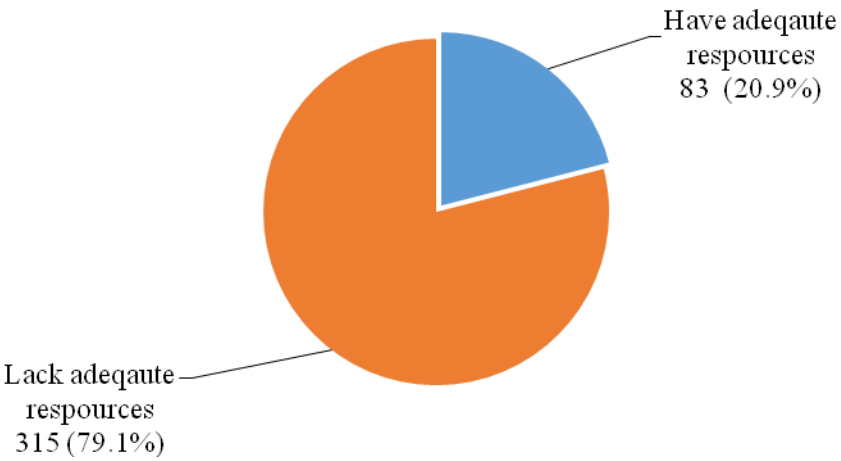

Figure 4.8: Household Access to Resources to Purchase Food

4.3.7 Agricultural Extension Services to the Household Respondents

The findings in Figure 4.9 show that, extension services to the respondents were low in the cropping season of the year of study 2023/2024 in which only 84 (21%) of the respondents were visited by agricultural extension services and received advice on farming system (*shamba darasa*).

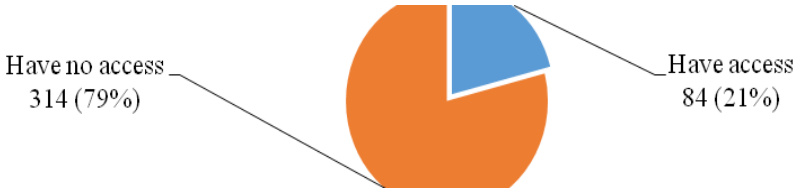

Figure 4.9: Household Agricultural Services, and Extension Services

On the other hand, most household respondents, 314 (79%), reported not receiving any extension services throughout the season. This analysis reveals that agricultural

extension services available to the respondents were limited, posing a significant obstacle to agricultural development and contributing to the issue of food insecurity in the study area. Similarly, Tilumanywa (2021), in their study on improving agricultural support services for smallholder farmers in Tanzania, highlighted that limited access to inputs and timely agrarian extension services to stakeholders, particularly smallholder farmers, significantly hampers progress in agricultural intensification, thereby compromising food security.

Interviews with key informants from NGOs expressed that there are very few agriculture extension officers in the study area to raise community awareness of sustainable agriculture and food security. The respondent stated that:

> "*Most farmers in the study area have never received extension services due to several significant challenges. These include the ineffective transfer of knowledge from research to practical application and inconsistent access to agriculture extension services provided by local governments. This gap in support has hindered their ability to improve agricultural practices and ensure food security*" (IDI, Agricultural Officer, January 2025).

Building on the anecdotes and research findings, access to extension services must be intensified. This would involve equipping farmers with knowledge and skills in sustainable practices to enhance land productivity while promoting the adoption of improved production methods and advanced agricultural technologies. The arguments are consistent with Amartya Sen's Entitlement Theory, which stresses that improving food entitlements involves expanding adults' knowledge, skills, and farming capabilities (Sunu, 2024; Kipchumba et al., 2025). This can be achieved through literacy training and agricultural extension programs.

4.3.8 Farming Technologies of the Households

Both field and crop rotations generally characterize the farming system among surveyed rural households in Kilwa District. Figure 4.10 illustrates the percentage of food production technologies used in the study area. As shown in the figure, approximately 356 (89%) of respondents relied on hand hoes, 27 (7%) used oxen hoes, and only 15 (4%) employed tractors for farm cultivation. Overall, food crop production technology in the area was underdeveloped. Most respondents relied heavily on manual labor and basic tools, such as machetes (*panga*), hand hoes, and axes for various farming operations. This indicates that family labor was the predominant source of the workforce in the study area. During the key informant interview, one participant emphasized that:

> *"The absence of on-farm technological innovation and the failure to adopt advanced agricultural technologies in this area have significantly reduced food productivity among households. This challenge has led to persistently low yields, further aggravating food insecurity by limiting households' ability to meet their nutritional needs and secure sustainable food availability*" (IDI, Agricultural Irrigation Officer, January 2025).

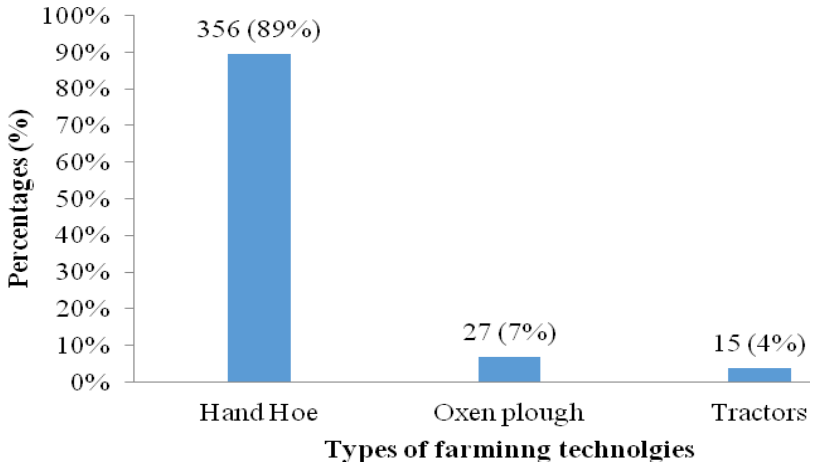

Figure 4.10: Types of Farming Technologies used by Household Farmers in the Study Area

Similar findings were reported by Gwambene et al. (2023) when discussing the reasons behind agricultural production challenges and food insecurity. They noted that farming technology in Tanzania is generally underdeveloped, with most cultivation carried out using hand hoes and rarely by oxen or tractors, compromising food production and security. Similarly, Munguti et al. (2024), in their study on food production and security in East Africa, observed comparable trends and reported that the continued reliance on outdated and inefficient farming technologies, particularly the use of hand hoes, presents a significant obstacle to improving agricultural production and productivity. Furthermore, another interview participant, in addressing these challenges, stressed that:

> *"In improving household food production and security, the government and development partners should prioritize investing in modern agricultural technologies and infrastructure, ensuring that farmers have access to affordable tools and training. Additionally, they should strengthen extension services to facilitate knowledge transfer and promote sustainable farming practices at the local level"* (IDI, Extension Officer, January 2025).

