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**THE RELATIONSHIP BETWEEN GENDER-INCLUSIVE ACCESS TO
AGRICULTURAL CREDIT AND HOUSEHOLD FOOD SECURITY: EVIDENCE
FROM KIRINYAGA COUNTY**

MUCHIRA BENSON MURIMI

147593



**A THESIS SUBMITTED IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE IN DEVELOPMENT FINANCE OF STRATHMORE
UNIVERSITY**

OCTOBER 2024

DECLARATION

I confirm that neither this institution nor any other has previously received or accepted the thesis for the award of a degree. Unless specifically stated in the thesis, none of the previously published or written works by others are included in this document, to the best of my understanding and conviction.

Benson Muchira Murimi

Signature: 

Date: 16/06/2024




The thesis of Benson Muchira Murimi received approval and review from the following:

The supervisor's name: is Prof. Simon Ndiritu

Faculty Affiliation: Strathmore Business School

Institution: Strathmore University

Signature: 

Date: 15/06/2024

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ABSTRACT

Numerous households in developing nations, notably in Africa, grapple with insufficient and nutritious food despite food insecurity interventions. Exclusionary agricultural financing, especially impacting women smallholder farmers, hampers food security by limiting credit, resources, and inputs, reducing crop yields, and hindering food production and household well-being. Addressing gender disparities in agricultural credit access is crucial to unlocking the potential of the agriculture industry, fostering sustainable food production, and improving livelihoods. This research investigates the relationship between household food security in Kirinyaga County, Kenya, and gender-inclusive access to agricultural credit. Objectives include exploring gender dynamics' influence on credit accessibility and its effect on household food security. The study delved into women's empowerment effects, scrutinized gender disparities in credit access, and assessed implications for food security. Cooperative membership's relationship with household food security is also examined. The exploration is guided by theoretical frameworks such as feminist theory, intra-household dynamics theory, and the Social Capital Food Theory (SCT). The study targeted approximately 50,782 farmers actively engaged in farming in Kirinyaga County, comprising 43,113 coffee cooperative farmers, 6,430 dairy farmers, and 1,239 irrigation cooperative farmers. Using the Yamane formula, a sample size of 397 farmers was determined for data collection. The research employed a stratified probability sampling methodology to ensure an impartial opportunity for every individual within the population to be chosen for inclusion in the sample. A Multivariate Probit analysis revealed that the ease of securing funds for farming by women and equal chances for men and women to get money for farming had a positive and highly significant influence on Food Availability, Food Utilization, and Food Accessibility. Women's involvement in farming and decision-making also had a positive and significant impact on household food security dimensions. However, challenges in accessing money for farming needs negatively affected Food Availability and Food Accessibility. Cooperative membership had a positive and highly significant effect on all three dimensions of food security. The study concludes that gender-inclusive access to agricultural credit, women's empowerment, addressing gender disparities, and strengthening cooperative membership are crucial for enhancing household food security. Recommendations include implementing gender-sensitive policies and initiatives, prioritizing women's empowerment in agriculture and decision-making, promoting inclusive lending practices, and strengthening cooperative membership. Stakeholders should adopt gender-inclusive practices such as targeted interventions, capacity-building programs for women farmers, and awareness campaigns promoting cooperative membership.

Key words: Gender-Inclusive, Access to Agricultural Credit & Household Food Security

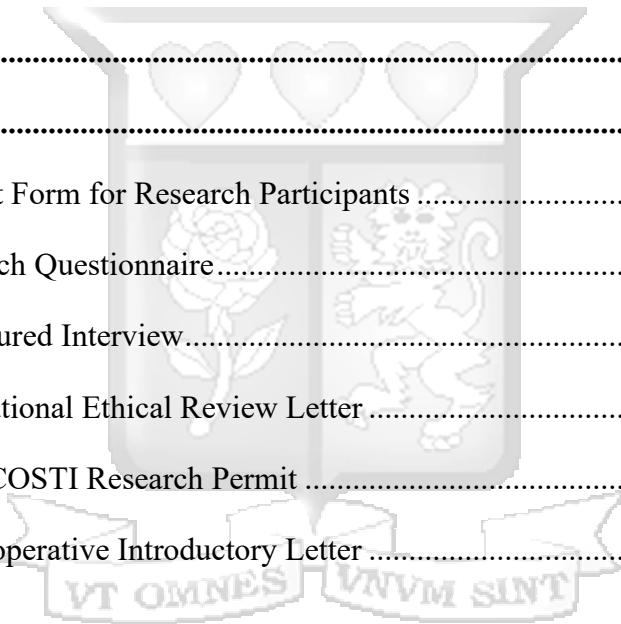
TABLE OF CONTENTS

DECLARATION	ii
APPROVAL	ii
ACKNOWLEDGEMENT	iii
ABSTRACT	iv
TABLE OF CONTENTS	v
LIST OF TABLES	ix
LIST OF FIGURES	x
LIST OF ABBREVIATIONS	xi
DEFINITIONS OF KEY TERMS	xii
CHAPTER ONE: INTRODUCTION	1
1.1 Background of the Study	1
1.2 Statement of the Problem.....	4
1.3 Research Objectives.....	6
1.3.1 General Objective	6
1.3.2 Specific Objectives	6
1.4 Research Questions.....	6
1.5 Significance of Study.....	6
1.6 Scope of Study	7
1.7 Limitations of the Study	8
1.8 Chapter Summary	8
CHAPTER TWO: LITERATURE REVIEW	9
2.1 Introduction.....	9
2.2 Theoretical Review	9
2.2.1 The Feminist Theory	9
2.2.2 Intra-Household Dynamics Theory.....	10

2.2.3 The Social Capital Theory	11
2.3 Empirical Review	13
2.3.1 Analyzing Gender Dynamics in Agricultural Credit Household and Household Food Security	13
2.3.2 Empowering women and ensuring food security within households.	14
2.3.3 Gender Disparities in access to agricultural credit and household food security based on gender.	16
2.3.4 The relationship between cooperative membership household food security	17
2.4 Summary of literature and research gaps	18
2.5 Conceptual Framework.....	23
2.5.1 Operationalization of the Study's Variable	25
2.6 Chapter Summary	26
CHAPTER THREE: RESEARCH METHODOLOGY	27
3.1 Introduction.....	27
3.2 Research Philosophy.....	27
3.3 Research Design	27
3.4 Target Population.....	28
3.5 Sampling Technique and Sample Size.....	28
3.6 Data Collection Instruments	29
3.7 Data Analysis	29
3.8 Diagnostic Tests	30
3.9 Research quality.....	31
3.9.1 Research Reliability and Objectivity	31
3.9.2 Validity of the research instrument	31
3.9.3 Ethical Considerations	32
3.10 Chapter Summary	32

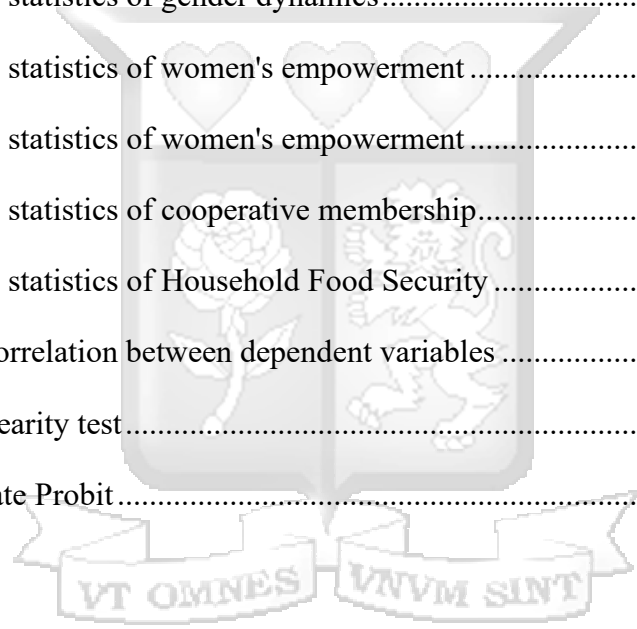
CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS	33
4.1 Introduction.....	33
4.2 Study Response Rate	33
4.3 Socioeconomic characteristics	33
4.4 Descriptive statistics of gender dynamics.....	35
4.5 Descriptive statistics of women's empowerment.....	38
4.6 Descriptive statistics of gender disparities.....	40
4.7 Descriptive statistics of cooperative membership	43
4.8 Descriptive statistics of Household Food Security	45
4.9 Correlation Analysis	47
4.10 Multicollinearity	48
4.11 Relationship between Gender-Inclusive Access to Agricultural Credit and Household Food Security.....	49
4.11.1 Influence of Gender Dynamics in Access to Agricultural Credit and Its Direct Impact on Household Food Security.....	51
4.11.2 The role of women's empowerment in enhancing household food security among smallholder farmers	51
4.11.3 Gender disparities in access to agricultural credit and their direct impact on household food security	52
4.11.4 The relationship between cooperative membership and its direct impact on household food security among smallholder farmers	53
CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS	55
5.1 Introduction.....	55
5.2 Summary of Findings.....	55
5.3 Discussion of findings	57
5.3.1 Influence of Gender Dynamics on Access to Agricultural Credit and Household Food Security	57

5.2.2 Role of Women's Empowerment in Enhancing Household Food Security	58
5.2.3 Gender Disparities in Access to Agricultural Credit and Household Food Security	60
5.2.4 Relationship between Cooperative Membership and Household Food Security....	61
5.4 Conclusion	62
5.5 Recommendations.....	63
5.5.1 Recommendations for Policy	63
5.5.2 Recommendation for Practice.....	64
5.6 Areas for Further Studies	65
REFERENCES.....	66
APPENDICES	74
Appendix I: Consent Form for Research Participants	74
Appendix II: Research Questionnaire.....	76
Appendix III: Structured Interview.....	81
Appendix IV: Institutional Ethical Review Letter	83
APPENDIX V: NACOSTI Research Permit	84
APPENDIX VI: Cooperative Introductory Letter	85



LIST OF TABLES

Table 2.1: Summary of Research Gaps	21
Table 2.2: Operationalization of the Study's Variable	25
Table 3.1 Target Population	28
Table 3.2: Sample Size.....	29
Table 3.3: Cronbach's alpha coefficient	31
Table 4.1: Response Rate	33
Table 4.2: Socioeconomic characteristics	34
Table 4.3: Descriptive statistics of gender dynamics.....	36
Table 4.4: Descriptive statistics of women's empowerment	38
Table 4.5: Descriptive statistics of women's empowerment	41
Table 4.6: Descriptive statistics of cooperative membership.....	43
Table 4.7: Descriptive statistics of Household Food Security	46
Table 4.8: Pearson's correlation between dependent variables	48
Table 4.9: Multicollinearity test.....	49
Table 4.10: Multivariate Probit.....	50



LIST OF FIGURES

Figure 2.1: Conceptual framework depicting linkages between dependent and independent variables24



LIST OF ABBREVIATIONS

AMCOS- Agricultural Marketing Cooperative Society

COP-Conference of Parties

EIGE-European Institution for Gender Equality

FAO-Food and Agriculture Organization

FtMA- Farm to Market Alliance

GDP-Gross Domestic Product

WHO- World Health Organization

IPC- Integrated Food Security Phase Classification

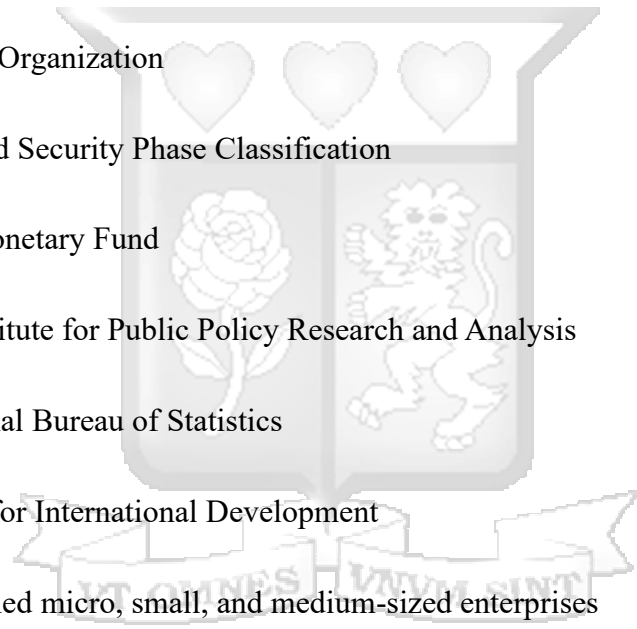
IMF-International Monetary Fund

KIPPRA- Kenya Institute for Public Policy Research and Analysis

KNBS- Kenya National Bureau of Statistics

USAID- US Agency for International Development

W-MSMEs- women-led micro, small, and medium-sized enterprises



DEFINITIONS OF KEY TERMS

Gender Dynamics: The relationships among individuals, both male and female, shaped by sociocultural ideas, reinforcing or challenging established power and role norms (USAID 2018).

Women Empowerment: The process through which women attain authority and autonomy in their lives, enabling them to make strategic decisions (UN Glossary).

Gender Disparities: The variances among males and females regarding their well-being and their access to resources, status, and well-being, typically benefiting men and frequently entrenched in legal systems, justice, and societal norms (EIGE Experts)

Cooperative membership involves individuals voluntarily uniting collaboratively to solve issues on an economic, social, and cultural level.

Household Food Security: The financial and societal condition within individual households, characterized by restricted or unclear access to a sufficient and healthful diet.

SDGs: Sustainable Development Goals (SDGs) constitute a comprehensive set of 17 global development objectives established by the United Nations in 2015.

Gender-Inclusive Access: The equitable opportunity for both men and women to obtain and utilize resources, services, and opportunities in the context of agricultural credit and financial services. This concept emphasizes the removal of gender-based barriers and the promotion of equal rights and opportunities for all genders in accessing and benefiting from agricultural resources and support systems.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

The mounting global imperative to secure household access to food, harmonizing with the Sustainable Development Goals (SDGs) established by the United Nations, constitutes a comprehensive framework for addressing global challenges. This has assumed unprecedented significance in recent years (SDGs, 2015). Despite this progress, numerous households, especially in developing nations, persistently encounter difficulties getting adequate nourishing food (Bozsik et al., 2022). Although the gender gap in financial access has reduced from 8.5% in 2016 to 4.2% in 2021, the gender exclusion gap has unexpectedly widened to 1.6% from 0.5% between 2019 and 2021 (Fin Access Household Survey, 2021). This difference underscores the persistent issue of guaranteeing equal access and chances for women in different areas of socio-economic existence, especially in the realms of agriculture as well as safety from hunger.

Food security, as per the 1996 World Food Summit, ensures access to adequate, secure, and wholesome nourishment, considering availability, access, utilization, and stability (World Food Summit, 1996). This includes considerations of the food system's use, accessibility, and stability (Panel, 2021). Despite women contributing 60-80% of food production in developing nations, where they play pivotal roles in agriculture, it is concerning that women encounter substantial obstacles in obtaining resources like land, loans, and inputs in contrast to men, despite being the majority in small-scale agriculture (Adeyemi, 2021; Heritz, 2004). Despite the important roles that women play, they frequently face greater rates of insufficient food supply in comparison to their male counterparts. Gender inequality obstructing their ability to obtain resources and information, and lack of the authority to make decisions adds to this disparity (Botreau & Cohen, 2020). In the 2022 FAO assessment report, in comparison to men, women continuously faced greater rates of food insecurity ranging between moderate and severe between 2014 and 2021.

An approximate projection suggests that the number of individuals experiencing hunger is expected to reach 670 million by 2030, an increase from the 828 million recorded in 2021. A report by the U.S. Global Leadership Coalition (USGLC), attributes the rise, at least in part, to the continued consequences of the COVID-19 epidemic. Approximately 2.3 billion people worldwide are grappling with food insecurity, signifying a 29.3% rise compared to the period preceding the pandemic (USGLC, 2023). The severity of food insecurity has witnessed a

noticeable increase, reaching 924 million individuals—an increase of 207 million within two years. Notably, there are still 45 million children younger than five years old facing malnutrition, 149 million experiencing stunted growth, and 39 million grappling with overweight issues due to malnutrition (FAO, 2021). In 2021, CARE identified a growing disparity in food insecurity between genders, with 31.9% of women and 27.6% of men facing food insecurity ranging from moderate to severe. These findings underscore the global relationship between the rise in gender inequality and the decline in food security across 109 nations. A study in Madagascar highlights the necessity of institutional, financial, and technical assistance to improve food security and productivity in agriculture among smallholder farmers confronting climate change (Harvey et al., 2014).

Notably, Kenya faces persistent food insecurity, impacting approximately 36.5% of the population in 2021 (WHO, 2021). Amidst factors such as drought, rapid urbanization, and a critical food security situation impacting over 5.4 million people between March and June 2023 (IPC, 2023). The goal of USAID is to tackle global challenges by providing humanitarian assistance and supporting sustainable development initiatives. As part of this mission, USAID projects a minimum contribution of Ksh. 16 billion in the 2022-2023 period to aid Kenya's initiatives for drought relief (USAID, 2023). Kenya has an estimated 7.5 million smallholder farmers, contributing about 80% of the nation's agricultural output, defined as farmers working on land sizes between 1 and 5 acres (FNMA in Kenya, 2022). Financial assistance is crucial for smallholder farmers to invest in more climate-resilient agriculture, as studies indicate their vulnerability to climate change (Harvey et al., 2018). Recent findings suggest that female-headed households (FHHs) in Kenya face a higher susceptibility to food insecurity in comparison to their male counterparts, primarily attributed to constrained access to essential resources. This limitation affects their overall well-being, including their ability to acquire food (Kassie et al., 2021).