This testimony aligns with Aguti (2023), who emphasized that enhancing sustainable farming practices requires government and development partners to invest in infrastructure. Promoting literacy among small-scale farmers is crucial to accessing information on modern and advanced agricultural practices and technologies (Mapiye et al., 2023). The anecdotes and argument above align with Amartya Sen's Food Entitlement Theory, which emphasizes the significant role of skills and technology in addressing food security (Hamdi, 2023; Akakpo et al., 2025). It suggests that inadequate literacy or skill levels and limited access to agricultural technologies heighten vulnerability and worsen food insecurity among rural households within the study area.

4.4 Social and Economic Determinants Affecting Food Security

The likelihood ratio chi-square (χ^2) of 348.978, with a p-value of 0.000, indicates that the model as a whole is statistically significant. This signifies that the model, containing all explanatory variables, is meaningful and that the variation in food security status is attributable to the sample's specified social and economic characteristics. Overall, the model explained 68.2% of the variance in household food security status (Cox and Snell R Squared) and 93.7% (Nagelkerke R Squared) while correctly classifying 96.7% of all cases.

Eleven explanatory variables were identified as potential determinants influencing food security in the study. The social determinants included the sex of the household head, the age of the household head, their education level, marital status, household size, access to social safety nets, and the hours spent working on house farms. In contrast, the economic determinants comprised household farm size, the household head's total annual income, the household head's total annual off-farm income, and access to credit. Both social and economic variables were tested for their significance at a 5% significance level. Table 4.5 presents the results of the binary regression model and the goodness-of-fit measures and highlights the complex social and economic determinants affecting rural households' food security in Kilwa District.

Table 4.5: Binary Logistic Regression Analysis Determining the Social and Economic Determinants Affecting Households Food Security

Determinant	Independent Variables	Estimated Coefficient (β)	Standard Error (SE)	Significancy P –value
Social	Household Head sex	-1.431	1.559	0.35860
	Age of Household head	-0.123	0.035	0.00039**
	Educational level of Household head	-0.339	0.171	0.04787**
	Marital status of Household Head	-2.44	0.715	0.00064**
	Household access to Social Safety nets	31.593	954.265	0.97359
	Household Size	3.998	1.212	0.00098**
	Hours spend in Household farms	0.053	0.199	0.79140
Economic	Household farm size	-0.749	0.176	0.00002**
	Household head annual income	-0.00002	0.000004	0.00000**
	Household off-farm annual income	-0.00006	0.000027	0.03783**
	Household access to credit	-18.805	7.0276	0.00745**
	Constant	-22.915	1908.487	0.99042
	Number of observations		398	
	Chi-square		348.978	
	2 Log likelihood		-47.4896	
	Cox & Snell R Square		0.682	
	Nagelkerke R Square		0.9368	
	Correctly predicted		96.72	

** indicate significance at the 5% level

The binary logistic regression analysis revealed that social and economic determinants are associated differently with food security in the study area. Of the eleven variables included in the model, eight significantly impacted household food security. These were the household head's age, education level, marital status, household size, household farm size, the household head's total annual income, the household head's total annual off-farm income, and access to credits.

4.4.1 Social Determinants Affecting Food Security

As presented in Table 4.5, four of the seven social variables identified as potential determinants of household food security were negatively correlated with rural

households' food security. However, only four variables "the age of the household head, education level, marital status, and household size" were found to be statistically insignificant. A detailed discussion of the relationship between the predictor variables and their connection with household food security is provided below.

4.4.1.1 Sex of the Household Head

The gender of the household head plays a vital role in household food security. The results in Table 4.5 show that the sex of a household head showed a negative but insignificant influence ($\beta = 1.35$; $p > 0.05$) on food security. The study indicates that despite household heads having similar visible characteristics, the invisible qualities account for the differences in food security levels. As a result, male-headed households were less food insecure and may reflect male dominance in access to productive resources compared to their female counterparts in the study area. This suggests that women and men have differing personal endowments such as land, credit, and non-tangible things such as education, with women exhibiting a lower sense of entitlement, consequently affecting food security. A key informant, during the interview emphasizing gender disparity in food security, stated that,

> "*Households headed by women in the study area are more likely to experience food security compared to those headed by men. Women face many marginalization and constraints, often embedded in norms and practices. They are discriminated against access to productive resources, such as land and services, such as credit, household and agricultural decisions, participation in community affairs and leadership, education and productive employment*" (IDI, Extension Officer, January 2025).

These results align with the study by Ogunniyi et al. (2021), which investigated the association between food security and the gender of the household head in rural

Nigeria. Consistent with a previous study that has found a negative association between the gender of the household head and food security, female-headed families are more likely to achieve food security than male-headed households (Ashagidigbi et al., 2022).

Moreover, other authors have argued that gender disparities in entitlement contribute to a systematic bias against women in accessing productive assets, such as land, compared to men (Galiè et al., 2015; Gavrilovic et al., 2018; Mozahem et al., 2021; Aziz et al., 2025). This disparity exacerbates women's vulnerability to food insecurity. In line with the Food Entitlement theory, food security is influenced by personal endowments, "resources that individuals legally own, such as houses, land, and intangible goods," along with their ability to access additional resources through trade and production (Kosec et al., 2024). Consequently, a decline in the endowments of women-headed households significantly contributes to food insecurity (Garnaik, 2025).

4.4.1.2 Household Head Age

The age variable plays a crucial role in this study because it influences the extent of households' farming experience and their understanding of food security. The age of the household head showed a significant negative influence ($\beta = -0.123$; $p < 0.05$) on food security (Table 4.5). These results indicate a negative relationship between the households' age and food security. A unit increase in the age of the household head, with all other predictor variables held constant, will decrease the probability that the household is food secure by 0.123. This may be due to the decline in productivity experienced by older household heads as they age. It is likely that older individuals

face greater challenges in working and often reside with their grandchildren, who provide only minimal contributions. This was supported by interview findings, where participants suggested that:

> "*Food-insecure households often had older heads, noting that aging reduces their productivity and ability to engage in labor-intensive farming activities resulting in lower agricultural yields and limited food availability. Moreover, older household heads face difficulties in accessing modern farming resources and frequently care for dependents who contribute minimally, which exacerbates financial strain. They emphasized that these combined determinants render such households particularly vulnerable to food insecurity, underscoring the importance of targeted interventions"* (IDI, Community Development Officer, January 2025).

In line with the above testimony, another key informant stressed that:

> *"Households led by younger individuals tend to be more food secure due to their energy and ability to cultivate larger farms than older and weaker household heads. Additionally, young household heads can seek and secure off-farm jobs and income more effectively, thereby addressing food insecurity"* (IDI, Extension Officer, January 2025).

This result corroborates the findings by Assenga and Kayunze (2020), who discovered that households with older heads were more food insecure. Iyakaremye and Kabanda (2024) also identified a significant negative correlation between household food security and the age of the household head, indicating that as the head's age increases, household food security decreases. This implies that older household heads are particularly susceptible to food insecurity due to a reduced labor capacity compared to their younger counterparts (Gebissa & Geremew, 2022). This observation aligns with Amartya Sen's food entitlement theory, which posits that food security is contingent not merely on food availability but on the entitlements, "the rights and capacities" that enable individuals to acquire it (Naz et al., 2023). For

elderly household heads, the diminished labor force restricts their ability to produce, exchange, or purchase food, narrowing their entitlement set and increasing their vulnerability to food insecurity.

4.4.1.3 Household Head Education Level

Years of schooling showed a negative and significant influence ($\beta = -0.339$; $p < 0.05$) on food security (Table 4.5). A decrease of one year of schooling, with all other predictor variables held constant, will decrease the probability that the household is food secure by 0.339. However, this is surprising because it is generally expected that households headed by individuals with more education are more food secure than those with fewer years of schooling. This can be partly explained by the finding that, in the sample of households surveyed, only 11.6% of the household heads had gone beyond primary school.

According to this study, households headed by illiterate individuals are more exposed to food insecurity. This suggests that variations in personal endowments, with a particular emphasis on non-tangible resources such as education and skills, result in households with illiteracy or low levels of education being more prone to food insecurity than those with higher literacy levels. The results are similar to other findings by Ogunniyi et al. (2021) and Araque-Padilla and Montero-Simo (2025).

Moreover, other authors have argued that the lack of educational endowments, including illiteracy, restricts access to advanced food production resources and technology, thereby undermining household food security (Mengistu & Kassie, 2022; Tigistu & Hegena, 2022; Yaqoob, 2023). Illiteracy and a lack of education

hinder agricultural productivity and directly contribute to food insecurity. This is consistent with the Food Entitlement theory, which suggests that food security is influenced by personal endowments, including literacy and professional skills, as well as access to agricultural extension programs (Iyakaremye & Kabanda, 2024; Kipchumba et al., 2025). As a result, a decline in individual educational endowments can significantly intensify food insecurity (Ahmed & Haque, 2023; Chandra, 2025).

4.4.1.4 Marital Status of the Household Head

Household head marital status was found to have a negative relationship with household food security ($\beta = -2.44$; $p < 0.05$), which was significant at the 5% level (Table 4.5). This finding revealed that households headed by unmarried individuals have a decreased chance of being food secure than those headed by married individuals. Unmarried individuals and widows will likely have smaller family units, which may restrict the available labor needed to enhance participation in farming and non-farming activities, ultimately impeding efforts to increase food production and improve food security (Fasakin et al., 2024).

Conversely, other authors have argued that population growth will likely increase in married households, expanding the labor force. This increased labor capacity enables greater participation in farming and non-farming activities, boosting food production and enhancing food security (Tesgera et al., 2024). Peprah et al. (2025) reported similar findings, suggesting that an unmarried status may increase food insecurity for individuals, as it limits the opportunity for spouses to share their labor and resources to strengthen household food stability. In line with the Food Entitlement theory, food security is influenced by the availability of labor and the household's capacity to

access and distribute food efficiently (Iyakaremye & Kabanda, 2024). A shortage of labor leads to entitlement failure, thereby undermining food security.

4.4.1.5 Household Size

The results suggest that household size is positively related to food security (β = 3.998; $p < 0.05$), and the relationship is statistically significant at the 5% level (Table 4.5). Larger households are more likely to be food secure because multiple members can generate income, reducing dependency on the household head. It implies that the larger the family size, the more likely the farmer is to achieve food security, as the household has more labor available to work on the farm. This study supports the findings by Mwanga (2019), which indicate that larger households, akin to family labor, have the potential for greater food production and security. Aligning with the Food Entitlement theory, it highlights that food security is influenced by the availability of labor and the household's ability to access and distribute food effectively (Kehinde et al., 2021; Nontu et al., 2024). Thus, larger households must secure sufficient entitlements to ensure adequate food access for all members, emphasizing the importance of production and access in achieving food security.

4.4.1.6 Household Access to Social Safety Nets

The results show that the social safety nets of the household head have a positive estimated slope coefficient but an insignificant influence (β = 31.593; $p > 0.05$) on food security (Table 4.5). A unit increase in the social safety net of the household head will increase the probability that the household is food secure by 31.593. Social safety nets can also affect the food security status of a family in the study area. An emergency food aid program is a prime example of safety nets (Derso et al., 2021).

Often, poverty reduction plans in developing countries are included in these programs (Dejene & Cochrane, 2022).

The formal forms of these programs include food aid to the poor, public provisions, and formal credit and saving schemes (Awoke et al., 2022). A safety net, recognized as a key variable in transfer entitlement, is crucial in household capital formation, strengthening household food security. The study suggests that social safety nets, far from being merely residual welfare measures to address temporary livelihood shocks, serve as significant mechanisms for improving food security. This aligns with Sen's Food Entitlement theory, which emphasizes that safety net transfers positively impact food security (Mildred, 2024; Peprah et al., 2025).

4.4.1.7 Hours spend by Household Members

Time spent by household members on the family farm showed a positive but insignificant influence ($\beta = 0.053$; $p > 0.05$) on food security (Table 4.5). An increase of one hour spent by household members on the family farm, with all other predictor variables held constant, caused an increase in the probability of the household being food secure by 0.053. This implies that food security increases as household members, including children, increase hours spent on family labor powers on the family farm. This finding is supported by Kilwa District Agriculture and Extension Officers and Planning Officers, who reported that,

> "*In most of our rural households, family labour power is predominant in the study area. Household members, including children, contribute to food security as they each work on their farms and support the family farm. For example, in rural areas, children often do household chores and assist with work on the family farm"* (IDI, Extension Officer, January 2025).

This result corroborates an argument by Stellmacher and Kelboro (2019), who highlighted that the efficient and effective use of agricultural labor is regarded as an investment in food production within households, as laborers often contribute by working on household farms and enhancing food security. This aligns with Sen's Food Entitlement theory, which emphasizes that the adequate and efficient use of labor power or a person's (or household's) 'endowment' enhances household food security (Devereux, 2012; Neglo et al., 2021; Tenzing, 2022; Mumed & Zeleke, 2024; Peprah, 2025).

4.4.2 Economic Determinants Affecting Food Security

Table 4.5 above shows a negative correlation between the economic variables and household food security. All four variables intended to determine household food security were statistically significant. These variables include household farm size (in acres), household annual income from agricultural production (in TSH), household off-farm annual income (in Tanzania Shillings), and household access to credit. The detailed relationship between the predictor variables and their connection with household food security is discussed below.

4.4.2.1 Total Size of Land Cultivated

The size of cultivated land (in care) exhibited a negative significant influence on food security ($\beta = -0.749$; $p < 0.05$) (Table 4.5). With all other predictor variables held constant, a decrease of one hectare of cultivated land led to decreases in household food security. This suggests that most households have access to only small plots of cultivated land, significantly hampers their ability to achieve food security. The limited farmland size restricts the scale of food production, leaving

households unable to produce sufficient quantities to meet their nutritional needs or maintain a stable food supply. This reliance on minimal farmland size exacerbates the challenges of ensuring both adequate and sustainable food availability for these households. During the interview, participants explained that the limited size of farmland available for agriculture, which exacerbates food insecurity, is restricted due to the lack of advanced agricultural technology. The respondents emphasized,

> *"We have vast areas of arable land, but we are unable to increase the size of farms for food production because most rural households carry out various farming operations manually. These operations include land preparation, cultivation, planting, harvesting, and storage. In our ecological setting, expanding and opening new farms is costly, as it involves clear-felling large trees and uprooting tree stumps. Most of us lack the machinery needed to carry out these tasks; instead, we primarily rely on traditional agricultural tools such as machetes, axes, and hoes. Under such circumstances, we are limited in our ability to expand our farms and, as a result, we continue to cultivate only small plots of land, primarily for subsistence, which compromises food security"* (IDI, Agricultural Officer, January 2025).