Despite women being significant contributors to national agriculture and food security, research from various regions indicates that rural women often encounter difficulties in accessing credit compared to their male counterparts under similar social and economic conditions (Fletschner, 2019). For low-income smallholder farmers, financial inclusion is crucial for sustainable food production to meet the growing population's needs. However, commercial banks in Kenya, similar to trends in other emerging nations, are hesitant to provide loans to smallholder farmers due to the lack of collateral and guarantors (Gichuki, 2022)

Based on data specific to the region, it is observed that approximately 60% of the agricultural workforce in Kirinyaga County, Kenya, consists of women. This underscores the substantial contribution of women to the agricultural sector in the area (KNBS, 2013). Nevertheless, gender inequalities endure, as women encounter constraints in accessing resources, and technology, and participating in decision-making processes. Illustratively, women in Kirinyaga County possess fewer land holdings and attain lower educational levels compared to their male counterparts (KNBS & SID, 2013). Additionally, compared to 58% of males in the same age range, 61% of girls who are fifteen to forty-nine years old suffer moderate to severe food insecurity. This implies that women experience shortages of food more frequently than men (Kenya National Bureau of Statistics [KNBS], 2019). The Wezesha (Enable) Kirinyaga economic stimulus project was initiated in Kirinyaga County to address food insecurity. Its primary objective is to diversify agriculture, raise household income, and enhance food security. The project focuses on value chains like avocado, dairy, tomatoes, and chicken, providing funding to 473 farmers' groups, benefiting around 14,000 households. This initiative offers young and female farmers diverse subsistence options, aiming to boost revenue and improve their standard of living (Star, 2021).

To evaluate the level of food availability over the preceding twelve (12) months, the research utilized subjective measures, in line with similar methodologies applied in recent investigations conducted in developing nations (Mallick, 2019; Ndiritu & Kassie, 2021). Women are pivotal a critical in all three aspects of food production, affordable food availability, and nutritional security according to Acheampong et al. (2022). Despite facing various social, cultural, and financial constraints, Women are essential to maintaining food safety. Ndiritu and Kassie (2021) advocate for building female farmer groups to enhance social capital networks, providing resources and education for smallholder Female-Headed Households (FHH) to access resources, markets, financing, and knowledge. In the face of climate-related challenges, governments must continue working to strengthen the resilience of smallholders (Kalele, Ogara, & Oludhe, 2021). This research specifically aims to analyze how gender dynamics, women's empowerment, and cooperative membership interact with agricultural credit access to gain a better understanding of the overall dynamics involved.

The independent variables in this study that is gender dynamics, women's empowerment, gender disparities in access to agricultural credit, and cooperative membership were selected due to their significant impact on household food security as evidenced in previous literature. Gender dynamics in agriculture are typically measured through indicators such as decision-

making power, control over resources, and labor division (Doss, 2023). Women's empowerment is often assessed using the Women's Empowerment in Agriculture Index (WEAI), which considers dimensions like production decisions, resource access, income control, leadership, and time allocation (Alkire et al., 2019). These variables were chosen because they capture the multifaceted nature of gender relations in agricultural contexts and their potential influence on food security outcomes.

Gender disparities in access to agricultural credit are commonly measured by comparing men's and women's access to formal and informal credit sources, loan amounts, interest rates, and collateral requirements (Fletschner & Kenney, 2019). Cooperative membership is typically evaluated through membership status, duration, and level of participation in cooperative activities (Verhofstadt & Maertens, 2021). These variables were selected over others due to their direct relevance to the agricultural sector in developing countries and their demonstrated impact on household food security in previous studies. For instance, research has shown that addressing gender disparities in credit access can significantly improve agricultural productivity and household food security (Quisumbing & Pandolfelli, 2021), while cooperative membership has been linked to improved access to resources and market opportunities for smallholder farmers (Abate et al., 2020).

1.2 Statement of the Problem

This study seamlessly aligns with the 2030 Sustainable Development Goals, with a specific focus on SDG 2. This goal intricately addresses the imperative to attain global food security, eradicate hunger, and foster sustainable agriculture. Gender inclusion is crucial for equitable growth in these sectors, as emphasized by the United Nations (UN) objectives, particularly focusing on empowering women in agriculture for a reliable and sustainable food supply (UN Women, 2024). Internationally, studies indicate that providing women farmers with equitable access to resources on par with their male counterparts could potentially elevate agricultural yields by 20–30%, boost overall agricultural output by 2.5–4%, and alleviate global hunger by 17%, affecting around 100–150 million individuals (The World Bank, 2014). According to Husar, M. (2023), there is a discrepancy in gender-inclusive lending for agricultural firms, with only 8% of Aceli-supported loans in East Africa going to companies that are wholly or primarily owned by women. Despite women's significant contributions to agriculture, challenges persist in accessing credit, as highlighted by the Agricultural Finance Corporation (AFC) Baseline Report 2019 in Kenya. Issues such as minimal savings, outstanding debts, lack

of collateral, and unfavorable credit scores hinder women's access to agricultural credit (Kassie et al., 2021; AFC Baseline Report, 2019).

Globally, around 928 million people, constituting 12% of the population, faced acute food insecurity in 2020, reflecting a rise of 148 million individuals from 2019 (FAO, 2021). Gender disparities in access to crucial resources are evident, with women facing unequal access compared to men, despite contributing over 50% to global food production (Ugwu, 2019; Odey et al., 2022). Studies have shown women significantly contribute to household food production in parts of Latin America, Asian world, and sub-Saharan Africa, ranging from 45% to 80% (Odey et al., 2022). In communities heavily dependent on agriculture, women constitute 80% of the workforce. Shockingly, only 1% of land titles are in their names, with an additional 5-7% held jointly, as revealed by research from the Kenya Land Alliance (Vincent, 2023). Despite their predominant role in these communities, women encounter restricted land rights, impeding their capacity to leverage land as collateral for financing, as highlighted by the Kenya Land Alliance (2023). Cultural barriers, lower educational attainment, and lack of knowledge further impede women's interactions with credit officers (Odey et al., 2022). Empowering women in agriculture emerges as a potential solution to enhance food security outcomes, leading to improved access to education, healthcare, and economic opportunities (Lufuke et al., 2022).

While previous research had extensively explored gender dynamics in agriculture and food security, few studies had specifically examined how gender-inclusive credit access impacts household food security (Wanare & Gwalani, 2019). Methodologically, most prior studies employed either qualitative approaches (Njuki et al., 2013) or single-method quantitative analyses (Quisumbing et al., 2021), leaving a gap in mixed-methods research. Conceptually, while the link between women's empowerment and food security had been established (Sraboni et al., 2014), the specific pathways through which gender-inclusive credit access influences food security outcomes remained underexplored (Galiè et al., 2019). Moreover, the role of cooperative membership in mediating this relationship had received limited attention (Dohmwirth & Hanisch, 2020). This study addressed these conceptual, contextual, and methodological gaps by employing a mixed-methods approach to examine the relationship between gender-inclusive access to agricultural credit and household food security in Kirinyaga County.

1.3 Research Objectives

1.3.1 General Objective

To examine the relationship between gender-inclusive access to agricultural credit and household food security within the context of Kirinyaga County, with the overarching aim of encouraging gender parity and sustainable growth in the agriculture industry.

1.3.2 Specific Objectives

- i) To examine the influence of gender dynamics in access to agricultural credit and its direct impact on household food security in Kirinyaga County.
- ii) To assess the role of women's empowerment in enhancing household food security among smallholder farmers in Kirinyaga County.
- iii) To investigate gender disparities in access to agricultural credit and their direct impact on household food security in Kirinyaga County.
- iv) To evaluate the relationship between cooperative membership and its direct impact on household food security among smallholder farmers in Kirinyaga County.

1.4 Research Questions

- i) How do gender dynamics in access to agricultural credit influence and directly impact household food security in Kirinyaga County?
- ii) How does women's empowerment enhance household food security among smallholder farmers in Kirinyaga County?
- iii) What is the nature of gender disparities in access to agricultural credit, and how do these disparities directly influence household food security in Kirinyaga County?
- iv) What is the relationship between cooperative membership and its direct impact on household food security among smallholder farmers in Kirinyaga County?

1.5 Significance of Study

The following parties gain from the study's empirical evidence:

1.5.1 Smallholder Farmers

The primary recipients of the research findings were small-scale farmers. The study aims to discover effective methods of increasing food production, improving crop yields, and

enhancing the availability of nutritious food by examining the connection between household food security and gender-inclusive access to agricultural credit. By delving into the dynamics of gender-inclusive access to agricultural credit, the research intends to highlight ways in which targeted assistance can assist smallholder farmers in overcoming challenges and improving their overall well-being.

1.5.2 Policy Makers

In the Kenyan context, the study's findings offer valuable insights that will help shape rural finance decision-making and policies in agricultural financing, food security, and agricultural growth. With a particular focus on the gendered dimensions of agricultural financing and how it interacts with household food security, the study seeks to provide evidence-based recommendations.

1.5.3 Academicians and Researchers

Research on this topic is intended to promote collaboration between academics from several disciplines, such as economics, development studies, agriculture, and climate science. By facilitating the interchange of ideas, information, and research findings, the researcher seeks to enhance the current knowledge base, pinpoint gaps in the field, and engage in collaborative efforts to enhance understanding of the challenges and opportunities related to enhancing food security for Kenyan small-scale farmers.

1.6 Scope of Study

This study focused conceptually on the interrelationships among gender dynamics, women's empowerment, cooperative participation, access to agricultural credit, and household food security. Geographically, the research was conducted in Kirinyaga County, Kenya. Kirinyaga County was selected due to its significant agricultural sector. Despite its agricultural prominence, the county faces food security challenges. The county's diverse agricultural activities, including coffee, tea, and rice farming, coupled with its gender disparities in resource access, make it an ideal location for examining the complex dynamics between gender-inclusive agricultural credit and household food security. The study specifically targeted smallholder farmers within the county, as they represent the majority of agricultural producers and are most vulnerable to food insecurity.

1.7 Limitations of the Study

This study acknowledges several limitations that should be considered when interpreting its findings. Firstly, the research was confined to Kirinyaga County, which may limit the generalizability of results to other regions with different socio-economic contexts or agricultural practices. Secondly, the reliance on self-reported data for both quantitative and qualitative components introduces potential response bias, as participants may have provided socially desirable answers or had difficulty accurately recalling past events. Thirdly, the cross-sectional nature of the study captures a snapshot in time, which may not account for seasonal variations in agricultural activities or long-term changes in food security status. Lastly, while the study aimed to examine the relationship between gender-inclusive access to agricultural credit and household food security, it may not fully capture all potential confounding variables that could influence this relationship, such as broader economic conditions or climate-related factors.

1.8 Chapter Summary

An introduction to the study session introduces this chapter, and then the researcher compares the concepts of food insecurity and food security. Following this, the chapter highlights the problem statement, outlines the study's goals and key aspects, and elucidates both the objective and research questions. Ultimately, the study's significance is emphasized.



CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

An exploration is conducted into various theories and empirical studies examining the relationship between gender-inclusive access to agricultural credit and household food security, particularly regarding the context of Kirinyaga County. The theoretical frameworks explored include feminist theory, Intra-Household Dynamics Theory, and the Social Capital Food Theory (SCT).

2.2 Theoretical Review

2.2.1 The Feminist Theory

The Feminist Theory, rooted in Marxism and socialism, spans three waves, addressing women's rights and societal roles. Originating from various feminist groups, it critiques gender disparities in subsistence production and supports inclusive policies. The 1st wave of feminism surfaced during the late 19th and early 20th centuries, succeeded by a second wave in the 1960s and early 1970s. The onset of the third wave occurred in the 1990s, leaving a notable influence on the present-day landscape (Naples, 2020). In the first wave, women's suffrage and legal rights were the main concerns. The second phase, commencing in the 1960s, centered on various subjects such as reproductive rights, employment discrimination, and societal expectations related to gender.

"The Feminine Mystique" by Friedan (1998) catalyzed this movement. Radical feminism was another aspect of the second wave; it questioned the notion that the contributions of men are greater than those of women and examined how the family reinforces male dominance (Feminism, 1970). The 3rd wave focuses on feminist goals linked to racism, homophobia, and Eurocentrism and questions traditional ideas of womanhood. It explores how gender interacts with other identity constructions, such as class, race, and sexual orientation, with a focus on intersectionality. Dietrich (2012), argues that subsistence production serves as a constant prerequisite for all other forms of production argues that subsistence production is a constant prerequisite for all other forms of production. Feminist perspectives can address the undervaluation and neglect of women's labor in subsistence production. Feminist theory contribute to the creation of more successful policies by considering the impact on male and female farmers and evaluating whether a gender-neutral policy is as beneficial as one focusing on women (Mupotsa, 2016).

This theory, while instrumental in highlighting women's rights and their roles in societal production, has certain limitations. While it draws attention to gender disparities and promotes inclusive policies, some critiques highlight its limited practical application in rural settings (Friedan, 1998). In particular, radical feminism, which questions male dominance, may not sufficiently address complex intersectional issues such as class, race, or rural economic constraints that further marginalize women in agricultural communities.

Guerra (2017) highlights its relevance in achieving food security by addressing violence and discrimination against women. She underscores the disproportionate impact of food insecurity on women and argues that eliminating violence and discrimination against women is vital for achieving food security (Guerra, 2017). The discourse on gender inequalities in productivity, specifically related to the adoption of agricultural technologies, focuses on Kenyan maize plots (Voss et al., 2023). African feminist approach integrates women farmers' indigenous knowledge into formal education, improving Kenya's rural areas' agricultural growth and food safety. Contemporary feminist theory recognizes that it extends beyond the concerns of women alone; it engages with the world through critical intersectional perspectives (Ferguson, 2017). The strengths of Feminist Theory lie in its comprehensive perspective on gender issues and its capacity to inform policies, while its weaknesses encompass critiques of radical feminism and face challenges in achieving widespread societal change (Thompson, 2001). Informed by Feminist Theory, the study investigates variables of credit access and gender-based discrimination. It conceptually explores how gender dynamics impact agricultural credit access and, consequently, directly affect household food security in Kirinyaga County, addressing historical and contemporary gender disparities within the agricultural credit system.

2.2.2 Intra-Household Dynamics Theory

The Intra-Household Dynamics Theory, introduced by Pierre-André Chiappori and published in *Econometrica* in 1988, recognizes the intricate nature of households as social units characterized by multiple decision-makers with diverse preferences and bargaining power (Shibata et al., 2020). This theory has been applied more recently to investigate gendered power dynamics in agricultural innovation processes, family members' socioeconomic changeability, and collective decision-making in agent-based models.

The Intra-Family Dynamics Framework has proven to be a valuable instrument for understanding intricate the influence of social connections among family members on food availability and overall well-being in the home (Asma & Kotani, 2023). It aids in identifying

and analyzing factors contributing to gender-based disparities in food insecurity. For instance, a study conducted in Ethiopia revealed that intra-household dynamics and resource distribution may play a role in gender bias concerning food insecurity experiences among Ethiopian adolescents (Asma & Kotani, 2023). The theory provides insights into understanding how food and nutrients are distributed within households. A research investigation was carried out in rural Nepal, employing the Intra-Household Dynamics Theory. The study examined factors influencing the distribution of food and nutrients within households, with a particular emphasis on the nutritional dynamics involving expectant mothers, mothers-in-law, and male headed households (Harris-Fry et al., 2018). Dynamics within households encompass interactions and relationships within a family, encompassing issues of authority, decision-making, and resource distribution. This theory is thus important to this study since effective management of food access and consumption within a household plays a crucial role in determining the household's capacity to address issues related to food insecurity (Burchi, 2012).

This theory has certain limitations. While it adeptly analyzes internal household power structures, it can be challenging to accurately measure intra-household dynamics, as these interactions are often informal and vary greatly between different cultural contexts (Shibata et al., 2020). Additionally, the theory focuses primarily on internal family relations, potentially overlooking external socio-economic factors, such as market access or institutional barriers that also influence resource distribution. Consequently, while the Intra-Household Dynamics Theory effectively addresses gender disparities within families, its scope may need to be expanded to consider external influences on household resource access and food security.

One strength of the Intra-Household Dynamics Theory, lies in its focused exploration of gendered power dynamics, while its weaknesses are associated with the intricate challenges involved in measuring intra-household dynamics (Cerrato & Cifre, 2021). Intra-household dynamics influence resource distribution, vital for addressing food insecurity. The theory aligns with the study's objective of assessing gender disparities in accessing agricultural credit and understanding how food is distributed within households.

2.2.3 The Social Capital Theory

Bourdieu's Social Capital Theory (SCT) originally emerged in 1985 as a combination of material or immaterial resources associated with maintaining a long-lasting network of institutionalized ties that are marked by mutual familiarity or acknowledgment (Claridge et al., 2023). This theoretical framework provides insight into the complex interplay between gender-

inclusive agricultural credit and household food security. This theory is a valuable framework for the study due to its emphasis on relationships and trust, although its weaknesses lie in the challenges associated with measuring social capital. Women, who encounter gender-specific challenges, stand to gain from strong social connections that facilitate access to credit opportunities, provide essential information, and establish a supportive network for agricultural pursuits (Machalek, 2015). In a semi-arid area of Kenya, research revealed a relationship between the involvement of female gender in making farming decision and the growth of social connections, including bonds, connections, and connecting links (Po & Hickey, 2020). This finding suggests that social capital can significantly contribute to promoting gender-inclusive agricultural credit and enhancing household food security.