These results are consistent with Li et al. (2021) and Imathiu (2021), who also observed that food security diminishes with a decrease in the size of cultivated land. Herrera et al. (2021) stated that smaller land sizes had poorer chances of achieving food security. Wolde et al. (2020) found a close nexus between food security and land use, contending that total cultivated land significantly impacts food insecurity. Moreover, Mekonnen et al. (2021) argued that households with a larger land size tend to have better production, thus providing a greater chance for the household to achieve food security. The results and their arguments align with Amartya Sen's Food Entitlement theory (Nkomo, 2023). They elucidate that food insecurity is not exclusively the result of the decline of personal endowments, such as land, possessed by many farming households, but also arises from constrained access to adequate

productive resources (Md et al., 2022; Nkomo, 2023; Sunu, 2024).

4.4.2.2 Total Household Annual Income

The results suggest that household income levels were negatively related (β = -0.00002; $p < 0.05$) to food security, and this relationship was significant at the 5% level (Table 4.5). This suggests that food security tends to decrease as household income levels increase. A decrease in household income increases the probability of food insecurity by 0.00002. This outcome was expected, as a decrease in income, all other determinants being equal, leads to reduced food accessibility and increased instability. The findings are consistent with similar studies on food security, such as those by Rashid et al. (2024), who found a negative impact of household income on food security. The findings are corroborated by the research of Nkoko and Swanepoel (2024), which underscores that lower household income levels compromise food stability, limit access to adequate food, and thus heighten the risk of food insecurity.

Similarly, Gwacela et al. (2024) discovered that households with low incomes experienced higher levels of food insecurity than those with higher incomes. The arguments align with Amartya Sen's Food Entitlement theory, which posits that food insecurity stems from people's inability to acquire food rather than the mere availability of food itself (Ahmed & Haque, 2023; Arya et al., 2023; Hamdi, 2023; Mildred, 2024; Ngassam, 2025; Streimikiene, 2025). Purchasing power is recognized as a critical factor in this capability. The entitlement approach sheds light on how income, as purchasing power, is utilized to achieve food security, emphasizing the

significance of both 'what is earned' (cash) and 'what is purchased' as essential components of household food provisioning and security (Mildred, 2024).

4.4.2.3 Total off-farm Income

The analysis revealed a significant negative relationship between off-farm income and the food security status of rural households ($\beta = -0.00006$; $p < 0.05$) (Table 4.5). The results indicated that a factor of 0. 00006 decreases the probability of the household being food secure in the study. The anticipated adverse effect of this variable was expected, as farmers tend to devote more time to off-farm activities, compromising the attention given to their farming practices. Plausibly, the income they derive from off-farm activities falls short of sufficiently offsetting the reduced earnings from agriculture and, in due course, compromises their food security. The key informants stressed this during the interview,

> "*Off-farm activities in the district are limited and often subject to economic uncertainties. If the income earned from off-farm activities by household members is not sufficient to compensate for the loss of income or food production from farming, households may find it difficult to purchase enough food or maintain a nutritious diet, thereby worsening their food security*" (IDI, Extension Officer, January 2025).

It implies that the absence of participation in off-farm activities reduces the likelihood of food security among rural households. This suggests that households not engaged in off-farm activities lack additional income and are more likely to experience food insecurity. It supports the argument that poor households' engagement in off-farm income faces constraints that impact rural household food security (Tesafa et al., 2023). These results are consistent with previous studies by Endiris, et al., (2021) and Mapunda (2024), which found that the limited

participation of rural households in off-farm activities undermines their food security. The arguments align with the Food Entitlement theory, suggesting that income derived from off-farm activities supplemented farmers' earnings, enhanced their purchasing power, and consequently improved their food security (Muzerengi, 2021; Arya et al., 2023; Maziya, 2023; Achieng, 2024; Prabhakar, 2025).

4.4.2.4 Household Access to Credit

Table 4.5 illustrates the impact of credit access on the food security of rural households. The findings suggest a negative relationship between a household's access to credit and food security ($\beta = -18.805$; $p < 0.05$), with the association being statistically significant at the 5% level. Quite unexpectedly, the coefficient for access to credit was significantly negative, suggesting that households with little or no access to credit sources were more likely to experience food insecurity. A potential explanation for the negative impact of access to credit is that small loans are often not provided promptly and are not effectively utilized for productive purposes. This suggests that providing and expanding credit services in rural areas does not automatically yield positive outcomes. During interviews with key informants, it was articulated that:

> *"Due to the limited availability of credit sources, the majority of credit recipients in the study areas depend on informal credit from individuals, businesspeople, and traders, often at excessively high interest rates. These elevated rates substantially diminish the effectiveness of credit and increase the risk of adverse impacts on the overall food security of rural households. Furthermore, the lack of timely access to limited credit reduces the chances of households obtaining essential production inputs, such as seeds, chemicals, and fertilizers. This shortfall hampers production and has a detrimental effect on the food security situation of these households"* (IDI, Community Development Officer, January 2025).

Furthermore, another interview participant emphasized that,

> *"Household access to resources could improve the food security of rural households by alleviating the liquidity constraints they face. To achieve meaningful outcomes, it is crucial to provide recipients with credit from formal financial institutions and the necessary knowledge and awareness to utilize financial resources efficiently and productively"* (IDI, Extension Officer, January 2025).

Therefore, household access to credit was anticipated to correlate positively with food security status. A possible explanation for this negative impact of access to credit could be that even small loans obtained are not effectively put to productive use. This implies that the mere availability and expansion of credit services in rural areas do not automatically lead to positive outcomes unless recipients have the knowledge and awareness to utilize financial resources productively. These results align with the findings of Ogunniyi et al. (2021), which indicate that the lack of access to credit hampers the food production of rural households, thereby diminishing their food consumption patterns and negatively impacting their food security.

The findings are consistent with Amartya Sen's Food Entitlement theory, which asserts that individuals' entitlements shape food security, comprising their resources, income, and access to economic opportunities such as financial credit (Korir, 2022). Access to credit emerges as a critical factor in this context, as its availability empowers households to invest in agricultural production and income-generating activities, thereby strengthening their purchasing power and ensuring greater food security (Diriba, 2024; Makinde, 2024; Osei, 2024). This demonstrates the interconnectedness between credit accessibility and food security, as proposed by the entitlement approach (Mukamana, 2025; Prabhakar, 2025).

CHAPTER FIVE

SUMMARY, CONCLUSION, AND RECOMMENDATION

5.1 Chapter Overview

This chapter presents the study's summary, conclusion, and recommendations. The study's specific objective guides the presentation: to raise awareness of household food insecurity and the social and economic determinants influencing its persistence.