The efficacy of gender-inclusive agricultural financing programs can be increased by identifying and utilizing social capital, according to social capital theory. This will enable women to express their concerns in advocacy campaigns and guarantee that interventions target their unique needs and goals (Po & Hickey, 2020). Raising knowledge of social capital dynamics, particularly those related to gender, across varied farming communities may promote changes in social capital, particularly in bridging and linking social capital. However, several gender-related barriers have been identified as limiting the benefits of social capital for smallholder male and female farmers. These barriers include cultural and societal norms that may prohibit women from speaking in public or assuming leadership positions, which can limit their ability to develop social capital (Silvert et al., 2022). Essentially, the theory of Social Capital emphasizes the significance of community connections for the effectiveness of credit programs aimed at enhancing household food security.

While it successfully underscores the importance of relationships in resource access, it may overlook the structural barriers that women, in particular, face, such as legal restrictions or gender biases in formal financial institutions (Machalek, 2015). Additionally, measuring social capital is often challenging, as its intangible nature (trust, reciprocity) is difficult to quantify. Furthermore, cultural norms may restrict the ability of women to fully benefit from social capital, particularly in societies where public speaking or leadership roles are limited for women.

Food security and rural farming households' social capital are positively correlated, according to research done in Nigeria's Akwa Ibom State (Social Capital, 2016). This emphasizes how important social networking is in fostering household food availability and raises the possibility

that creating gender-neutral agricultural funding programs could help. While social capital enhances gender-inclusive agricultural financing, cultural norms may impose limitations (Silvert et al., 2022). The theory highlights the significance of community ties in ensuring the success of credit programs. This is consistent with one of the study's objectives, which is to assess how smallholder farmers and household food security relate to one another.

2.3 Empirical Review

This analysis integrates relevant elements, methodologies, and outcomes from previous studies on household food security. The insights and suggestions derived from these studies guided the direction of the current research.

2.3.1 Analyzing Gender Dynamics in Agricultural Credit Household and Household Food Security

Fletschner (2019) conducted a study on rural credit markets in developing countries, revealing that women encounter more obstacles than men in obtaining credit due to systemic issues such as lack of collateral, lower financial literacy, and discriminatory practices within financial institutions. The methodology employed involved surveys targeting male and female farmers in rural areas to compare credit accessibility and its impact on agricultural investments. The findings demonstrated that these barriers prevent women from investing in critical farm inputs such as seeds, fertilizers, and machinery, leading to reduced agricultural productivity and negative effects on household food security. The study underscored the need for policy reforms aimed at equalizing access to agricultural credit for women.

Quisumbing and Pandolfelli (2021) expanded on these findings by investigating gender disparities in access to agricultural resources, including credit, across several developing countries. Using a mixed-method approach combining quantitative surveys and qualitative interviews, the research targeted smallholder farmers and financial institutions to assess the gender gap in access to agricultural loans. The results showed that women, despite their significant role in food production, often face exclusion from formal financial systems, limiting their ability to invest in farming inputs and technologies. This exclusion results in lower yields and exacerbates food insecurity in households where women are the primary food producers. The study emphasized the critical need for financial inclusion policies that specifically address the barriers women face in agricultural credit access.

Kassie, Ndiritu, and Stage (2021) conducted a study in Ethiopia that explored the impact of gender disparities in agricultural credit on food security. The research utilized household

surveys and a probit regression model to analyze how access to formal credit differed between male- and female-headed households. The findings revealed that male-headed households had significantly better access to formal credit institutions, while female-headed households were often limited to informal lending or no credit at all. This disparity negatively affected women's ability to invest in modern farming technologies, ultimately lowering the food security status of female-headed households. The study recommended targeted interventions to increase women's access to formal credit channels as a means to improve household food security.

Jindo et al. (2023) examined gender disparities in accessing financial support for agriculture in Kenya. The research used a cross-sectional survey design and included both quantitative and qualitative data collection methods to capture the experiences of male and female farmers regarding access to agricultural credit. The study found that women frequently encounter challenges such as gender-based discrimination, lack of collateral, and restricted land ownership, all of which limit their ability to secure loans for farming activities. These constraints hinder women's capacity to invest in agriculture, adversely impacting their household's food security. The study suggested that improving legal frameworks around land ownership and offering gender-sensitive financial products could enhance women's access to credit and contribute to better food security outcomes.

Acheampong et al. (2022) in Ghana investigated the relationship between access to agricultural credit and food security. The researchers employed a quantitative approach using regression analysis to examine the link between credit access and the consumption of nutritious food groups. The findings revealed that although access to credit improved overall food availability, it was negatively associated with the consumption of more nutritious food groups. This was attributed to the diversion of credit towards inputs that enhanced farm productivity but did not necessarily improve dietary diversity. The study highlighted the importance of aligning agricultural credit schemes with broader food security goals, ensuring that increased farm productivity also translates into improved nutrition for households.

2.3.2 Empowering women and ensuring food security within households.

Links (2021) highlights that approximately 43% of individuals engaged in agricultural activities are women, contributing significantly to food cultivation. Despite this, women face consistent disparities in access to land and resources, with their land rights often being less secure than those of men. This limited access to land negatively affects their ability to invest in agriculture, limiting their potential to improve household food security. The study emphasizes

the importance of promoting gender equality in resource allocation to improve food security and agricultural productivity.

A report by Oxfam (2019), later endorsed by the United Nations in 2023, further underscores the importance of ensuring equal access to land and agricultural resources for women. The report highlights that equal access not only enhances food security but also contributes to broader development objectives, such as improved household investments, increased agricultural productivity, and better nutrition outcomes. The findings suggest that empowering women through equitable access to resources leads to positive outcomes, not only for household food security but also for the overall socio-economic development of communities. The report calls for policy interventions that address the structural barriers women face in accessing land and other resources.

Sraboni, Malapit, Quisumbing, and Ahmed (2020) conducted a study in Bangladesh that examined the impact of women's empowerment on household food security. Using the Women's Empowerment in Agriculture Index (WEAI), the researchers analyzed data from household surveys to assess how different dimensions of empowerment, such as decision-making in production, access to resources, and income control, affect food security. The findings revealed that households where women had higher levels of empowerment experienced better food security and improved nutritional outcomes. The study concluded that empowering women in agricultural activities directly contributes to the nutritional capacity of households, as women tend to prioritize food production and family well-being.

In another study, Meinzen-Dick et al (2020) explored the link between gender equality in resource access and food security in sub-Saharan Africa. The study employed a mixed-method approach, combining quantitative household surveys and qualitative interviews with male and female farmers. The results showed that when women have control over agricultural resources, they are more likely to invest in food production, leading to improved food security outcomes. Additionally, the study found that women's decision-making power in agriculture positively correlates with improved nutrition and food diversity within households, as women tend to allocate resources towards food that benefits the entire family.

FAO (2021) highlighted the broader impacts of empowering women on global food security. The research used econometric models to simulate the potential effects of providing women with equal access to agricultural inputs and land rights. The findings projected that granting women the same access to resources as men could lead to a 20-30% increase in farm yields and

a 2.5-4% increase in total agricultural output in developing countries. This would result in a 12-17% reduction in the global population of undernourished individuals. The study stressed that empowering women in agriculture is one of the most effective strategies for reducing hunger and improving global food security.

2.3.3 Gender Disparities in access to agricultural credit and household food security based on gender.

FAO (2023) reports that women face considerable disadvantages in accessing credit, land, services, and digital technology compared to men. These disparities contribute to a 24% productivity gap between male and female farmers operating on farms of the same size. Women's limited access to resources not only reduces their productivity but also negatively impacts food security, as they are less able to invest in farming inputs such as seeds, fertilizers, and equipment. The report emphasizes the need for addressing these gender-based disparities in order to improve agricultural productivity and household food security.

Kihui (2021) supports these findings by highlighting the significance of addressing gender-related productivity disparities in the agricultural sector. The study, which focused on agricultural households in Kenya, found that men are more likely to access agricultural credit than women, who often face barriers such as lack of collateral and legal ownership of land. Using household surveys and regression analysis, the study revealed that women-led households tend to have lower food security levels due to their limited access to financial resources. The findings call for gender-sensitive financial policies that increase women's access to credit, which is crucial for enhancing food security at the household level.

Kassie, Ndiritu, and Stage (2021) conducted a study in rural Kenya to investigate the relationship between household food security and the gender of household heads. The research employed probit regression models to analyze survey data from male- and female-headed households, revealing that female-headed households had significantly less access to formal credit than male-headed households. This lack of access limited their ability to invest in farming inputs, thereby reducing agricultural productivity and food availability. The study suggested that improving women's access to agricultural credit would lead to better food security outcomes, particularly for households headed by women, as they are more likely to allocate resources toward family well-being and nutrition.

Kiriti and Tisdell (2010) explored the broader issue of gender inequality in agricultural households in rural Kenya, focusing on the challenges women face in obtaining agricultural

credit. The study used qualitative interviews and focus groups to examine the experiences of female farmers and their difficulties in securing loans. The findings revealed that women often lacked the collateral required for loans, faced discriminatory lending practices, and had less access to information about financial services. These challenges restricted their ability to invest in their farms, limiting production and negatively impacting household food security. The study recommended policy reforms that target these specific barriers, such as providing credit facilities that do not require land ownership as collateral.

Jindo et al. (2023) further examined the obstacles women encounter in acquiring financial support for agricultural activities in Kenya. The study utilized a cross-sectional survey design and found that women face substantial challenges in securing agricultural loans due to factors such as gender-based discrimination and limited property rights. These challenges constrain their capacity to invest in farming, thereby affecting agricultural productivity and household food security. The research highlighted that women's limited access to credit not only reduces their economic opportunities but also has a cascading effect on food security, as they are unable to improve crop yields or diversify their farming activities. The study called for the implementation of more inclusive credit systems that cater to the unique needs of women farmers.

2.3.4 The relationship between cooperative membership household food security

Kehinde and Kehinde (2020) explored this relationship in southwest Nigeria, finding that cooperative participation positively influenced household food security by improving access to credit and resources. However, the study also noted that this impact was not uniform across all households, as factors such as market conditions and agricultural practices played a significant role in determining the effectiveness of cooperative membership. The study employed household surveys and regression analysis to evaluate the association between cooperative participation and food availability, revealing a complex but generally positive relationship between the two variables.

Mapunda (2021) expanded on this research by examining cooperative membership in Tanzania's Southern Highlands, focusing on the Agricultural Marketing Cooperative Society (AMCOS). The study used a mixed-method approach combining surveys and interviews to assess how cooperative membership impacted food security. The findings showed that although cooperative participation had the potential to improve food security by providing members with better access to markets and agricultural inputs, the benefits were inconsistent. Market

fluctuations and variations in agricultural practices influenced the extent to which cooperative membership contributed to household food security. This study highlighted the need for more stable and supportive market conditions to maximize the benefits of cooperative membership for food security.

Manda, Alene, and Gardebreek (2020) conducted a study in Zambia that explored how cooperative participation and technological innovations in agriculture intersect to influence household food security. Using a quantitative approach involving household-level data, the research found a positive relationship between cooperative membership and food security. The study highlighted that cooperative members had better access to agricultural technologies, which led to increased productivity and, consequently, improved food availability. The findings underscored the importance of integrating cooperatives with technological advancements in agriculture to ensure food security at the household level.

In Ethiopia's Oromia Regional State, Guyalo and Ifa (2023) studied the role of farming cooperatives in alleviating poverty and enhancing food security for smallholder farmers. The study used econometric analysis to assess the impact of cooperative membership on poverty reduction and food supply. The findings indicated that well-formulated policies and effective implementation of cooperative programs were crucial for maximizing their potential to alleviate food insecurity. The study stressed that cooperatives could significantly improve household food security, but only when supported by policies that address market access and resource distribution challenges.

In the Northwestern region of Mt. Kenya, Mwangi et al. (2020) conducted a study that examined the role of cooperative membership in improving food security among dairy farmers. The research found that 93% of households were part of a dairy cooperative, and this high level of participation contributed to enhanced food security. The study used descriptive statistics to analyze data from cooperative members, showing that active participation in cooperatives fostered social connections and collaboration, which in turn improved access to resources and markets. The findings highlighted the importance of cooperative membership in promoting household food security through both social and economic support mechanisms.

2.4 Summary of literature and research gaps

The unequal financial access for women engaged in African agriculture, specifically in Kenya, is frequently linked to behavioral differences arising from risk, social, and competitive preferences, as detailed in an IMF publication. To address the enduring gender disparity in

agricultural funding in Africa, the article underscores the significance of tackling demand-side factors. This includes improving the financial literacy of women and girls to rectify the situation. (Morsy, 2020) Conducting an in-depth review of existing literature in Kirinyaga County, Kenya, has revealed substantial insights from diverse sources regarding the relationship between gender-inclusive availability of agricultural loans and food security in the home. KIPPRA assessed the existing situation regarding Kenyan female ability to obtain financing for agriculture. The study collected primary data from 25 counties across diverse livelihood zones, encompassing various activities within agricultural value chains. The findings provide insights into the accessibility of agricultural financing and the credit requirements of women in rural areas (KIPPRA, 2019). The research unveiled significant findings regarding the relationship between providing gender-inclusive access to agricultural credit and enhancing household food security.

In general, agricultural finance is restricted, with only 14.7% of the agricultural population having access. Notably, distinct gender disparities exist, especially among women aged 65 and above residing in urban areas, where access levels are notably low (KIPPRA, 2019). Women in rural areas tend to prefer formal non-prudential sources, while those in urban areas lean towards formal prudential sources. Both men and women predominantly save through formal prudential sources, with women additionally relying more on formal non-prudential and informal sources than men. The study also emphasizes a low adoption of insurance, showcasing variations across genders and age groups. Spatial analysis of the Agricultural Finance Corporation (AFC) branch network suggests the need to reassess financial services in specific regions, providing nuanced insights into factors influencing household food security. These factors include gender disparities, source preferences, savings behavior, insurance uptake, and the spatial distribution of financial services.

The research conducted by Kiriti and Tisdell in 2010 focuses on recognizing and examining gender inequality in agricultural households in rural Kenya. The study focuses on the Nyeri district as a specific case for analysis. While the available sources do not specifically address the findings of food security and agricultural credit in Kirinyaga County, existing research on gender disparity in Kenyan agricultural households, encompassing rural areas like Kirinyaga County, sheds light on the difficulties encountered by women in accessing financial support. This has an impact on farm investments and production, ultimately affecting food security in the home (Kiriti & Tisdell, 2010). The study also identifies a bias towards men in food purchases, with husbands depleting food supplies by spending money on non-food items. It

also advises against promoting cash crops in patriarchal cultures, as it could limit women's and children's access to food (Kiriti & Tisdell, 2010). Moreover, the research underscores the significant economic inequality faced by women in Kenya and other African countries, hindering the growth of MSMES businesses run by women (Kiriti & Tisdell, 2010).

The ongoing publication of this study emphasizes the urgency of tackling gender disparities in agriculture to enhance food security in Kenya. However, it is worth noting that the specific connection between family food security in Kirinyaga County and inclusive access to agricultural financing based on gender is not explicitly addressed in the current research. The summary of the research gaps is as shown in Table 2.1.



Table 2.1: Summary of Research Gaps

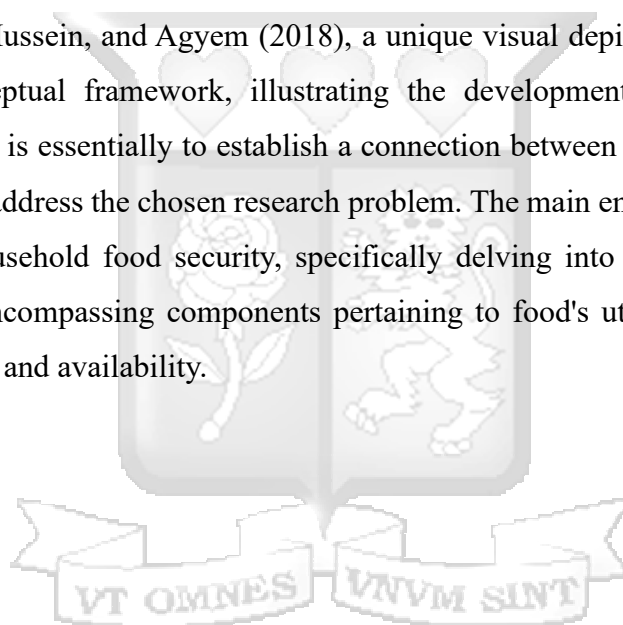
Author (Year)	Study	Methodology	Findings	Gaps	Focus of the study
Fletschner (2019)	Gender disparities in access to rural credit markets	Surveys targeting male and female farmers	Women face more obstacles than men in accessing credit due to systemic issues like lack of collateral and lower financial literacy.	Limited focus on the intersection of gender, credit access, and food security in specific agricultural sectors.	Our study focused on gender-inclusive access to credit in cooperatives and its role in household food security.
Quisumbing & Pandolfelli (2021)	Gender disparities in access to agricultural resources	Mixed-method (quantitative surveys, qualitative interviews)	Women are excluded from formal financial systems, limiting their ability to invest in farming inputs and affecting food security.	No specific focus on how gender-inclusive financial policies can bridge disparities in food security.	We explored how targeted financial policies can reduce gender disparities in food security within cooperatives.
Kassie, Ndiritu & Stage (2021)	Impact of gender disparities in credit on food security in rural Kenya	Probit regression analysis, household surveys	Female-headed households had less access to formal credit, reducing agricultural productivity and food availability.	Focuses primarily on rural areas; limited analysis of cooperatives' role in mitigating credit access disparities.	Our research included both rural and cooperative sectors to assess how gender disparities in credit access affect food security.
Kiriti & Tisdell (2010)	Gender inequality in agricultural households in Kenya	Qualitative interviews, focus groups	Women lack collateral for loans and face discriminatory lending practices, restricting investment and food security.	Emphasis on qualitative insights without quantitative validation on the role of cooperatives.	We use a mixed-method approach to quantify the impact of gender-inclusive cooperatives on credit access and food security.