5.2 Summary

This study, titled 'Socio-economic Determinants Affecting Rural Households' Food Security in Kilwa District, Lindi, Tanzania,' is guided by three specific objectives: awareness of household food insecurity and the social and economic determinants influencing the persistence of household food insecurity.

Additionally, considering the nature of these specific objectives, the study was underpinned by Sen's Food Entitlement Theory in assessing socio-economic determinants affecting rural households' food security. The identified specific objectives guided the literature review, making references from global to regions such as North and South America, the Caribbean, Europe, Australia, and the Pacific Islands. Furthermore, locations such as Asia, Sub-Saharan Africa, the Southern African Development Community, and the East African Community regions were also examined about other regions.

In the current study, households participated in assessing their awareness of food security, as well as variables such as household head gender, age, education level, marital status, household size, household access to social safety nets, hours spent by

household members, farm size, monthly income, household off-farm income, and access to credit, among others. These variables were used to assess the effect of socioeconomic determinants on food security, guided by quantitative and qualitative approaches, respectively, in the study area.

It is worth noting that this study adopted a pragmatic philosophy. Additionally, a sample size of 398 households and 20 key informants participated in this study. Data were collected from male and female household heads, District Agricultural and Extension Officers, Planning Officers, and NGOs operating in agriculture and food security in the district.

5.2.1 Food Security Status and Awareness among Household Heads

Food insecurity remains a significant issue, with the majority of households (274 out of 398 (68.8%)) being food insecure, while only 124 households (31.2%) are food secure. Approximately 338 respondents (85%) rely on their farms for food, yet most households lack the financial capacity to provide for their families adequately. Only a small number, 60 households (15%), purchase food from the market, and merely 123 respondents (31%) are self-sufficient in food. Moreover, food diversity is low, as evidenced by 314 respondents (79%) reporting limited variety and over 275 households (69%) experiencing food shortages.

Additionally, 199 respondents (50%) reported inconsistent food availability. While more than half of the surveyed rural households (64%) are familiar with food security and its implications, 36% remain unaware. Despite this awareness, government efforts to tackle food insecurity in the area have been inadequate. A lack

of access to extension services has been a significant barrier, with 314 farmers (79%) never receiving such support. This has hindered their ability to adopt improved agricultural practices to secure household food.

Furthermore, the absence of on-farm technological innovations and the failure to implement advanced agricultural technologies have notably reduced food productivity among households in the study area. The findings strongly align with Amartya Sen's entitlement theory, which posits that knowledge and insights enhance households' production capabilities. This improvement in individuals' access to food is rooted in their 'entitlement set,' which takes various forms and leads to the capacity to transform resources into an adequate food supply. The theory highlights the vital role of entitlements in securing food for rural households.

5.2.2 The Effect of Social Determinants on Food Security

The findings recount that the age of the household head had a notably significant effect on food security, with an older head decreasing the household's chances of being food secure. Education levels showed a similar trend, where lesser-educated heads significantly increased vulnerability to food insecurity. The sex of the household head showed a negative but insignificant influence on food security, indicating that male-headed households were less food insecure. This may reflect male dominance in access to productive resources compared to their female counterparts in the study area. Marital status also played a role, with unmarried household heads less likely to ensure food security. In contrast, larger households, with multiple members contributing to income, had a significantly better shot at being food secure.

Access to social safety nets and the hours household members spent working on the family farm had positive, though not statistically significant, impacts on food security. These elements suggested that while they can bolster food security, their effects were not markedly substantial in this study. The findings align with Sen's Entitlement Theory, which emphasizes that food security is influenced by social determinants affecting household members, determining the entitlements “namely, the set of commodities” they possess and control.

5.2.3 The Effect of Economic Determinants on Food Security

Economic determinants, such as the size of cultivated land, exhibited a significantly negative influence on food security. Household income levels were also significantly negatively related to food security. Off-farm income significantly influenced household food security, while access to credit showed a significant negative relationship with food security. All economic variables were important at the 5% level. These findings suggest that these determinants negatively impact household food security in rural households, with their effects in this context being statistically significant. The findings are consistent with Sen's Entitlement Theory, which asserts that food security is determined not solely by overall availability but also by economic determinants affecting household members, who form entitlement sets based on the combination of resources and endowments they use to secure food.

5.3 Conclusion

In conclusion, this study highlights that food insecurity is a serious issue among rural households in Kilwa District. Most households are food insecure, relying predominantly on subsistence farming but lacking the financial capacity to meet their

families' needs. Challenges such as low food diversity, frequent shortages, and inconsistent availability exacerbate the problem. Although about half of the respondents know food security and its implications, limited government support and inadequate extension services have hindered addressing these issues. The absence of technological innovations and modern agricultural practices has also significantly reduced productivity.

The binary logit regression findings revealed that social and economic determinants positively and negatively influence household food security at varying significance levels. Among the social variables, the age of the household head, education level, and marital status were found to negatively and significantly affect food security. In contrast, household size had a positive and significant correlation. Social safety nets, although positively correlated, had an insignificant impact. Additionally, all four economic variables, household farm size, annual incomes from agricultural production, off-farm yearly revenue, and access to credit, had a statistically significant adverse effect on household food security. These results underline the complex interplay of social and economic determinants in shaping food security outcomes, highlighting the urgent need for targeted interventions to address these gaps and improve the well-being of rural households in the region.

The findings enrich existing knowledge by demonstrating that variables such as education level, marital status, household size, and access to credit have statistically significant effects on food security outcomes. These insights advance academic discourse by highlighting the need for multidimensional approaches in future research, particularly those that integrate social and economic determinants with

local agricultural contexts. From a research perspective, the study affirms the critical role of location-specific research and mixed-method approaches in uncovering the complex realities of rural livelihoods and food insecurity. It highlights the need for continued empirical inquiry into off-farm income opportunities, gender dynamics, and financial inclusion as transformative pathways toward household resilience

Policy-wise, the findings provide a compelling case for targeted interventions that go beyond agricultural production. They advocate for inclusive, gender-sensitive programmes that promote livelihood diversification, strengthen extension services, and improve access to affordable credit. By aligning policy frameworks with the lived experiences of rural households, stakeholders can design more responsive and sustainable strategies to combat food insecurity and enhance rural well-being.

5.4 Recommendations

Based on the study's findings, the following recommendations are proposed to address food insecurity among rural households in the district

5.4.1 Recommendations to the Government

The government must foster collaboration and coordination among stakeholders (e.g., government agencies, non-profit organizations, community groups, and academic institutions) involved in food security initiatives. This collaboration should strengthen awareness campaigns on food security and sustainable agriculture through extension services, community meetings, and local media. By fostering partnerships and sharing best practices, stakeholders can leverage collective expertise and resources to enhance the effectiveness and impact of food security interventions.

This approach will ensure that all households, particularly those less familiar with the concept, are educated on the importance of food security and practical measures to achieve it. Additionally, implementing gender-inclusive educational programs targeting household heads to improve literacy and agricultural knowledge will increase their capacity to manage resources effectively and adopt innovative farming practices in response to changing needs.

Long-term rural development strategies should integrate both on-farm and off-farm sectors to address food insecurity. Engaging in off-farm activities significantly boosts household income, which can be reinvested into agricultural activities to enhance household food security. To ensure sustainable food security for rural households, an inclusive and gender-sensitive off-farm participation approach should be adopted to attract and encourage women's participation in off-farm income-generating activities. Additionally, comprehensive strategies should include location-specific studies to uncover the potential of off-farm activities in various rural areas across Tanzania, considering rural communities' agro ecological and socio-economic diversity. This can be achieved by providing educational services and recognizing and supporting specialized skills. These measures will expand alternative livelihood opportunities for households engaged in off-farm activities, alleviate their constraints, and improve their food security status.

Given the significant positive impact of access to credit on food security, it is recommended that the government, financial institutions, and policymakers collaborate to develop and enhance mechanisms enabling rural households to access credit. The microcredit scheme should be gender-sensitive, simple, flexible, and

offered at low interest rates to ensure household accessibility. This would allow financial and lending institutions to reduce barriers to credit access, enabling families to invest in off-farm economic activities. This would facilitate investments in agricultural inputs, advanced technologies, and other income-generating activities to enhance productivity and improve food security. Furthermore, lending institutions should provide affordable credit in rural areas and offer financial literacy training to help households manage loans effectively and maximize financial resources. Implementing these recommendations would allow us to address the multifaceted issues impacting food security in Kilwa District and improve the overall well-being of rural households.

5.4.2 Recommendation for Further Study

Due to time and resources limitations, this study could not be conducted in all districts of Tanzania. Therefore, it is suggested that a study be undertaken across all rural districts in Tanzania to investigate the socio-economic determinants affecting rural households' food security. Furthermore, another study should determine how each determinant highlighted in this research influences rural household food security.

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APPENDICES

Appendix I: Consent for Research Interview

I, **VERONICA STEPHEN BALUWA,** of the Open University of Tanzania, am conducting research on the socio-economic factors affecting rural households' food security in Kilwa District. Dear participant, you are kindly requested to partake in this study. Your participation is highly valued and appreciated. Please be assured that, the information collected shall remain confidential and be used only for academic purposes only. Thank you in advance for your time and assistance in this study.

Conflict of Interest The researcher and all individuals involved in this study have no conflicts of interest related to this research.

Contact Information If you have any questions or suggestions regarding this study, please contact me at phone number 0674803162 / 0621812225 or via email at verobaluwas@gmail.com

Interviewee Consent to Participate in Research Interview

I, the undersigned, hereby acknowledge that I have read/listen and understood the purpose of the research being conducted by. I willingly agree to participate in this study and understand that my responses will be treated with strict confidentiality and used solely for academic purposes.

Participant's Name: _____

Signature: _____

Date: _____

Appendix II: Questionnaire on Household Head

SECTION A: Demographic Characteristics of the Household Head

1.Name:_____2.Village:_____3.Ward name:_____

4. Date:……

5. Record of sex of the respondent ……..

6. What is your age (years)?…….

7. Schooling years…….

8. What level? Primary [ ]; Secondary [ ]; Higher education [ ] Illiterate [ ]

9. Marital status 1. Married 2. Otherwise

10. If otherwise are you? Single [ ]; Divorced [ ]; Separated [ ]; Widowed [ ]

11. Family type (1= nuclear, 0=joint).

12. What is your current occupation? Farmer [ ]; Trading [ ]; Employee [ ]; Fisher [ ]; Unemployed [ ]

13. Total household income/month in Tsh…….

14. What are sources of income?…….

15. Do you have access to credit? 1. Yes 2. No

16. How many members of the household?.....

17. How many of your household members fall in the following age group?

Table I

Age groups (in years)	Number of males	Number of females
18-30		
31-40		
41-50		
65 a 51 years and above		

18. Do gender roles within your household affect the availability of food during shortages?

1. Yes 2. No

19. Do traditional cultural practices in your community contribute to food shortages?

1. Yes 2. No

20. Do you have access to social safety nets? 1. Yes 2. No

21. Does your household's access to social safety nets improve your food security? 1. Yes 2. No

SECTION B: Farming system and Land use

22. How long have you been farming…….years (Farming experience in years)

23. How many croplands operated by the household (acres)……..

24. Tenancy status (1=land owner, 0= otherwise);

25. How did you obtain your land? 1. Inheritance [ ] 2. Purchased [ ] 3. Village/government [ ]

4. Borrowed [ ] 5. Accessed free land [ ]

26. Mention types of major food crops do you cultivate.....

27. Do you use the use of ox plough in cultivation 1. Yes 2. No

28. Do you use advanced technological in tilling the land? 1. Yes 2. No

29. What is the farming technology do you use in tilling the land? 1. Hand hoe/Manual [ ] 2. Animal [ ] 3. Tractor [ ] 4. Other specify……

30. Do you have access to agricultural extension services? 1. Yes 2. No

31. Did extension staff visit you last growing season to give you farm advice? 1. Yes 2. No

32. If yes, how many times did extension staff visit you the cropping of 2020/2021 season?

a. Frequently b. Rarely c. Not at all

33. Did you use modern farm inputs (organic or inorganic fertilizers)? 1. Yes 2. No

34. If you did not apply farm inputs, give the reasons……..

35. How much organic fertilizer did you use for the 2020/2021 in food crops (kg)……

36. Do you use improved seeds 1. Yes 2. No

37. Do you use of herbicides/ insecticides. 1. Yes 2. No

SECTION C: Level of Food Production at Household Level

38. What is your food requirement to the members of the household per year (kg)?.....

39. What are your sources of food? (a) From the household farm [ ] c. Purchased in the market [ ]

(c) Relatives and friends [ ] (d) Others (specify)……

40. How much food did you harvest in the 2020/2021; 2021/2022; 2022/2023 and 2023/2024 season (bag, tin or kilogram)

……...

41. How much food did you store ……..(bag, tin or kilogram), sell…….(bag, tin or kilogram) in the last year?

42. How much food did you in the last year? (a) sell…….. (b) Consume…… (d) Seeds……

43. Do you have access markert? 1. Yes 2. No

44. Do you buy food in the markert 1. Yes 2. No

(a) Is the market price affordable? 1. Yes 2. No

45. What is the trend of food price in the markert since the last 2 years? 1. Increased; 2. Decreased

46. Has the increase in food prices led to food shortages in your household? 1. Yes 2. No

SECTION D: Level of Awareness on Importance of Food Security

47. How many times per day does your family actually eat?

(a) Did you face shortage of food in the last 4 years seasons? 1. Yes 2. No

(b) Frequency of food shortage per four years?

48. i. Have you ever heard on food security?

ii. Are you aware of food security? 1. Aware 2. Not aware 3. Other (specify)…

iii.Are you aware of measures to combat household food insecurity? 1. Yes 2. No

iv. Are you aware of the importance of food security? 1. Yes 2. No

v. What measures did you take to address food insecurity?