Author (Year)	Study	Methodology	Findings	Gaps	Focus of the study
Jindo et al. (2023)	Gender disparities in accessing financial support for agriculture in Kenya	Cross-sectional survey design	Women face substantial challenges in acquiring agricultural loans due to gender-based discrimination and property rights issues.	Does not explore how gender-sensitive credit systems could address food security more comprehensively.	We proposed gender-sensitive credit systems within cooperatives to address both financial inclusion and food security gaps.
Mapunda (2021)	Cooperative membership and food security in Southern Highlands of Tanzania	Surveys and interviews	Cooperative membership could improve food security, but market conditions and agricultural practices influence this impact.	Inconsistent findings based on varying market conditions; lacks focus on gender dynamics within cooperatives.	Our study provided a more consistent analysis of gender dynamics in cooperative membership and food security.
Manda et al. (2020)	Technological innovations, cooperative participation, and food security in Zambia	Quantitative approach using household-level data	Cooperative participation and access to agricultural technology positively impacted food security.	Limited focus on the gendered impact of technology and cooperative membership on food security.	We assessed the combined impact of gender, technology, and cooperative membership on household food security.
Guyalo & Ifa (2023)	Cooperatives' role in alleviating poverty and enhancing food supply in Ethiopia	Econometric analysis	Cooperatives can alleviate poverty and improve food supply if well-supported by policies.	Focuses on policy support but lacks specific analysis of gender disparities within cooperatives.	We analyze gender disparities within cooperatives, focusing on their role in enhancing food security.
Mwangi et al. (2020)	Dairy cooperatives and food security in Northwestern Mt. Kenya	Descriptive statistics	Active participation in dairy cooperatives fosters social connections, improving resource access and food security.	Does not explore gender-based differences in cooperative access and membership's impact on food security.	Our study highlighted the importance of gender equity in cooperative access and participation for improving food security.

Author (Year)	Study	Methodology	Findings	Gaps	Focus of the study
Kihiu (2021)	Gender-related productivity disparities in the agricultural sector in Kenya	Household surveys and regression analysis	Men have more access to credit and resources, contributing to lower food security in female-headed households.	Does not sufficiently address how cooperative membership can mitigate the effects of credit disparities.	We integrated cooperative membership as a tool to mitigate gender-based credit disparities and enhance household food security.

2.5 Conceptual Framework

As stated by Adom, Hussein, and Agyem (2018), a unique visual depiction for researchers is provided by a conceptual framework, illustrating the development of the matter being examined. Its purpose is essentially to establish a connection between the main concepts of a study and effectively address the chosen research problem. The main emphasis of this research lies in examining household food security, specifically delving into the exploration of the dependent variable encompassing components pertaining to food's utilization as well as its stability, accessibility, and availability.



Independent Variables

Dependent Variable

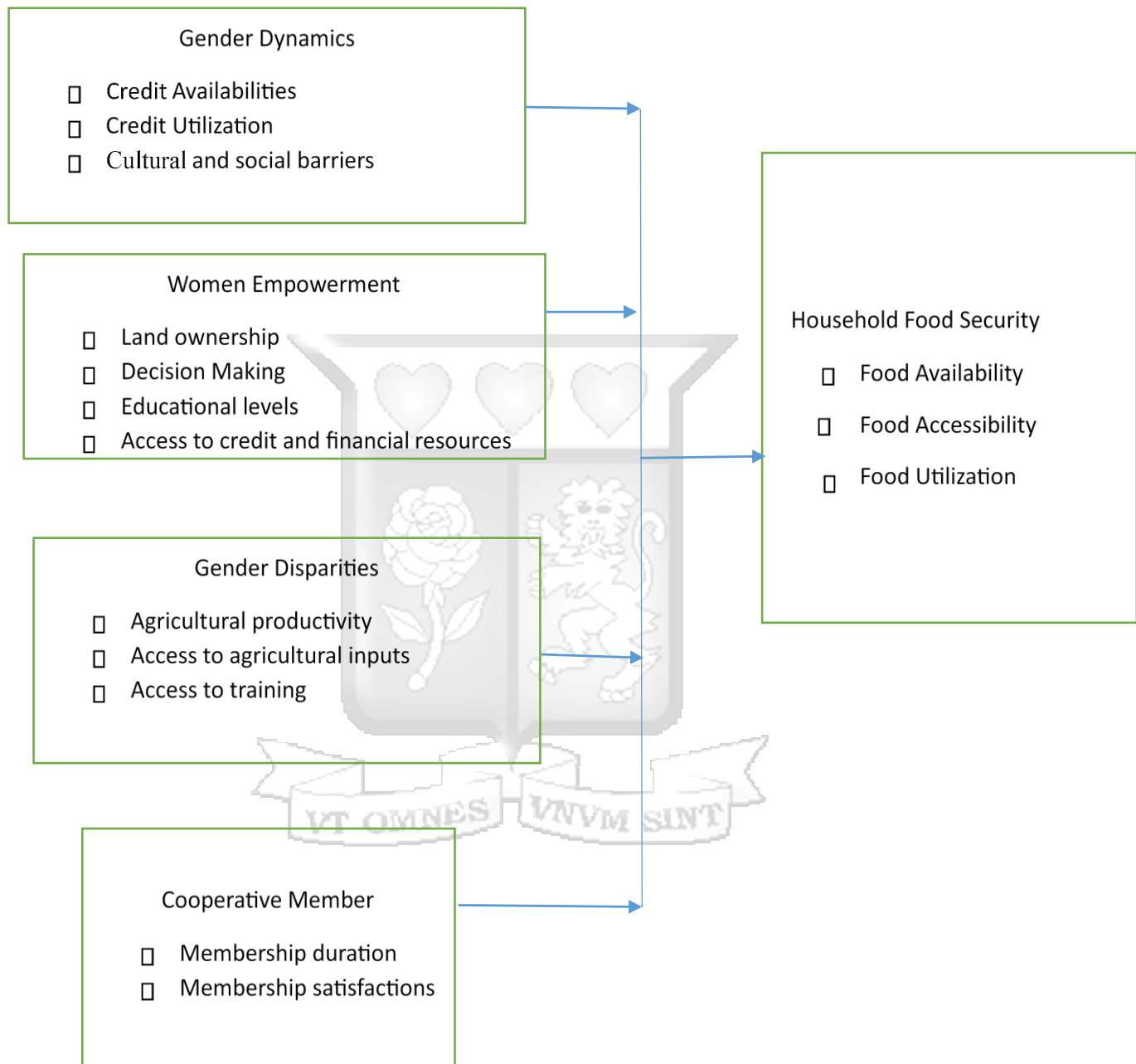


Figure 2.1: Conceptual framework depicting linkages between dependent and independent variables

Source: Author (2024)

2.5.1 Operationalization of the Study's Variable

Table 2.2 presents the depiction of variable measurements.

Table 2.2: Operationalization of the Study's Variable

Variable	Supporting Literature	Type of Variable	Measurements	Data Analysis Techniques	Supporting Theory
Gender Dynamics	Wellington, 2022; Acheampong et al., (2022)	Independent variable	Credit availabilities Credit utilization Barriers faced by men and women.	Descriptive statistics Gender Analysis Framework (GAF)	Social Capital Theory
Women empowerment	Oxfam 2021; Links, (2021)	Independent variable	Nature of land ownership Levels of educational Amounts of access to agricultural credits and resources The major decision-makers	Descriptive statistics Inferential statistics	Feminist Theory
Gender Disparities	Kihiu, 2021; Kiriti & Tisdell, 2010	Independent variable	Levels of agricultural productivity Levels of access to agricultural inputs Number of agricultural-related training.	Descriptive statistics Inferential statistics	Intra-Household Dynamics Theory
Cooperative Membership	Kehinde & Kehinde, (2020); Mwangi, et al., 2020	Independent variable	Membership duration Membership satisfaction	Descriptive statistics Inferential statistics	Social Capital Theory
Household Food Security	Gebre & Rahut, (2021)	Dependent Variable	Food: Stability Availability Utilization Accessibility	Descriptive statistics Inferential statistics (HFIAS)	Theory of Food and Nutrition Security

Source: Author (2024)

2.6 Chapter Summary

The section encompasses three theories, namely the Feminist Theory, Intra-Household Dynamics Theory, and Social Capital Theory. The discussion aligns these theories with research objectives, examining gender dynamics in agricultural credit, women's empowerment, disparities in credit access, and the relationship between cooperative membership and food security. Empirical reviews from diverse sources offer insights, and the chapter concludes with a literature summary, identifying research gaps. The Conceptual Framework visually represents the focus on household food security components.



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

The section offers clarification on the research philosophy, target population, design, sample, strategy employed in the study, methods for gathering data, and analytic methodologies. Furthermore, it explores facets of study quality, tackling issues of validity and reliability. The final section of the chapter highlights the ethical considerations that are involved during the research procedure.

3.2 Research Philosophy

The research philosophy in this study was guided by positivism, a paradigm that assumes knowledge is derived from objective, measurable observations of social phenomena (Saunders, Lewis, & Thornhill, 2019). Positivism, as a research philosophy, emphasizes the use of empirical data and measurement to generate generalizable laws that can explain and predict social realities. It was chosen for this study to objectively assess household food security in Kirinyaga County, focusing on quantifiable data related to gender disparities in access to credit and cooperative membership. This approach was appropriate for the study's aim of gathering empirical evidence to formulate generalizations and predict the dynamics of food security in the region. Positivism allowed the study to systematically collect data, analyze it using statistical methods, and draw reliable conclusions that could support policy recommendations. Recent research supports the use of positivism in studies that seek to explain and predict social phenomena through empirical observation (Creswell & Creswell, 2020).

3.3 Research Design

The research design served as a guiding framework and set of principles that the study followed to achieve its objectives (McLaughlin, 2012). To investigate the relationship between gender-inclusive access to agricultural credit and household food security in Kirinyaga County, the study employed a mixed-methods research design, with a particular emphasis on descriptive research methodology. This approach allowed for the collection and examination of both quantitative and qualitative data, enabling an in-depth exploration of the topic. A descriptive research strategy was adopted due to its ability to gather structured, interpretable, and assessable information. Statistical methods were used to measure the relationship between gender inclusivity in agricultural loans and household food security, using data from a substantial sample of households (Kananu et al., 2023).

3.4 Target Population

In the realm of research, a population denotes the collection of variables, individuals, objects, or events under examination. This population may encompass both theoretical and actual elements, with the variables within each population sharing common characteristics that facilitate their categorization into a unified group (Bryman, 2012). The study population focused on approximately 50,782 farmers actively engaged in farming, a number comprising 43,113 coffee cooperative farmers, 6,430 dairy farmers, and 1,239 in irrigation cooperatives.

Table 3.1 Target Population

Name of Cooperative	Number of Farmers	Percentage
Kabare Coffee Farmers Cooperative Society(Fcs)	7428	14.63%
Thirikwa Coffee Farmers Cooperative Society(Fcs)	2749	5.41%
Ngiriambu Coffee Farmers Cooperative Society(Fcs)	5336	10.51%
Baragwi Coffee Farmers Cooperative Society(Fcs)	21750	42.83%
New Ngariama Coffee Farmers Cooperative Society(Fcs)	5850	11.52%
Kirima Dairy Cooperative Society	4958	9.76%
Podago Dairy Cooperative Society	1049	2.07%
Kirinyaga Dairy Cooperative Society	423	0.83%
Miitono Irrigation Cooperative Society	500	0.98%
Karia Irrigation Cooperative Society	307	0.60%
Murinduko Irrigation Cooperative Society	432	0.85%
TOTAL	50782	100%

3.5 Sampling Technique and Sample Size

Sampling serves as a methodological tool that empowers researchers to select a subset of a population mirroring the characteristics of the entire group under investigation. This entails choosing a preset number of people in a way that accurately reflects the intended audience (Mugenda et al., 2019). This research employed a stratified probability sampling. This was employed to ensure an impartial opportunity for every individual within the population to be chosen for inclusion in the sample. The sample size was derived from a formula assuming the probability of 0.5 and a 95% confidence level. Yamane formula was used to calculate the sample size (Yamane, 1967).

$$n = N [1 + N (e^2)]$$

In this context, 'n' represents the sample size, 'N' denotes the population size, and signifies the level of precision. Consequently, the determination of the sample size was conducted based on these parameters.

$$n = 50782 / (1 + 50782(0.05)^2) = 397 \text{ Kirinyaga farmers}$$

Table 3.2: Sample Size

Name of Cooperative	Number of Farmers	Percentage
Kabare Coffee Farmers Cooperative Society(Fcs)	58	14.63%
Thirikwa Coffee Farmers Cooperative Society(Fcs)	21	5.41%
Ngiriambu Coffee Farmers Cooperative Society(Fcs)	42	10.51%
Baragwi Coffee Farmers Cooperative Society(Fcs)	170	42.83%
New Ngariama Coffee Farmers Cooperative Society(Fcs)	46	11.52%
Kirima Dairy Cooperative Society	39	9.76%
Podago Dairy Cooperative Society	8	2.07%
Kirinyaga Dairy Cooperative Society	3	0.83%
Miitono Irrigation Cooperative Society	4	0.98%
Karia Irrigation Cooperative Society	2	0.60%
Murinduko Irrigation Cooperative Society	3	0.85%
TOTAL	397	100%

Source: Study data (2024)

3.6 Data Collection Instruments

Research instruments encompass tools used to collect, evaluate, and examine data relevant to a research study's goal (Soh et al., 2020). The primary research instrument for this study was questionnaires, distributed to participants with the support of an introductory letter to encourage voluntary participation. The researcher initiated the process to obtain the necessary permissions. Structured questionnaires were administered in person to the 379 farmers and interview guide to 12 farmer's representatives.

3.7 Data Analysis

To achieve the research objectives, a Multivariate Probit (MVP) model was employed. The MVP model, originally developed by Ashford and Sowden (1970), is designed to estimate several correlated binary outcomes jointly. In our study, it was used to analyze the relationship

between gender-inclusive access to agricultural credit and the three dimensions of household food security simultaneously.

The MVP model is particularly useful when dealing with multiple, interrelated binary dependent variables. It allows for the possibility that these outcomes are correlated, which is often the case in complex social and economic phenomena (Greene, 2018). The model can be represented as:

$$Y^*_{ij} = X'_{ij}\beta_j + \varepsilon_{ij}, i = 1, \dots, N, j = 1, \dots, M$$

Where Y^*_{ij} is a latent variable for the j th outcome for the i th individual, X_{ij} is a vector of explanatory variables, β_j is a vector of parameters, and ε_{ij} are error terms distributed as multivariate normal with zero means and unit variances.

The observed outcomes are:

$$Y_{ij} = 1 \text{ if } Y^*_{ij} > 0 \text{ and } 0 \text{ otherwise}$$

In our study, j represents the three dimensions of food security (Availability, Utilization, and Accessibility), while the explanatory variables include gender dynamics, women's empowerment, gender disparities in access to agricultural credit, and cooperative membership.

While the MVP model offers advantages over univariate models by accounting for potential correlations between outcomes, it does have limitations. The model assumes that the error terms follow a multivariate normal distribution, which may not always hold in practice. Additionally, the interpretation of results can be complex, particularly when dealing with interaction effects (Cappellari & Jenkins, 2003).

3.8 Diagnostic Tests

To uphold the methodological rigor of the study, key variables essential to the investigation were measured, including gender dynamics in access to agricultural credit, gender disparities, women's empowerment, and cooperative membership. These variables are integral to the examination of household food security dynamics in Kirinyaga County. Relationship analysis was utilized to unravel the intricate interrelationships embedded in the research scope. Potential multicollinearity issues were scrutinized to ensure the robustness of the model. The process of model validation, coupled with comprehensive diagnostic tests, was fundamental to evaluating the reliability and effectiveness of the analytical framework. In cases where necessary, model re-specification was committed to address any issues uncovered during diagnostics, thereby ensuring precision and robustness. Additionally, a thorough examination of uniformity in

parallel regression coefficients was conducted, enhancing the depth of insights into the consistency of predictor variables across different levels. This systematic approach fortifies the research model, providing a resilient foundation for contributing meaningful insights to the discourse on household food security.

3.9 Research quality

Research quality pertains to the degree to which methods for collecting and analyzing data will yield consistent results in subsequent studies (Saunders, Lewis, & Thornhill 2009).