49. If trained, does of learning materials on food security help to reduce food shortages in your household? 1. Yes 2. No

50. What are the possible measures to be taken to overcome the problem of food shortage?

51. How did you feed the household during the time without food grain?

52. Do yo have access to safe and nutritious water Yes/No

53. Do you have access to portable water? Yes/No

54. Have you ever encountered illness in the previous seasons?

55. What is the rate of food diversity in your area 1. High 2. Medium. 3. Low

55. Was food produced self sufficient?

56. How frequent do you experience food shortage? Never, 2. Rarely 3. Others (specify)

57. Have you ever encountered inconsistence food availability? Yes/No

58. Have you ever encountered major events in the past four years? Yes/No

59. Have you ever experience food crises in the past four years? Yes/No

60. Do you have strategy to address future food crises? Yes/No

61. If Yes, how?

Appendix III: Check List for Key Informant from District Officials/NGO

1. What are the factors associated with food insecurity in the district?

2. Which does the most period that the district experience food insecurity?

3. Does district/NGO give sensitization on the importance of food storage to the villagers?

4. What are the district/NGO strategies and efforts to eliminate food insecurity?

Appendix IV: Idhini ya kwa kuomba kufanya Mahojiano ya Utafiti

Idhini ya kwa kuomba kufanya Mahojiano ya Utafiti

Mpendwa mshiriki, mimi naitwa Veronica Stephen Baluwa. Kwa unyenyekevu unaombwa kushiriki katika utafiti huu unaolenga kutathmini masuala ya kijamii na kiuchumi yanayoathiri usalama wa chakula katika kaya zilipo hapa kjijini, katika Wilaya ya Kilwa. Ushiriki wako unathaminiwa sana. Ninakuhakikishia kuwa maoni yako yote yatabaki kuwa siri.

Mgongano wa Maslahi

Mtatifi na wote wenye kuhusika na utafiti huu hawana migongano ya maslahi katika utafiti huu.

Mawasiliano; Ikiwa una maswali au ushauri wowote katika utafiti huu wasiliana nami kwa Simu Namba 0674803162/0621812225 ama barua pepe verobaluwas@gmail.com

Idhini ya Kushiriki Katika Mahojiano ya Utafiti

Mimi, aliyesaini hapa chini, ninathibitisha kuwa nimesoma/nimesikiliza na kuelewa madhumuni ya utafiti unaoendeshwa. Ninakubali kwa hiari kushiriki katika utafiti huu na kuelewa kuwa majibu yangu yatashughulikiwa kwa usiri mkubwa na yatatumika kwa madhumuni ya kitaaluma pekee.

Jina la Mshiriki: MBULYANGA MOHAMEDI

Sahihi: Mohamedi

Tarehe: 24/01/2025

Appendix V: Dodoso kwa Mkuu wa Kaya.

SEHEMU A: Tarrifaza Kidemografia za Mkuu wa Kaya

Jina:_____2. Kijiji:_____3. Jina la kata:_____ 4. Tarehe:……

5. Jinsia ya mhojiwa …….. 6. Una umri wa mhojiwa (miaka)?……

7. Miaka aliyosoma shule……

8. Kiwango gani? Msingi [ ]; Sekondari [ ]; Elimu ya juu [ ] Hajui kusoma na kuandika [ ]

9. Hali ya ndoa 1. Ndoa [ ] 2 . Vinginevyo [ ]

10. Ikiwa vinginevyo ni wewe? Hajaolewa [ ]; Alioachika/acha [ ]; Imetenganishwa [ ]; Mjane [ ]

11. Aina ya familia (1. Baba, mama na watoto, 2. naishi na pamoja na ndugu).

12. Kazi yako ya sasa ni ipi? Mkulima [ ]; Biashara [ ]; Mfanyakazi [ ]; Mvuvi [ ]; Hana kazi [ ]

13. Jumla ya mapato ya kaya/mwezi kwa Tsh…….

14. Vyanzo vya mapato ni vipi?……

15. Je, unaweza kupata mkopo? 1. Ndiyo 2. Hapana

16. Wanakaya wangapi?.....

17. Je, ni wanakaya wangapi wako katika kundi la umri ufuatao?

Makundi rika (miaka)	Idadi ya Wanawake	Idadi ya Wanaume
18-30		
31-40		
41-50		
Zaidi ya miaka 51		

18. Je, majukumu ya kijinsia ndani ya kaya yako yanaathiri upatikanaji wa chakula wakati wa uhaba? 1. Ndiyo 2. Hapana

19. Je, mila za kitamaduni katika jamii yako zinachangia uhaba wa chakula? 1. Ndiyo 2. Hapana

20. Je, unaweza kufikia misaada ya kijamii? 1. Ndiyo 2. Hapana

21. Je, upatikanaji wa misaada ya kijamii katika kaya yako unaboresha usalama wako wa chakula? 1. Ndiyo 2. Hapana

SEHEMU B: Mfumo wa kilimo na matumizi ya Ardhi

22. Umekuwa ukilima kwa muda gani…….miaka (Uzoefu wa kilimo kwa miaka)

23. Ni mashamba yenye ukubwa kiasi gani ya mazao yanayolimwa na kaya (ekari)……

24. Hali ya umiliki wa ardhi(1=mmiliki wa ardhi, 0= vinginevyo);

25. Ulipataje ardhi yako? 1. Mirathi [ ] 2. Imenunuliwa [ ] 3. Kijiji/serikali [ ]
4. Imeazimwa [ ] 5. Imepatikana/umepewa bure [ ]

26. Taja aina za mazao makuu ya chakula unayolima.....

27. Je, unatumia jembe la ng'ombe katika kulima 1. Ndiyo 2. Hapana

28. Je, unatumia teknolojia ya hali ya kisasa katika kulima ardhi? 1. Ndiyo 2. Hapana

29. Je, ni teknolojia gani ya kilimo unayotumia katika kulima ardhi? 1. Jembe la mkono/Mwongozo [ ] 2. Mnyama [ ] 3. Trekta [ ] 4. Mengine bayana……

30. Je, unaweza kupata huduma za ugani za kilimo? 1. Ndiyo 2. Hapana

31. Je, wahudumu wa ugani walikutembelea msimu uliopita wa kilimo ili kukupa ushauri wa kilimo? 1. Ndiyo 2. Hapana

32. Kama ndiyo, ni mara ngapi watumishi wa ugani walikutembelea msimu wa

2020/2021?