3.9.1 Research Reliability and Objectivity

Research reliability refers to the extent of consistency in the results produced by research tools (Saunders, Lewis, & Thornhill, 2009). Several techniques, such as the test-retest method, which entails giving the same test to the same group of participants twice, was used to evaluate the study's reliability. A key aspect of maintaining objectivity in the data collection phase involved ensuring accurate and comprehensive recording of data. This approach safeguarded against subjective biases, preventing the researcher from selectively choosing what to record. Internal consistency and reliability are deemed high when the alpha coefficient is close to 0.70 implying that the data would be generalized to mirror all responses within the target population and therefore the questionnaire was deployed after obtaining an alpha coefficient of 0.8213.

Table 3.3: Cronbach's alpha coefficient

Average interitem covariance:	0.14264
Scale reliability coefficient:	0.8213

Source: Study data (2024)

3.9.2 Validity of the research instrument

The validity of study instruments pertains to the capacity to measure the designated variables or concepts precisely and reliably, ensuring the collected data aligns with the research goals (Mohajan, 2017). To ensure validity, the research goals and objectives were clearly defined and assessment measures were aligned with these articulated research goals. Subsequently, the researcher reviewed assessments for any potential wording issues that may impact validity. To enhance the validation process, a peer review was conducted involving three academic experts in the fields of agricultural economics and gender studies from Strathmore University. These peers critically evaluated the research instruments for content validity and construct validity. Additionally, data comparison instruments were employed, including the Women's

Empowerment in Agriculture Index (WEAI) and the Household Food Insecurity Access Scale (HFIAS), which are widely validated tools in the field. The research instruments were compared against these established measures to ensure they adequately captured the intended constructs and were appropriate for the local context of Kirinyaga County.

3.9.3 Ethical Considerations

The study upheld strict ethical standards throughout the research process. Prior to data collection, ethical approval was obtained from the Strathmore University Institutional Science, Ethics and Review Committee (SU-IRERC) and a research permit was secured from the National Commission for Science, Technology and Innovation (NACOSTI). These approvals ensured that the research adhered to established ethical guidelines. Throughout the data collection and analysis process, survey data confidentiality was rigorously protected. To guarantee that no information was revealed in a way that could publicly identify a participant or the information source, confidentiality was strictly maintained. The study questionnaires did not contain any personal identifiers of participants without their prior consent, thus ensuring their privacy. Data gathered from in-depth interviews were utilized solely for educational research purposes. All participants were informed about the nature of the study and provided informed consent before participating. These measures collectively ensured that the research was conducted ethically and with full respect for participants' rights and privacy.

3.10 Chapter Summary

The section commences by delineating essential components such as research philosophy, design, target demographic, and data-gathering methods, with a particular emphasis on considerations of validity and reliability. Employing a positivist approach, the investigation seeks to predict food security within Kirinyaga County households. Through stratified probability sampling, we target 397 farmers, from a possible population of 50,782 farmers. Methodological rigor is upheld through the implementation of diagnostic tests, while ethical considerations prioritize participant confidentiality and privacy.

CHAPTER FOUR: PRESENTATION OF RESEARCH FINDINGS

4.1 Introduction

This chapter presents the study's research findings on the relationship between gender-inclusive access to agricultural credit and household food security in Kirinyaga County. Section 4.1 provides the introduction, Section 4.2 discusses the study response rate, Section 4.3 presents the respondents' demographic information, and Section 4.4 presents the diagnostic tests and the results per each objective. The study's sample size was 397 Kirinyaga farmers who are members of SACCOs.

4.2 Study Response Rate

The researcher administered questionnaires and semi-structured interviews to 397 Kirinyaga farmers who are members of SACCOs. Out of the 397 questionnaires and semi-structured interviews distributed, 379 were completed, representing a response rate of 95.5% as shown in Table 4.1

Table 4.1: Response Rate

Questionnaires	Number	Percentage
Completed	379	95.5%
Not Completed	18	4.5%
Administered	397	100%

Source: Study data (2024)

This remarkable 95.5% response rate can be attributed to the effective data collection procedures employed by the researcher, which included proper planning, training of research assistants, and close follow-up with the respondents. The response rate is considered excellent and sufficient for analysis and drawing meaningful conclusions from the data.

4.3 Socioeconomic characteristics

This section presents the respondents' demographic characteristics. These demographic factors are essential in understanding the background of the respondents and how they may influence their access to agricultural credit and household food security. Table 4.2 presents the socioeconomic characteristics of the households surveyed in Kirinyaga County. The table

includes information on the gender and age of the household head, their marital status, years of schooling, years actively engaged in farming, and main livelihood activity.

Table 4.2: Socioeconomic characteristics

Variable	Category	Frequency	Percentage
Gender of the household head	Male	205	54.1%
	Female	174	45.9%
Marital status of household head	Divorced	26	6.9%
	Married	243	64.1%
	Single	96	25.3%
	Widowed	14	3.7%
Livelihood of household head	Farming	303	79.9%
	Own a small business	64	16.9%
	Work for someone else	9	2.4%
	Currently not working	3	0.8%
Variable	Mean	Standard Deviation	
Age of household head (years)	44	13.8	
Years of schooling of household head	12	4.0	
Years actively engaged in farming in the last 10 years	8	3.0	

Source: Study data (2024)

The socioeconomic characteristics of the households surveyed in Kirinyaga County reveal interesting patterns across various demographic factors. In terms of gender distribution, there is a relatively balanced representation, with 54.1% of household heads being male and 45.9% female. This near-equal distribution suggests a significant presence of female-headed households in the study area.

Marital status shows a predominance of married household heads at 64.1%, followed by single individuals at 25.3%. Divorced and widowed household heads represent smaller proportions at

6.9% and 3.7% respectively. This distribution reflects the typical family structure in rural Kenyan communities, with a majority of households headed by married couples.

The primary livelihood of the household heads is overwhelmingly farming, accounting for 79.9% of the sample. This underscores the agricultural nature of Kirinyaga County's economy. A smaller proportion (16.9%) own small businesses, while very few work for someone else (2.4%) or are currently not working (0.8%).

The average age of household heads is 44 years, with a standard deviation of 13.8 years, indicating a wide age range among respondents. The mean years of schooling is 12, equivalent to completing secondary education, with a standard deviation of 4 years suggesting some variation in educational attainment. On average, household heads have been actively engaged in farming for 8 of the last 10 years, with a standard deviation of 3 years, indicating a strong and consistent involvement in agricultural activities.

4.4 Descriptive statistics of gender dynamics

The first variable was to examine the influence of gender dynamics in access to agricultural credit and its direct impact on household food security in Kirinyaga County. The table 4.3 presents the variables related to gender dynamics and access to money for farming in Kirinyaga County.

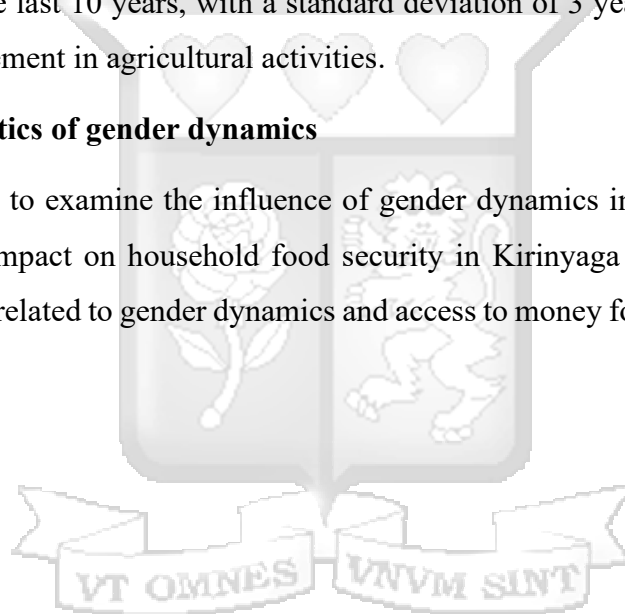


Table 4.3: Descriptive statistics of gender dynamics

Variable	Description	Male	Male %	Female	Female %
Ease of securing funds for farming	Very difficult	46	22.4%	39	22.4%
	Difficult	69	33.7%	59	33.9%
	Neutral	36	17.6%	30	17.2%
	Easy	35	17.1%	29	16.7%
	Very easy	19	9.3%	17	9.8%
Primary sources for agricultural loans/credit	Banks	82	40.0%	70	40.2%
	Cooperatives	53	25.9%	45	25.9%
	Family or friends	36	17.6%	31	17.8%
	Chamas	34	16.6%	28	16.1%
Usage of funds obtained through loans	Farming needs	114	55.6%	96	55.2%
	Family needs	62	30.2%	52	29.9%
	Emergency needs	29	14.1%	26	14.9%
Main challenges in accessing money for farming	High-interest rates	77	37.6%	66	37.9%
	Lack of collateral	63	30.7%	54	31.0%
	Gender discrimination	36	17.6%	30	17.2%
	Bureaucratic processes	29	14.1%	24	13.8%
Accessibility of loans for farming	Extremely challenging	52	25.4%	44	25.3%
	Challenging	55	26.8%	47	27.0%
	Neutral	35	17.1%	30	17.2%
	Manageable	38	18.5%	33	19.0%
	Very manageable	25	12.2%	20	11.5%

Regarding the ease of securing funds for farming, both male and female respondents exhibited similar experiences. Approximately 22.4% of both men and women reported that it was very difficult to secure funds, while the majority of respondents (33.7% of men and 33.9% of women) indicated that it was difficult. A smaller proportion found the process neutral (17.6% of men and 17.2% of women) or easy (17.1% of men and 16.7% of women). Only about 9% of men and 9.8% of women found it very easy to secure funds for farming.

In terms of primary sources for agricultural loans or credit, banks were the most common source for both men and women, with 40.0% of men and 40.2% of women using banks for loans. Cooperatives were the second most popular source (25.9% for both men and women), followed by family or friends and chamas, where the distribution was also fairly balanced across genders.

The usage of funds obtained through loans predominantly went towards farming needs, with 55.6% of men and 55.2% of women using loans for this purpose. Family needs followed, accounting for 30.2% of loans for men and 29.9% for women. A smaller proportion of respondents, 14.1% of men and 14.9% of women, used loans for emergency needs.

In addressing the main challenges in accessing money for farming, high-interest rates were the most significant obstacle, reported by 37.6% of men and 37.9% of women. Lack of collateral was the second major challenge, affecting 30.7% of men and 31.0% of women. Gender discrimination was a concern for 17.6% of men and 17.2% of women, while bureaucratic processes were reported as a challenge by 14.1% of men and 13.8% of women.

When it came to the accessibility of loans for farming, around a quarter of both men (25.4%) and women (25.3%) found the process extremely challenging. Another 26.8% of men and 27.0% of women found it challenging, while around 17% from both groups were neutral. Loans were manageable for 18.5% of men and 19.0% of women, and only about 12.2% of men and 11.5% of women found the process very manageable.

To gain deeper insights into gender roles and the division of labor in agricultural activities, farmers were asked to describe how duties and responsibilities are assigned to men and women within the community. The responses revealed the existence of distinct gender-specific roles. Men are generally responsible for tasks that require physical strength, such as plowing, preparing the land, and managing heavy machinery. Women, on the other hand, are often tasked with planting, weeding, and harvesting. However, the roles are not always rigid, and in some households, tasks may vary based on specific needs or circumstances.

A common theme that emerged was the unequal distribution of responsibilities in agriculture. While both men and women contribute significantly to farming activities, women often bear a heavier workload. Men typically take on leadership roles in decision-making, accessing credit, and marketing the produce, while women focus on maintaining the crops, sowing seeds, and processing the harvest. This division of labor reflects traditional gender norms that persist in

agricultural communities, where men tend to have more influence in critical financial and strategic decisions.

These findings highlight the need for initiatives that promote gender equality in agricultural pursuits. While some flexibility in roles was noted, the overall imbalance in workload and responsibilities suggests that addressing gender disparities in agricultural tasks could improve efficiency and well-being within the community. Encouraging shared decision-making and ensuring equal access to resources and opportunities for both men and women will be crucial for advancing gender equity in agriculture..

4.5 Descriptive statistics of women's empowerment

The second objective was to assess the role of women's empowerment in enhancing household food security among smallholder farmers in Kirinyaga County. Table 4.4 presents variables related to empowering women and ensuring food security within households in Kirinyaga County.

Table 4.4: Descriptive statistics of women's empowerment

Variable	Description	Frequency (Male)	Percentage (Male)	Frequency (Female)	Percentage (Female)
Impact of women's involvement in farming on household food security	Minimal	10	4.9%	8	4.6%
	Low	15	7.3%	12	6.9%
	Moderate	44	21.5%	38	21.8%
	High	97	47.3%	82	47.1%
Decision-making in the household	Substantial	39	19.0%	34	19.5%
	Husband mainly decides	70	34.1%	60	34.5%
	Wife mainly decides	43	21.0%	36	20.7%
Land ownership registration	Joint decision-making	92	44.9%	78	44.8%
	Wife	29	14.1%	24	13.8%
	Husband	113	55.1%	96	55.2%
	Joint	63	30.7%	54	31.0%

Source: Study data (2024)

Regarding the impact of women's involvement in farming on household food security, a significant portion of male respondents (47.3%) and female respondents (47.1%) reported that women's contributions had a high impact on household food security, underscoring their critical role. Additionally, 19.0% of men and 19.5% of women indicated a substantial impact. A moderate impact was noted by 21.5% of men and 21.8% of women. Only a small percentage reported minimal or low impacts, with 12.2% of men and 11.5% of women, showing the overwhelmingly positive influence of women's involvement in farming on food security across both genders.

In terms of decision-making within the household, joint decision-making between husbands and wives was the most common practice, with 44.9% of men and 44.8% of women reporting this arrangement. This reflects a trend toward shared household authority. However, traditional roles still exist, as 34.1% of men and 34.5% of women noted that the husband was mainly responsible for making decisions. Only 21.0% of men and 20.7% of women reported that the wife was the primary decision-maker, indicating that, while shared decision-making is gaining traction, many households still adhere to conventional patterns.

With respect to land ownership registration, there remains a notable gender disparity. A majority of men (55.1%) and women (55.2%) indicated that land is registered in the husband's name, while 14.1% of men and 13.8% of women reported land registration under the wife's name. However, joint land ownership is becoming more common, with 30.7% of men and 31.0% of women reporting joint registration. This suggests a gradual shift toward more equitable land ownership arrangements, though gender disparities still persist in many households.

To assess the role of women's empowerment in enhancing household food security among smallholder farmers, several questions were posed to gather insights on access to financial resources and its impact. The responses revealed diverse experiences with agricultural credit. While some women had accessed credit through cooperatives, using it to improve their crops, others had never accessed such resources, relying solely on personal savings or family support. These experiences highlight the varying levels of financial inclusion among women farmers, with some benefiting from credit while others remain excluded.

The responses also emphasized the potential of credit and loans to empower women in agricultural activities. Access to financial resources was seen as a crucial enabler, allowing women to make important decisions regarding crop production and marketing, thereby

increasing their confidence and influence in household matters. However, there was also recognition of the risks associated with borrowing. The importance of financial literacy and support in making informed borrowing decisions was highlighted as necessary to ensure that women benefit from credit without becoming overburdened by debt.

Furthermore, there was consensus on the link between women's involvement in farming and household food security. Many respondents agreed that when women actively participate in farming, they tend to focus on growing diverse crops that enhance the household's nutritional intake, leading to improved food security. However, it was noted that women's involvement is just one of many factors influencing food security, alongside access to essential resources like land and water. The discussion on community support programs further revealed that while some initiatives aimed at empowering women in agriculture exist, there is a call for more targeted efforts to address the specific needs of women farmers and bolster their contributions to food security.

4.6 Descriptive statistics of gender disparities

The third objective was to investigate gender disparities in access to agricultural credit and their direct impact on household food security in Kirinyaga County. Table 4.5 presents variables related to gender disparities in accessing money for farming in Kirinyaga County.

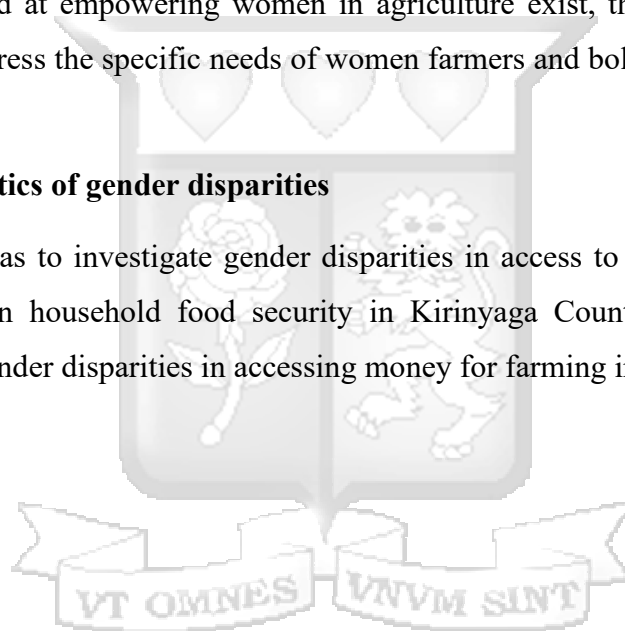


Table 4.5: Descriptive statistics of women's empowerment

Variable	Description	Male	Male %	Female	Female %
Chances for men and women to get money for farming	Very unequal	48	23.4%	40	23.0%
	Unequal	65	31.7%	55	31.6%
	Neutral	43	21.0%	37	21.3%
	Equal	33	16.1%	28	16.1%
	Very equal	16	7.8%	14	8.0%
Awareness of programs or rules promoting fairness in accessing money for farming	Yes	88	42.9%	75	43.1%
	No	117	57.1%	99	56.9%
Perception of equal distribution of financial benefits among farmers	Completely Disagree	41	20.0%	35	20.1%
	Disagree	67	32.7%	57	32.8%
	Neutral	45	22.0%	38	21.8%
	Agree	36	17.6%	30	17.2%
	Strongly Agree	16	7.8%	14	8.0%

Source: Study data (2024)

The first variable examines the chances for men and women to get money for farming, with 31.7% of male respondents and 31.6% of female respondents perceiving the chances as unequal, indicating a shared view of disparity between genders. Furthermore, 23.4% of men and 23.0% of women viewed the chances as very unequal. Only 16.1% of men and women believed the chances were equal, while a small proportion, 7.8% of men and 8.0% of women, saw the chances as very equal. This illustrates a general perception of inequality in accessing funds for farming across both genders.

For the second variable, which assesses awareness of programs or rules promoting fairness in accessing money for farming, 42.9% of men and 43.1% of women were aware of such programs, while a majority—57.1% of men and 56.9% of women—were not. This indicates a limited awareness of initiatives aimed at promoting financial fairness in farming, with similar levels of awareness across both male and female respondents.

The third variable focuses on the perception of equal distribution of financial benefits among farmers. A significant portion of both men (32.7%) and women (32.8%) disagreed with the idea that financial benefits were equally distributed, while 20.0% of men and 20.1% of women completely disagreed. Only 17.6% of men and 17.2% of women agreed, and 7.8% of men and 8.0% of women strongly agreed. These findings suggest that most respondents, irrespective of gender, perceive inequities in the distribution of financial benefits among farmers.

The data reveals a perceived inequality in access to farming funds between men and women, limited awareness of programs aimed at promoting fairness, and a general belief that financial benefits are not equally distributed among farmers. These perceptions are consistent across both male and female respondents.

To explore gender disparities in access to agricultural credit, respondents were asked whether they believed both men and women have equitable opportunities to access financial resources for farming. A common theme that emerged was the acknowledgment of existing inequalities. Several respondents pointed out that women often face more barriers than men, such as a lack of collateral or limited decision-making power within the household. These factors were seen as major obstacles that prevent women from accessing financial resources on an equal footing with men, highlighting the ongoing challenges to achieving financial equity in agricultural pursuits.

The theme of barriers to accessing credit was further explored, with respondents identifying specific factors that make it harder for either gender to obtain financial resources for farming. One key challenge mentioned was the lack of collateral, particularly for women who may not have land titles in their names. Financial literacy also emerged as a critical theme, as many women may be unaware of available credit options or lack the knowledge to navigate the loan application process. Additionally, some respondents mentioned that women often encounter discrimination or bias when applying for loans, further limiting their access to financial resources.

These responses underscore the theme of inequitable opportunities in accessing agricultural credit, with women facing greater obstacles compared to men. Barriers such as lack of collateral, limited decision-making power, financial illiteracy, and bias were consistently mentioned as contributing to the gender disparities in access to credit. This suggests that addressing these issues is crucial to promoting equal financial opportunities for both men and women in the agricultural sector.

4.7 Descriptive statistics of cooperative membership

The fourth objective was to evaluate the relationship between cooperative membership and its direct impact on household food security among smallholder farmers in Kirinyaga County. The table 4.6 presents variables related to cooperative membership and household food security in Kirinyaga County.

Table 4.6: Descriptive statistics of cooperative membership

Variable	Description	Frequency (M)	Percentage (M)	Frequency (F)	Percentage (F)
Influence of cooperative membership on household food security	Less influence	15	7.3%	12	6.9%
	Slight influence	24	11.7%	21	12.1%
	Moderate influence	57	27.8%	48	27.6%
	High influence	72	35.1%	60	34.5%
	Great influence	37	18.0%	33	19.0%
Benefits received due to cooperative membership	Farm Inputs	41	20.0%	37	21.3%
	Agriculture	25	12.2%	20	11.5%
	Credit				
	Training	37	18.0%	29	16.7%
	Better income	58	28.3%	51	29.3%
	Market Assistance	34	16.6%	27	15.5%
	Other	10	4.9%	10	5.7%
Impact of cooperative membership on household food expenditure	Yes	155	75.6%	133	76.4%
	No	50	24.4%	41	23.6%

Source: Study data (2024)

The first variable examines the influence of cooperative membership on household food security. A significant portion of male respondents (35.1%) and female respondents (34.5%) indicated high influence, while 27.8% of men and 27.6% of women perceived a moderate influence. In contrast, only 7.3% of men and 6.9% of women felt that cooperative membership

had less influence. This indicates that cooperative membership is generally viewed as having a positive impact on household food security across both genders.

The second variable assesses the benefits received due to cooperative membership. The most common benefit reported was better income, with 28.3% of male respondents and 29.3% of female respondents indicating this. Farm inputs were cited by 20.0% of men and 21.3% of women, while 18.0% of men and 16.7% of women received training. Agriculture credit and market assistance were mentioned by 12.2% and 16.6% of male respondents, and 11.5% and 15.5% of female respondents, respectively. This suggests that cooperative membership provides various benefits, primarily focused on improving income, with similar patterns observed among both men and women.

The third variable evaluates the impact of cooperative membership on household food expenditure. A substantial majority of both male (75.6%) and female (76.4%) respondents reported that cooperative membership positively affected their food expenditure, indicating that being part of a cooperative significantly influences financial outcomes related to food security for both genders.

To evaluate the relationship between cooperative membership and household food security, a key theme that emerged from the respondents' experiences was the overall positive impact of cooperative membership on farming activities. Many respondents, like Respondent 11, noted that being part of a cooperative allowed them to access quality inputs at lower costs and secure better prices for their produce. Additionally, cooperatives provided training and support that improved their farming practices, thereby enhancing their productivity and contributing to household food security. The access to shared resources and knowledge transfer through cooperatives was consistently mentioned as a major benefit.

However, alongside the benefits, respondents also highlighted challenges associated with cooperative membership. A recurring theme was the delays in receiving inputs or payments, which some respondents found frustrating. The slow decision-making processes within cooperatives were also mentioned as a barrier, potentially affecting timely access to resources and the efficiency of farming activities. Despite these challenges, respondents like Respondent 12 expressed that the overall advantages of cooperative membership—such as improved access to markets, inputs, and training—outweighed the disadvantages, contributing positively to their agricultural outcomes and food security.

The theme of gender disparities in access to agricultural credit was also explored during the interviews. While the primary focus was on cooperative benefits, the interviews suggested that gender-based barriers, such as limited decision-making power and access to financial resources, might also influence cooperative participation and access to agricultural credit. This underscores the need for cooperatives and related agricultural institutions to address both logistical challenges and gender inequities to further enhance household food security.

4.8 Descriptive statistics of Household Food Security

The dependent variable was to assess the household food security among smallholder farmers in Kirinyaga County. The table 4.7 presents variables related to household food security in Kirinyaga County.



Table 4.7: Descriptive statistics of Household Food Security

Variable	Description	Frequency (M)	Percent (M)	Frequency (F)	Percent (F)
Frequency of eating smaller portions due to insufficient food	Never	19	9.3%	17	9.8%
	Seldom	36	17.6%	30	17.2%
	Occasionally	68	33.2%	59	33.9%
	Frequently	82	40.0%	68	39.1%
Farm size in Kirinyaga County (acres)	Less than 1 acre	27	13.2%	24	13.8%
	1 to 2 acres	59	28.8%	50	28.7%
	2 to 3 acres	55	26.8%	47	27.0%
	More than 3 acres	64	31.2%	53	30.5%
Frequency of skipping meals due to insufficient food	Never	16	7.8%	14	8.0%
	Hardly ever	32	15.6%	27	15.5%
	Sometimes	65	31.7%	56	32.2%
	Frequently	92	44.9%	77	44.3%
Frequency of experiencing a complete shortage of food	Never	24	11.7%	21	12.1%
	Rarely	45	22.0%	38	21.8%
	Sometimes	73	35.6%	61	35.1%
	Regularly	63	30.7%	54	31.0%
Household food security status	Food secure	47	22.9%	41	23.6%
	Moderately food insecure	109	53.2%	92	52.9%
	Severe food insecure	49	23.9%	41	23.6%

Source: Study data (2024)

The first variable assesses the frequency of eating smaller portions due to insufficient food. A notable 40.0% of male respondents and 39.1% of female respondents reported frequently eating

smaller portions, with an additional 33.2% of men and 33.9% of women doing so occasionally. Only 9.3% of men and 9.8% of women claimed they never eat smaller portions, indicating a significant prevalence of portion reduction due to food insufficiency across both genders.

Regarding farm size in Kirinyaga County, a majority of both male (28.8%) and female (28.7%) respondents owned farms ranging from 1 to 2 acres, while 31.2% of men and 30.5% of women had more than 3 acres. This suggests a varied distribution of farm sizes, with many households operating on a small scale, and similar patterns observed among both genders. The frequency of skipping meals due to insufficient food showed that 44.9% of male respondents and 44.3% of female respondents frequently skipped meals, and 31.7% of men and 32.2% of women did so sometimes. Only 7.8% of men and 8.0% of women reported never skipping meals, indicating that meal skipping due to food shortages is common across both genders.

When examining the frequency of experiencing a complete shortage of food, 35.6% of male respondents and 35.1% of female respondents reported sometimes facing a complete shortage, with 30.7% of men and 31.0% of women experiencing it regularly. This suggests a significant number of households encounter severe food shortages, with similar patterns observed among both genders. Lastly, the household food security status indicates that 53.2% of male respondents and 52.9% of female respondents reported being moderately food insecure, while 23.9% of men and 23.6% of women classified themselves as severely food insecure. Only 22.9% of men and 23.6% of women felt food secure, highlighting a concerning level of food insecurity in the population, with similar patterns observed across both genders.

4.9 Correlation Analysis

Pearson correlation analysis assessed the relationships between food availability, food utilization, and food accessibility. The correlation between food availability and food utilization was positive and strong, $r(379) = 0.752$, while the correlation between food availability and food accessibility was also positive and strong, $r(379) = 0.685$. The correlation between food utilization and food accessibility was positive and moderate, $r(379) = 0.597$, implying that they can be run independently in the model as shown in Table 4.8.

Table 4.8: Pearson's correlation between dependent variables

	Food Availability	Food Utilization	Food Accessibility
Food Availability	1		
Food Utilization	0.752	1	
Food Accessibility	0.685	0.597	1

Source: Study data (2024)

4.10 Multicollinearity

Multicollinearity was checked through the Variance Inflation Factor (VIF) test. The VIF checks for correlation of independent variables, and particularly the variance rises when there's correlation. The absence of correlation between independent variables is indicated by the result of $VIF = 1$. When $1 < VIF < 5$, the value of VIF indicates that there exists a moderate correlation between the variables, while $VIF \geq 5$ to 10 indicates that the variables are highly correlated (Shrestha, 2020). For the study, the highest VIF value is 2.31, which is less than 10, thus the study concludes that the data does not suffer from multicollinearity in the results, as shown in Table 4.9.

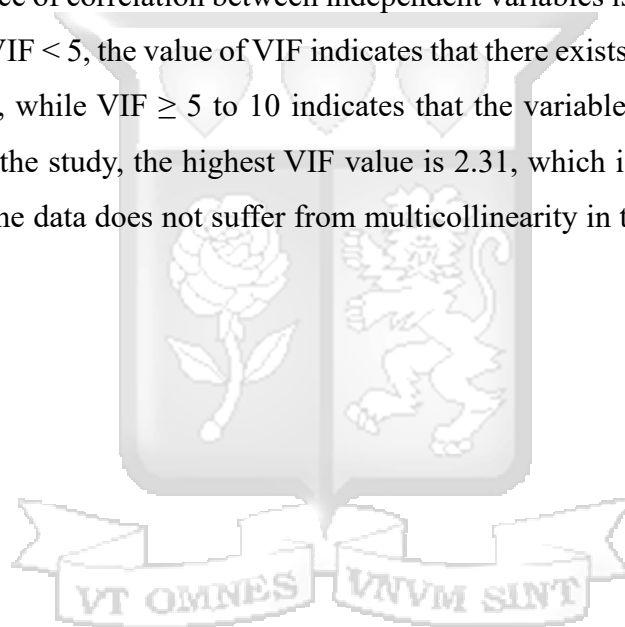


Table 4.9: Multicollinearity test

Variable	VIF	1/VIF
Gender of the household head	1.24	0.806
Age of household head	1.56	0.641
Marital status of household head	1.37	0.73
Years of schooling of household head	1.48	0.676
Years actively engaged in farming in the last 10 years	1.29	0.775
Livelihood of household head	1.19	0.84
Ease of securing funds for farming (women)	1.73	0.578
Primary sources for agricultural loans or credit	1.62	0.617
Usage of funds obtained through loans for farming	1.45	0.69
Main challenges in accessing money for farming needs	1.58	0.633
Accessibility of loans or credit for farming activities	1.81	0.552
Impact of women's involvement in farming on household food security	1.92	0.521
Decision-making in the household	1.39	0.719
Land ownership registration	1.27	0.787
Chances for men and women to get money for farming	2.14	0.467
Awareness of programs or rules promoting fairness in accessing money for farming	1.53	0.654
Perception of equal distribution of financial benefits among farmers	1.87	0.535
Influence of cooperative membership on household food security	2.31	0.433
Benefits received due to cooperative membership	1.94	0.515
Impact of cooperative membership on household food expenditure	1.76	0.568
Frequency of eating smaller portions due to insufficient food	2.03	0.493
Farm size (acres)	1.35	0.741
Frequency of skipping meals due to insufficient food	1.97	0.508
Frequency of experiencing a complete shortage of food	1.82	0.549
Household food security status	2.25	0.444
Mean VIF	1.69	

Source: Study data (2024)

4.11 Relationship between Gender-Inclusive Access to Agricultural Credit and Household Food Security

A Multivariate Probit model was used to analyze gender-inclusive access to agricultural credit and household food security. The Multivariate Probit analysis allows for the simultaneous estimation of multiple binary dependent variables, accounting for the potential correlation between them. In this study, the three dependent variables were Food Availability, Food Utilization, and Food Accessibility, which represent different dimensions of household food security. Table 4.10 presents the results of the Multivariate Probit analysis, showcasing the coefficients, standard errors, and significance levels of the independent variables for each of the three dependent variables.

Table 4.10: Multivariate Probit

	Food Availability		Food Utilization		Food Accessibility	
		S.E		S.E		S.E
Gender of the household head	0.124	0.118	0.087	0.115	0.201*	0.117
Age of household head	-0.007	0.005	-0.003	0.005	-0.009*	0.005
Marital status of household head	0.063	0.087	0.112	0.085	0.041	0.086
Years of schooling of household head	0.028*	0.015	0.017	0.015	0.035**	0.015
Years actively engaged in farming in the last 10 years	0.031*	0.018	0.022	0.017	0.028	0.018
Livelihood of household head	-0.094	0.105	-0.137	0.103	-0.062	0.104
Ease of securing funds for farming (women)	0.178***	0.062	0.109*	0.061	0.152**	0.062
Primary sources for agricultural loans or credit	0.089	0.071	0.127*	0.07	0.094	0.071
Usage of funds obtained through loans for farming	0.142*	0.082	0.097	0.08	0.169**	0.081
The main challenges in accessing money for farming needs	-0.115*	0.069	-0.082	0.068	-0.129*	0.069
Accessibility of loans or credit for farming activities	0.221***	0.066	0.164**	0.065	0.197***	0.066
Impact of women's involvement in farming on household food security	0.257***	0.058	0.189***	0.057	0.231***	0.058
Decision-making in the household	0.104	0.079	0.137*	0.077	0.095	0.079
Land ownership registration	0.061	0.092	0.042	0.09	0.078	0.092
Chances for men and women to get money for farming	0.194***	0.06	0.147**	0.059	0.182***	0.06
Awareness of programs promoting fairness in accessing money	0.137*	0.073	0.095	0.071	0.153**	0.073
Perception of equal distribution of financial benefits among farmers	0.205***	0.063	0.161**	0.062	0.189***	0.063
Influence of cooperative membership on household food security	0.273***	0.056	0.214***	0.055	0.252***	0.056
Benefits received due to cooperative membership	0.184***	0.061	0.139**	0.06	0.171***	0.061
Impact of cooperative membership on household food expenditure	0.152**	0.067	0.118*	0.066	0.144**	0.067
Frequency of eating smaller portions due to insufficient food	-0.231***	0.053	-0.175***	0.052	-0.217***	0.053
Farm size County (acres)	0.079*	0.043	0.061	0.042	0.088**	0.043
Frequency of skipping meals due to insufficient food	-0.196***	0.055	-0.151***	0.054	-0.184***	0.055
Frequency of experiencing a complete shortage of food	-0.217***	0.057	-0.169***	0.056	-0.203***	0.057
Household food security status	0.315***	0.051	0.245***	0.05	0.293***	0.051
Constant	-1.624**	0.645	-1.196*	0.632	-1.557**	0.644
Number of observations	379		379		379	
Wald chi2(72)	193.47		163.28		187.92	
Prob > chi2	0.000		0.000		0.000	

Legend: *p<.1; **p<.05; ***p<.01 Source: Study data (2024)

4.11.1 Influence of Gender Dynamics in Access to Agricultural Credit and Its Direct Impact on Household Food Security

The Multivariate Probit analysis revealed significant relationships between gender dynamics in accessing agricultural credit and household food security, but the impact varied across the three dependent variables: Food Availability, Food Utilization, and Food Accessibility. One key finding was the variable "Ease of securing funds for farming (women)", which had a positive and highly significant influence on all three aspects of household food security: Food Availability (coefficient = 0.178, $p < 0.05$), Food Utilization (coefficient = 0.109, $p < 0.05$), and Food Accessibility (coefficient = 0.152, $p < 0.05$). This suggests that when women have easier access to agricultural credit, households benefit from greater food availability, better utilization of food resources, and improved access to food, thereby enhancing overall food security.