33. Je, ulitumia pembejeo za kisasa za kilimo (mbolea hai)? 1. Ndiyo 2. Hapana

34. Iwapo hukutumia pembejeo za kilimo, toa sababu ……..

35. Ulitumia mbolea kiasi gani kwa mwaka 2020/2021 katika mazao ya chakula (kg)……

36. Je, unatumia mbegu zilizoboreshwa 1. Ndiyo 2. Hapana

37. Je, unatumia dawa za kuulia wadudu. 1. Ndiyo 2. Hapana

SEHEMU C: Kiwango cha Uzalishaji wa Chakula katika Ngazi ya Kaya

38. Ni nini mahitaji yako ya chakula kwa wanakaya kwa mwaka (kilogramu)?.....

39. Vyanzo vyako vya chakula ni vipi? (a) Kutoka shamba la kaya [ ] c. Kununua sokoni [ ]

(c) Kutoka kwa Jamaa na marafiki [ ] (d) Wengine (taja)……

40. Ulivuna kiasi gani cha chakula katika mwaka wa 2020/2021; 2021/2022; msimu wa 2022/2023 na 2023/2024 (gunia au kilogramu) ……

41. Ulihifadhi chakula kiasi gani ……..(gunia au kilogramu)kuuza…….(gunia au kilogramu) katika mwaka jana?

42. Je, ulitumia kiasi gani mwaka jana kwa ajili ya (a) chakula?....(b) kuuza…. (c) Tumia… (d) Mbegu…

43. Je, unapata soko la mazao? 1. Ndiyo 2. Hapana

44. Je, unanunua chakula sokoni 1. Ndiyo 2. Hapana

45. Je, mwenendo wa bei ya chakula sokoni ni upi tangu miaka 2 iliyopita? 1.Imeongezeka;

2. ilipungua

46. Je, ongezeko la bei za vyakula limesababisha uhaba wa chakula katika kaya yako? 1. Ndiyo 2. Hapana

SEHEMU YA D: Uelewa juu ya Umuhimu wa Usalama wa Chakula

47. Familia yako hula mara ngapi kwa siku?

(a) Je, umekumbana na uhaba wa chakula katika misimu ya miaka minne iliyopita?

1. Ndiyo
2. Hapana

(b) Mara ngapi umekumbana na uhaba wa chakula katika kipindi cha miaka minne?

48. i. Je, umwahi kusikia kuhusu usalama wa chakula? 1. Ndiyo 2. Hapana

ii. Je, una ufahamu wa usalama wa chakula?

1. Nina ufahamu
2. Sina ufahamu
3. Viginevyo (tafadhali eleza)...

iii. Je, una ufahamu wa hatua za kukabiliana na upungufu wa chakula katika kaya?

1. Ndiyo
2. Hapana

iv. Je, una ufahamu wa umuhimu wa usalama wa chakula?

1. Ndiyo
2. Hapana

v. Ni hatua gani ulizochukua kushughulikia upungufu wa chakula?

49. Ikiwa umefunzwa, je, vifaa na mbinu za kujifunzia kuhusu usalama wa chakula vinasaidia kupunguza uhaba wa chakula katika kaya yako?

1. Ndiyo
2. Hapana

50. Ni hatua zipi zinazoweza kuchukuliwa ili kukabiliana na tatizo la uhaba wa chakula?

51. Ni jinsi gani uliweza kulisha familia wakati wa ukosefu wa nafaka za chakula?

52. Je, una upatikanaji wa maji salama na yenye virutubishi vya kutosha?

1. Ndiyo
2. Hapana

53. Je, una upatikanaji wa maji yanayofaa kunywa?

1. Ndiyo
2. Hapana

54. Je, umewahi kukumbana na magonjwa katika msimu uliopita?

55. Je, upatikananaji wa chakula katika eneo lako ukoje?

1. Juu
2. Kati
3. Chini

56. Je, chakula kinachozalishwa kinatosheleza mahitaji ya kaya?

57. Je, ni mara ngapi unakumbana na uhaba wa chakula?

1. Sijawahi
2. Mara chache
3. Viginevyo (tafadhali eleza)...

58. Je, umewahi kukutana na hali ya kutokuwepo kwa uhakika wa upatikanaji wa chakula?

1. Ndiyo

2. Hapana

59. Je, umewahi kukumbana na matukio makubwa/majanga katika miaka minne iliyopita?

1. Ndiyo
2. Hapana

60. Je, umewahi kupitia mzozo wa chakula katika miaka minne iliyopita?

1. Ndiyo
2. Hapana

61. Je, una mkakati wa kushughulikia mizozo ya chakula ya siku zijazo?

1. Ndiyo
2. Hapana
3. Ikiwa jibu ni Ndiyo, ni mkakati gani?

Appendix VI: Orodha ya Masuali kwa Viongozi wa Wilaya/Kata/Vijiji /NGO

1. Je, ni mambo gani yanayohusiana na uhaba wa chakula wilayani?

2. Ni kipindi kipi ambacho wilaya inakabiliwa na uhaba wa chakula?

3. Je, Halmasahuri ya wilaya/NGO inatoa uhamasishaji juu ya umuhimu wa kuhifadhi chakula kwa wanakijiji?

4. Je, Halmasahuri ya wilaya /NGO zina mikakati na jitihada gani za kuondoa uhaba wa chakula?

Appendix VII: Student Research Clearance Letter

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

THE OPEN UNIVERSITY OF TANZANIA

Ref. No OUT/PG2022000090 **12th December, 2024**

District Executive Director (DED),
Kilwa District Council,
P O.Box 160,
LINDI.

Dear Director,

RE: RESEARCH CLEARANCE FOR MS. VERONICA STEPHEN BALUWA, REG NO: PG2022000090

2. The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007.In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3. To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Ms. Veronica Stephen Baluwa, Reg.No: PG2022000090),** pursuing **Master of Arts in Gender Studies**

(MAGS). We here by grant this clearance to conduct a research titled **"Socio-Economic Factors Affecting Rural Households' Food Security in Tanzania: A Case Study of Kilwa District"** She will collect her data at your area from 20th January 2025 to 20th February 2025.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,
THE OPEN UNIVERSITY OF TANZANIA

Prof.Gwahula Raphael Kimamala

For: VICE CHANCELLOR

Appendix VIII: Student Introduction Letter for Data Collection

THE UNITED REPUBLIC OF TANZANIA

PRESIDENT AUTHORITY

REGIONAL ADMINISTRATION AND LOCAL GOVERNMENT AUTHORITY

KILWA DISTRICT COUNCIL

Replywith:

Ref:No. KDC/E.10/VOL.III/181 **Date 15 January, 2025**

Ward Executive Officer,
Miguruwe,Kivinje,Mingumbi,Likawage,Mitole,Mandawa.
P.O.BOX, 160,
KILWA.

RE: INTRODUCTION LETTER

The heading above is concern

2. Weregret to receive a letter dated 12th **December, 2024** with Re. No, **PG2022000090** in which introduced **Ms. Veronica Stephen Baluwa** who is a bonafide student of the Open Univeraity of Tanzania who required to conduct research activities as part of their study program Kilwa District Council. The tittle of the research is "**Socio-economic factors affecting rural households' food security in Tanzania**" The period of research is from 20th January, 2025 – 20th February, 2025.

3. There fore, with this letter you are requested to grant any assistance tha may enable him to achieve the research objectives

4. Regards,

Liku P. Dotto.
FOR: DISTRICT EXECUTIVE DIRECTOR

Kny MKURUGENZI MTENDAJI
HALMASHAURI YA WILAYA
KILWA

Copy to

Region Commissioner's Office,
9 Barabara ya Mtulen,
P.O. Box 1054,
LINDI.

District Executive Director Office,P.o.BOX 160,Kilwa-Lindi,Phone No:+255 232013065,Fax No:+255 232013065.
Web Site:www.Kilwadc.go.tz,Email:ded@kilwadc.go.tz