Additionally, the variable "Chances for men and women to get money for farming" had a similarly positive and significant impact on all three dimensions of food security: Food Availability (coefficient = 0.194, $p < 0.05$), Food Utilization (coefficient = 0.147, $p < 0.05$), and Food Accessibility (coefficient = 0.182, $p < 0.05$). This indicates that equitable access to agricultural credit for both men and women improves household food availability, utilization, and accessibility, implying that gender-equal financial opportunities contribute to more stable and secure household food systems. While both variables were significant for all three dimensions, the slightly higher coefficients for "Chances for men and women to get money for farming" compared to "Ease of securing funds for farming (women)" suggests that equitable access to resources between genders might have a more comprehensive effect on household food security. This underscores the importance of policies promoting gender equity in agricultural financing as a way to improve food security outcomes at the household level. In summary, while both variables were significant for the three dependent variables, the differences in coefficient values provide insight into the varying strength of their impact on food availability, utilization, and accessibility. Gender equality in credit access is shown to be crucial for improving overall household food security

4.11.2 The role of women's empowerment in enhancing household food security among smallholder farmers

The influence of women's empowerment in enhancing household food security among smallholder farmers is measured in terms of their involvement in farming activities and their role in household decision-making. These factors are directly linked to household food security

outcomes, including Food Availability, Food Utilization, and Food Accessibility. By empowering women in both agricultural and household spheres, the overall food security of smallholder farming households can be significantly improved.

The Multivariate Probit analysis demonstrated the positive and highly significant impact of women's involvement in farming on household food security. The variable "Impact of women's involvement in farming on household food security" showed strong positive effects on all three dimensions: Food Availability (coefficient = 0.257, $p < 0.05$), Food Utilization (coefficient = 0.189, $p < 0.05$), and Food Accessibility (coefficient = 0.231, $p < 0.05$). This suggests that as women play a more active role in farming, households experience enhanced access to food, improved utilization of available food resources, and increased food availability. Empowering women in agriculture not only increases productivity but also contributes to household food security across multiple dimensions.

Moreover, the variable "Decision-making in the household" had a positive and significant impact on Food Utilization (coefficient = 0.137, $p < 0.01$). This result highlights that when women have a greater influence in household decision-making, it leads to better management and utilization of food resources, contributing to improved food security. Empowering women to participate equally in decision-making processes ensures that food-related decisions are made more effectively, benefiting the entire household.

4.11.3 Gender disparities in access to agricultural credit and their direct impact on household food security

Gender-based barriers in accessing credit directly impact Food Availability, Food Utilization, and Food Accessibility, shaping the overall food security status of households. The Multivariate Probit analysis revealed significant negative effects of the variable "Main challenges in accessing money for farming needs" on household food security. The challenges in accessing credit had a negative and significant impact on Food Availability (coefficient = -0.115, $p < 0.01$) and Food Accessibility (coefficient = -0.129, $p < 0.01$). These findings suggest that when farmers, particularly women, encounter obstacles in securing funds for farming, it detrimentally affects their household's ability to maintain adequate food supplies and access to food. This highlights the importance of addressing the barriers women face in obtaining agricultural credit to mitigate their adverse effects on household food security.

Additionally, the variable "Perception of equal distribution of financial benefits among farmers" had a positive and highly significant impact on all three dimensions of household food

security: Food Availability (coefficient = 0.205, $p < 0.05$), Food Utilization (coefficient = 0.161, $p < 0.05$), and Food Accessibility (coefficient = 0.189, $p < 0.05$). This indicates that when farmers perceive financial benefits as being equally distributed, regardless of gender, it leads to better food security outcomes for their households. Equal financial access enables farmers to make better use of resources, leading to improved food availability, utilization, and accessibility.

4.11.4 The relationship between cooperative membership and its direct impact on household food security among smallholder farmers

The influence of cooperative membership on household food security among smallholder farmers is a critical factor for improving Food Availability, Food Utilization, and Food Accessibility. The Multivariate Probit analysis indicated that the variable "Influence of cooperative membership on household food security" had a positive and highly significant impact on all three dimensions: Food Availability (coefficient = 0.273, $p < 0.05$), Food Utilization (coefficient = 0.214, $p < 0.05$), and Food Accessibility (coefficient = 0.252, $p < 0.05$). These results suggest that cooperative membership not only increases access to food but also improves how households manage and utilize food resources, contributing to greater food security. The collective nature of cooperatives allows farmers to pool resources, benefit from shared knowledge, and access credit and inputs more easily, which enhances their ability to maintain food security.

Additionally, the variables "Benefits received due to cooperative membership" and "Impact of cooperative membership on household food expenditure" had positive and significant effects on all three dimensions of household food security. The benefits derived from cooperative membership—such as better access to inputs, credit, training, and improved income from better market prices—play a pivotal role in enhancing food availability, utilization, and accessibility. These benefits also help reduce household food expenditure, allowing farmers to allocate resources more effectively toward sustaining food security.

In conclusion, the Multivariate Probit analysis highlighted the crucial relationship between cooperative membership and household food security among smallholder farmers in Kirinyaga County. Cooperative membership enhances household food security by providing farmers with vital resources and support, ultimately leading to improved food availability, utilization, and accessibility. Promoting and strengthening cooperative membership, alongside gender-

inclusive policies and interventions, is essential for achieving sustained food security in the region.



CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

An extensive examination of the research findings is presented in this chapter, drawing connections between the existing literature on gender-inclusive access to agricultural credit and household food security. The discussion is organized according to the study's objectives, exploring the influence of gender dynamics, the role of women's empowerment, gender disparities in access to agricultural credit, and the relationship between cooperative membership and household food security. The chapter also highlights the study's key conclusions, summarizing the main insights gained from the research. Finally, practical recommendations are presented following the findings and conclusions.

5.2 Summary of Findings

The study examined the influence of gender dynamics on access to agricultural credit and its direct impact on household food security in Kirinyaga County. The Multivariate Probit analysis revealed that the ease of securing funds for farming by women had a positive and highly significant influence on all three dimensions of household food security: Food Availability (coefficient = 0.178, $p < 0.05$), Food Utilization (coefficient = 0.109, $p < 0.1$), and Food Accessibility (coefficient = 0.152, $p < 0.05$). Furthermore, equal chances for men and women to get money for farming also had a positive and highly significant impact on Food Availability (coefficient = 0.194, $p < 0.05$), Food Utilization (coefficient = 0.147, $p < 0.05$), and Food Accessibility (coefficient = 0.182, $p < 0.05$). These findings underscore the importance of gender-inclusive access to agricultural credit in enhancing household food security in Kirinyaga County.

The study assessed the role of women's empowerment in enhancing household food security among smallholder farmers in Kirinyaga County. The Multivariate Probit analysis provided evidence for the crucial role of women's empowerment in improving household food security. The impact of women's involvement in farming on household food security had a positive and highly significant effect on Food Availability (coefficient = 0.257, $p < 0.05$), Food Utilization (coefficient = 0.189, $p < 0.05$), and Food Accessibility (coefficient = 0.231, $p < 0.05$). Moreover, women's decision-making in the household had a positive and significant impact on

Food Utilization (coefficient = 0.137, $p < 0.1$). These results highlight the importance of empowering women in farming and household decision-making to enhance household food security among smallholder farmers in Kirinyaga County.

The study investigated gender disparities in access to agricultural credit and their direct impact on household food security in Kirinyaga County. The Multivariate Probit analysis showed that the main challenges in accessing money for farming needs had a negative and significant influence on Food Availability (coefficient = -0.115, $p < 0.1$) and Food Accessibility (coefficient = -0.129, $p < 0.1$), suggesting that the challenges faced by farmers, particularly women, in accessing money for farming needs have a detrimental effect on their household's food availability and accessibility. Additionally, the perception of equal distribution of financial benefits among farmers had a positive and highly significant impact on all three dimensions of household food security: Food Availability (coefficient = 0.205, $p < 0.05$), Food Utilization (coefficient = 0.161, $p < 0.05$), and Food Accessibility (coefficient = 0.189, $p < 0.05$). These findings emphasize the need to address gender disparities in access to agricultural credit to enhance household food security in Kirinyaga County.

The study evaluated the relationship between cooperative membership and its direct impact on household food security among smallholder farmers in Kirinyaga County. The Multivariate Probit analysis demonstrated a strong and positive relationship between cooperative membership and household food security. The influence of cooperative membership on household food security had a positive and highly significant effect on Food Availability (coefficient = 0.273, $p < 0.05$), Food Utilization (coefficient = 0.214, $p < 0.05$), and Food Accessibility (coefficient = 0.252, $p < 0.05$). Furthermore, the benefits received due to cooperative membership and the impact of cooperative membership on household food expenditure also had positive and significant effects on all three dimensions of household food security. The study in Kirinyaga County examined the influence of gender dynamics on access to agricultural credit and its implications for household food security. Using Multivariate Probit analysis, findings revealed that women's ability to secure funds for farming significantly enhanced all aspects of household food security: Food Availability (coefficient = 0.178, $p < 0.05$), Food Utilization (coefficient = 0.109, $p < 0.1$), and Food Accessibility (coefficient = 0.152, $p < 0.05$). Similarly, equal access to agricultural credit for both genders positively impacted Food Availability (coefficient = 0.194, $p < 0.05$), Food Utilization (coefficient = 0.147, $p < 0.05$), and Food Accessibility (coefficient = 0.182, $p < 0.05$). These results

underscore the critical role of gender-inclusive credit access in promoting household food security.

Additionally, the study assessed women's empowerment in enhancing food security among smallholder farmers in the region. The analysis revealed significant positive effects of women's involvement in farming on Food Availability (coefficient = 0.257, $p < 0.05$), Food Utilization (coefficient = 0.189, $p < 0.05$), and Food Accessibility (coefficient = 0.231, $p < 0.05$). Moreover, women's decision-making power within households positively influenced Food Utilization (coefficient = 0.137, $p < 0.1$). These findings emphasize the importance of empowering women in both agricultural activities and household decision-making to improve food security.

Furthermore, the study investigated gender disparities in access to agricultural credit and their impact on food security outcomes. Results indicated that challenges in accessing farming funds had adverse effects on Food Availability (coefficient = -0.115, $p < 0.1$) and Food Accessibility (coefficient = -0.129, $p < 0.1$), particularly affecting women farmers. Conversely, perceptions of equitable distribution of financial benefits positively impacted Food Availability (coefficient = 0.205, $p < 0.05$), Food Utilization (coefficient = 0.161, $p < 0.05$), and Food Accessibility (coefficient = 0.189, $p < 0.05$). Addressing these disparities is crucial for improving household food security in Kirinyaga County.

Lastly, the study explored the relationship between cooperative membership and food security among smallholder farmers in the county. Findings from the Multivariate Probit analysis demonstrated significant positive associations between cooperative membership and all dimensions of household food security: Food Availability (coefficient = 0.273, $p < 0.05$), Food Utilization (coefficient = 0.214, $p < 0.05$), and Food Accessibility (coefficient = 0.252, $p < 0.05$). These results underscore the importance of promoting and strengthening cooperative membership as a strategy to enhance food security among smallholder farmers in Kirinyaga County.

5.3 Discussion of findings

5.3.1 Influence of Gender Dynamics on Access to Agricultural Credit and Household Food Security

The findings of this study corroborate the existing literature on gender dynamics in agricultural credit and household food security. The Multivariate Probit analysis revealed that the ease of

securing funds for farming by women had a positive and highly significant influence on all three dimensions of household food security: Food Availability (coefficient = 0.178, $p < 0.05$), Food Utilization (coefficient = 0.109, $p < 0.1$), and Food Accessibility (coefficient = 0.152, $p < 0.05$). This is consistent with the findings of KIPPRA (2019), which highlighted that women in Kenya face limited access to agricultural credit, and when they do secure loans, they often allocate the borrowed funds towards pressing household needs instead of investing in agriculture, negatively affecting their household's food security. The study emphasizes the necessity of gender-sensitive policies and initiatives to overcome the barriers hindering women from accessing agricultural loans.

Furthermore, the study found that equal chances for men and women to get money for farming had a positive and highly significant impact on Food Availability (coefficient = 0.194, $p < 0.05$), Food Utilization (coefficient = 0.147, $p < 0.05$), and Food Accessibility (coefficient = 0.182, $p < 0.05$). This finding is in line with the research conducted by Acheampong et al. (2022) in Ghana, which discovered a significant link between the overall availability of food and agricultural families. The research highlighted the significant role of agricultural loans in boosting farm produce production and, consequently, improving food accessibility. Access to credit enhances the likelihood of households purchasing labor, chemicals, and other inputs, which can contribute to increased output and improved household food conditions.

The findings of this study underscore the importance of gender-inclusive access to agricultural credit in enhancing household food security in Kirinyaga County. This is consistent with the existing literature, which emphasizes the need for gender-sensitive policies and initiatives to overcome the barriers hindering women from accessing agricultural loans (KIPPRA, 2019). Moreover, the study highlights the significant role of agricultural loans in boosting farm produce production and, consequently, improving food accessibility (Acheampong et al., 2022). These findings contribute to the growing body of evidence on the importance of gender dynamics in agricultural credit and household food security, and the need for policies and interventions that promote gender-inclusive access to agricultural credit to enhance household food security.

5.2.2 Role of Women's Empowerment in Enhancing Household Food Security

The findings of this study provide evidence for the crucial role of women's empowerment in improving household food security among smallholder farmers in Kirinyaga County. The Multivariate Probit analysis revealed that the impact of women's involvement in farming on

household food security had a positive and highly significant effect on Food Availability (coefficient = 0.257, $p < 0.05$), Food Utilization (coefficient = 0.189, $p < 0.05$), and Food Accessibility (coefficient = 0.231, $p < 0.05$). This finding is consistent with the existing literature, which highlights the significant role of women in agricultural activities and the importance of their empowerment in bolstering household food security (Links, 2016; Oxfam, 2019; Sraboni et al., 2014).

Approximately 43 percent of individuals engaged in agricultural activities are women, and they play a significant role in cultivating a substantial portion of the food in developing countries (Links, 2016). However, women face greater challenges in accessing land and their land rights are often less secure. The findings of this study corroborate with the Oxfam report (2019), subsequently endorsed by the United Nations in 2023, which emphasizes that ensuring equal access to land and resources for both genders not only positively influences food security but also contributes to broader development objectives, such as household investment, agricultural productivity, women's empowerment, nutrition, and advancements in farmland rental markets.

Moreover, the study found that women's decision-making in the household had a positive and significant impact on Food Utilization (coefficient = 0.137, $p < 0.1$). This finding is in line with the research conducted by Sraboni et al. (2014) in Bangladesh, which revealed that empowering women in agricultural activities enhances household food security and nutritional capacity. The findings of this study also support the research conducted by Links (2016), which suggests that granting women equivalent availability of agricultural production resources as males may lead to a 20 to 30 percent increase in farm yields, a 2.5 to 4 percent rise in total agricultural output of developing countries, and a potential reduction in the global population of undernourished individuals by 12 to 17 percent.

The findings of this study highlight the importance of empowering women in farming and household decision-making to enhance household food security among smallholder farmers in Kirinyaga County. The study provides evidence that supports the existing literature on the crucial role of women's empowerment in improving household food security (Links, 2016; Oxfam, 2019; Sraboni et al., 2014). The findings underscore the need for policies and interventions that promote gender equality in access to land and resources, as well as women's empowerment in agricultural activities and household decision-making, to enhance household food security and contribute to broader development objectives.

5.2.3 Gender Disparities in Access to Agricultural Credit and Household Food Security

The findings of this study shed light on the gender disparities in access to agricultural credit and their direct impact on household food security in Kirinyaga County. The Multivariate Probit analysis showed that the main challenges in accessing money for farming needs had a negative and significant influence on Food Availability (coefficient = -0.115, $p < 0.1$) and Food Accessibility (coefficient = -0.129, $p < 0.1$), suggesting that the challenges faced by farmers, particularly women, in accessing money for farming needs have a detrimental effect on their household's food availability and accessibility. This finding corroborates with the existing literature, which consistently highlights that inequalities between genders in securing agricultural credits have a substantial impact on the household supply of food in Kenya (FAO, 2023; Jindo et al., 2023; Kassie, Ndiritu, & Stage, 2021; Kihuu, 2021; Kiriti & Tisdell, 2010).

Gender disparities, including limited access to knowledge, and resources, and a heavier unpaid care burden, contribute to a 24% productivity gap between women and men farmers who operate on farms of the same size (FAO, 2023). Women also face disadvantages in terms of accessing land, services, credit, and digital technology compared to men (FAO, 2023). The findings of this study support the research conducted by Kassie, Ndiritu, and Stage (2021), which found that access to vital resources, such as loans, varies between families led by men and women, contributing significantly to the food security disparities observed in rural areas of Kenya. The study also corroborates with the thesis by Kiriti and Tisdell (2010), which highlights the challenges women face in obtaining agricultural credit, restricting their investment in their farms and enhancing production, consequently affecting household food security.

Additionally, the study found that the perception of equal distribution of financial benefits among farmers had a positive and highly significant impact on all three dimensions of household food security: Food Availability (coefficient = 0.205, $p < 0.05$), Food Utilization (coefficient = 0.161, $p < 0.05$), and Food Accessibility (coefficient = 0.189, $p < 0.05$). This finding emphasizes the need to address gender disparities in access to agricultural credit to enhance household food security in Kirinyaga County. According to 2019 data from the World Bank, women made up around 59% of the overall workforce in Kenya's agriculture sector, a sector crucial to the country's GDP (USAID, 2021). However, a forecasted credit deficit of \$2.7 billion is hindering the improvement of Kenyan women-led MSMEs, consequently affecting their drive and ability to expand their businesses (USAID, 2021). The findings of this study

underscore the importance of addressing these inequalities as a crucial step towards enhancing overall food security within households in the country.

The findings of this study provide evidence for the gender disparities in access to agricultural credit and their direct impact on household food security in Kirinyaga County. The study corroborates with the existing literature, which consistently highlights the inequalities between genders in securing agricultural credits and their substantial impact on the household supply of food in Kenya (FAO, 2023; Jindo et al., 2023; Kassie, Ndiritu, & Stage, 2021; Kihiu, 2021; Kiriti & Tisdell, 2010). The findings emphasize the need for policies and interventions that address gender disparities in access to agricultural credit and promote equal distribution of financial benefits among farmers to enhance household food security in the region.

5.2.4 Relationship between Cooperative Membership and Household Food Security

The research highlights a robust and positive correlation between cooperative membership and household food security among smallholder farmers in Kirinyaga County. Using Multivariate Probit analysis, it was found that cooperative membership significantly enhances Food Availability (coefficient = 0.273, $p < 0.05$), Food Utilization (coefficient = 0.214, $p < 0.05$), and Food Accessibility (coefficient = 0.252, $p < 0.05$). These results align with previous studies indicating that cooperative membership can boost food security, although its effectiveness can depend on local conditions (Kehinde & Kehinde, 2020; Mapunda, 2021; Manda et al., 2020).

In southwest Nigeria, Kehinde and Kehinde (2020) identified a nuanced relationship between credit availability, cooperative membership, and household food security in rural areas. Similarly, Mapunda (2021) observed that while cooperative membership has the potential to enhance food security in Tanzania's Southern Highlands, the relationship is influenced by market conditions and agricultural practices. This study supports the premise that cooperative membership can improve household food security, as evidenced by its significant positive impact on all three food security dimensions.

Additionally, the study found that the benefits and expenditures associated with cooperative membership positively influence all aspects of household food security. This finding resonates with Manda et al.'s (2020) research in Zambia, which showed that agricultural technology innovations and cooperative involvement can enhance food security. Moreover, research by Guyalo and Ifa (2023) in Ethiopia's Oromia Regional State emphasizes the importance of well-formulated policies and effective implementation in the success of farming cooperatives in addressing food insecurity.

Further support comes from Mwangi et al. (2020), who studied dairy farmers in the Northwestern region of Mt. Kenya and found that 93 percent of households were cooperative members, highlighting the role of social networks in enhancing food security. These findings underline the importance of promoting cooperative membership to boost household food security among smallholder farmers in Kirinyaga County, as it fosters social connections and collaborative efforts among members.

This study provides robust evidence of the positive relationship between cooperative membership and household food security in Kirinyaga County. It corroborates existing literature that emphasizes the potential of cooperative membership to enhance food security, although contextual factors may influence this relationship (Kehinde & Kehinde, 2020; Mapunda, 2021; Manda et al., 2020). The findings highlight the need to promote cooperative membership and implement well-formulated policies to improve food security among smallholder farmers in the region (Guyalo & Ifa, 2023; Mwangi et al., 2020).

5.4 Conclusion

The study concludes that gender dynamics play a significant role in access to agricultural credit and its direct impact on household food security in Kirinyaga County. The ease of securing funds for farming by women and equal chances for men and women to get money for farming has a positive and highly significant influence on all three dimensions of household food security: Food Availability, Food Utilization, and Food Accessibility. These findings underscore the importance of gender-inclusive access to agricultural credit in enhancing household food security in the region. Addressing the barriers that hinder women from accessing agricultural loans and promoting gender-sensitive policies and initiatives are crucial steps toward improving household food security.

The study concludes that women's empowerment is pivotal in enhancing household food security among smallholder farmers in Kirinyaga County. The impact of women's involvement in farming on household food security has a positive and highly significant effect on Food Availability, Food Utilization, and Food Accessibility. Moreover, women's decision-making in the household has a positive and significant impact on Food Utilization. These findings highlight the importance of promoting gender equality in access to land and resources and women's empowerment in agricultural activities and household decision-making to enhance household food security and contribute to broader development objectives.

The study concludes that gender disparities in access to agricultural credit directly and detrimentally impact household food security in Kirinyaga County. The main challenges in accessing money for farming needs have a negative and significant influence on Food Availability and Food Accessibility, particularly for women farmers. Additionally, the perception of equal distribution of financial benefits among farmers has a positive and highly significant impact on all three dimensions of household food security. These findings emphasize the need for policies and interventions that address gender disparities in access to agricultural credit and promote equal distribution of financial benefits among farmers to enhance household food security in the region.

The study concludes that cooperative membership has a strong and positive relationship with household food security among smallholder farmers in Kirinyaga County. The influence of cooperative membership on household food security has a positive and highly significant effect on Food Availability, Food Utilization, and Food Accessibility. Furthermore, the benefits received due to cooperative membership and the impact of cooperative membership on household food expenditure also have positive and significant effects on all three dimensions of household food security. These findings underscore the importance of promoting and strengthening cooperative membership, as well as the critical role of well-formulated policies and their effective implementation, in enhancing household food security among smallholder farmers in the region.

5.5 Recommendations

In line with the findings, recommendations are made thereof for policy and practice.

5.5.1 Recommendations for Policy

The study recommends that policymakers and relevant stakeholders develop and implement gender-sensitive policies and initiatives to overcome the barriers that hinder women from accessing agricultural loans. This can include targeted financial literacy programs, flexible collateral requirements, and gender-responsive credit schemes. These measures should aim to improve women's access to agricultural credit and promote gender equality in the agricultural sector, ultimately contributing to enhanced household food security in the region.

The study recommends that government agencies, non-governmental organizations, and development partners prioritize women's empowerment in agricultural activities and household decision-making. This can be achieved through capacity-building programs, training on modern agricultural practices, and leadership development initiatives. Empowering women in

farming and household decision-making will not only improve household food security but also contribute to broader development objectives, such as increased agricultural productivity, nutrition, and advancements in farmland rental markets.

The study recommends that financial institutions, cooperatives, and other lending organizations address gender disparities in access to agricultural credit by implementing inclusive lending practices and promoting equal distribution of financial benefits among farmers. This can involve setting gender-specific targets for agricultural lending, providing gender-sensitive financial products and services, and conducting regular gender audits to monitor progress. Addressing gender disparities in access to agricultural credit will enhance household food security and promote sustainable agricultural development in the region.

The study recommends that government agencies, cooperatives, and farmer organizations strengthen and promote cooperative membership among smallholder farmers in Kirinyaga County. This can be achieved through awareness campaigns, capacity-building programs, and the provision of incentives for cooperative membership. Additionally, policymakers should formulate and effectively implement policies that support the growth and sustainability of farming cooperatives. Promoting and strengthening cooperative membership will enhance household food security, foster social connections, and promote collaboration among smallholder farmers in the region.

5.5.2 Recommendation for Practice

Based on the findings of this study, it is recommended that stakeholders in the agricultural sector, including government agencies, financial institutions, cooperatives, and farmer organizations, prioritize gender-inclusive practices to enhance household food security among smallholder farmers in Kirinyaga County. This can be achieved by implementing targeted interventions such as gender-sensitive financial products and services, capacity-building programs for women farmers, and awareness campaigns promoting cooperative membership. These interventions should aim to address the barriers that hinder women from accessing agricultural credit, promote women's empowerment in agricultural activities and household decision-making, and strengthen cooperative membership among smallholder farmers. By adopting these gender-inclusive practices, stakeholders can create an enabling environment that fosters sustainable agricultural development and enhances household food security in the region.

5.6 Areas for Further Studies

Further research is recommended to investigate specific barriers faced by women in accessing agricultural credit, evaluate existing policies and programs promoting gender equality in agriculture, and explore other socio-economic and cultural factors influencing household food security. Comparative studies across regions and longitudinal studies on the long-term impacts of women's empowerment, cooperative membership, and addressing gender disparities could provide deeper insights and inform context-specific interventions.



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APPENDICES

Appendix I: Consent Form for Research Participants

TITLE: THE RELATIONSHIP BETWEEN GENDER-INCLUSIVE ACCESS TO AGRICULTURAL CREDIT AND HOUSEHOLD FOOD SECURITY: EVIDENCE FROM KIRINYAGA COUNTY

Introduction: Greetings, my name is Benson Murimi, currently pursuing postgraduate studies at Strathmore Business School. I am engaged in a research endeavor exploring the complex interrelationships among gender dynamics, credit disparities, and the empowerment of women, cooperative membership, and household food security within Kirinyaga County.

Research Procedure: I aim to distribute questionnaires to stratified selected farmers in Kirinyaga County and conduct interviews with all farmers, including the union leaders. The research questionnaires and interviews will address subjects concerning gender dynamics, access to credit, empowerment of women, cooperative membership, and household food security.

Risks and Benefits: While there is no guarantee for monetary benefits, your participation will contribute valuable insights to our understanding of these critical issues. Although there was no major harm caused by participating in the study possible risks include minimal discomfort or inconvenience during data collection. To reduce this risk the interviews will take the shortest time possible, and the questionnaire is participant friendly.

Participant's Rights: You are under no obligation to continue with this research, and you can stop at any moment without fear of harm or victimization.

Confidentiality: All gathered data was handled with the highest level of confidentiality. Your identity shall remain undisclosed, and the data was presented in a summarized, collective format.

Questions and Clarifications: Feel free to inquire about any queries you may have. In case you require additional information post-signing, feel at liberty to reach out to the researcher.

Contact Details: Should you have any inquiries before, during, or after the research, don't hesitate to reach out to Benson Murimi at +254711985375.

Signature and Date: By affixing your signature below, you affirm your voluntary consent to engage in this study and confirm your comprehension of the aforementioned details, either through personal reading or explanation by a chosen representative.

Participants' names: -----

Participant's Signature: -----

Date: -----

Researcher's Signature: -----Date: -----

We appreciate your willingness to engage in this study. Your involvement holds significance for our research.



Appendix II: Research Questionnaire

I am Benson Murimi, currently pursuing postgraduate studies at Strathmore Business School. The focus of my research revolves around exploring the nuanced interrelationships among gender dynamics, credit discrepancies, and the empowerment of women, cooperative involvement, and household food security within Kirinyaga County.

Instructions: Please read the questions and provide the most accurate answers you can. You should respond to or complete each part exactly as it is. Where applicable, check the box ().

Section A: Demographic Information

1. What gender do you identify with?

Male

Female

2. How old are you?

3. Please indicate your current marital status

Married

Divorced

Single

Widowed

4. How many years have you spent in formal education?

5. How long have you been actively engaged in farming in the last ten years in this county?

6. What do you do for a living?

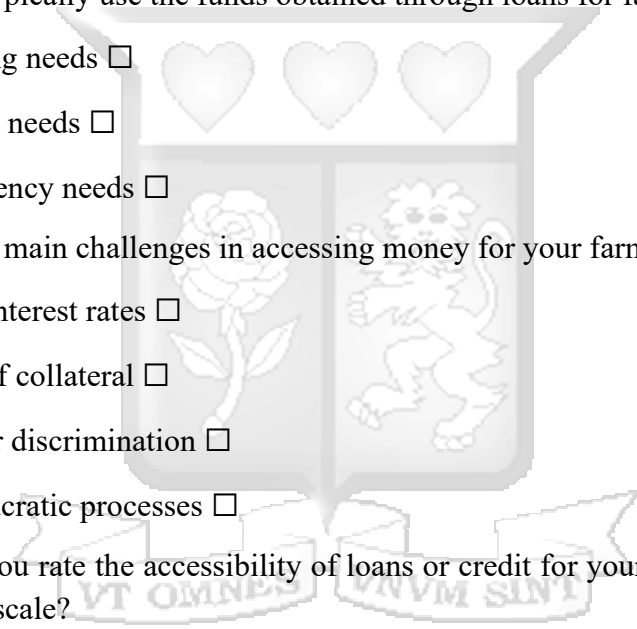
i. Farming

ii. Own a small business

iii. Work for someone else

iv. Currently not working

Section B: Gender Dynamics (Access to Money for Farming)

1. How simple or challenging is it for women in your local area to secure funds for farming, using a rating scale of 1 to 5, where 1 signifies significant difficulty and 5 denotes significant ease?
 2. Who are your primary sources for agricultural loans or credit?
 - a. Banks
 - b. Cooperatives
 - c. Family or friends
 - d. Chamas
 3. How do you typically use the funds obtained through loans for farming purposes?
 - a. Farming needs
 - b. Family needs
 - c. Emergency needs
 4. What are your main challenges in accessing money for your farming needs?
 - a. High-interest rates
 - b. Lack of collateral
 - c. Gender discrimination
 - d. Bureaucratic processes
 5. How would you rate the accessibility of loans or credit for your farming activities on the following scale?
 - a. Extremely challenging
 - b. Challenging
 - c. Neutral
 - d. Manageable
 - e. Very manageable
- 

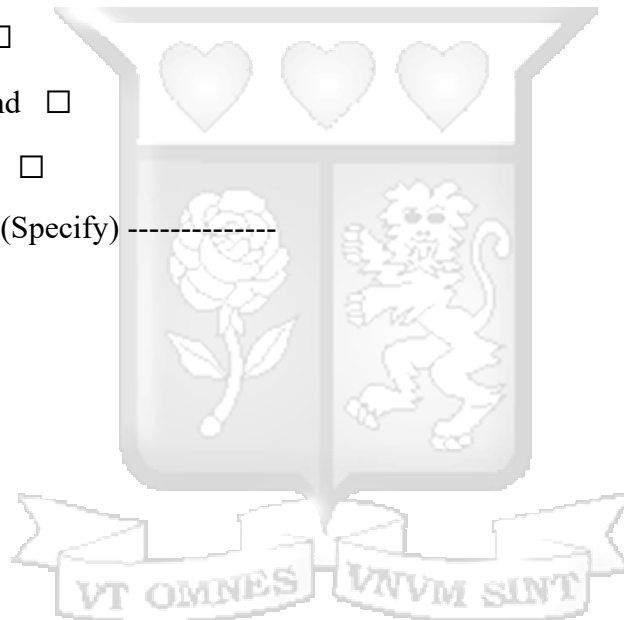
Section C: Empowering women and ensuring food security within households.

1. On a scale of 1–5, with 1 being minimal and 5 being substantial, how much do you think women's involvement in farming affects how much food your family has?

2. In your household, who predominantly takes the lead in making significant decisions?
 - a. Husband mainly decides
 - b. Wife mainly decides
 - c. Joint decision-making
 - d. Others (Specify)-----

3. Regarding your family land, who holds the official registration as the landowner?

- a. Wife
- b. Husband
- c. Joint
- d. Others (Specify)-----



Section D: Gender Disparities (How Fairly Money is given for Farming)

1. On a scale of 1-5, with 1 being very unequal and 5 being very equal, how would you rate the chances for men and women to get money for farming?
2. Have you seen any programs or rules that try to make it fairer for men and women to get money for farming? (Yes/No)
3. Do you believe there is an equal distribution of financial benefits among all farmers in your community?

Completely Disagree Disagree Neutral Agree Strongly Agree

Section E: Cooperative Membership and Household Food Security

1. On a scale of 1-5, where 1 signifies less influence and 5 denotes great influence, how has cooperative membership influenced your household's food security?
2. What benefit have you received because of cooperative membership?
 - a. Farm Inputs
 - b. Agriculture Credit
 - c. Training
 - d. Better income
 - e. Market Assistance
 - f. Other (specify) _____

2. Has cooperative membership affected your household's food expenditure? (Yes/No)

Section F: Household Food Security

1. In your last 30 days, how often did you or other household members eat smaller portions of food than needed because there was not enough food?
 - a. Never
 - b. Seldom
 - c. Occasionally
 - d. Frequently
2. What is your farm size in Kirinyaga County?
3. Either you or another member of the household skipped a meal (breakfast, lunch, or dinner) due to insufficient food.
 - a. Never
 - b. Hardly ever
 - c. Sometimes
 - d. Frequently
4. You or any other person in your household experienced a shortage of food, going the entire day and night without eating anything.
 - a. Never
 - b. Rarely
 - c. Sometimes
 - d. Regularly
5. How would you describe your household's food security status?
 - a. Food secure (Consistently have access to enough food)
 - b. Moderately food insecure (Occasionally experience shortages)
 - c. Severe food insecure (Frequently experience shortages)

In conclusion, we are grateful for your time and dedication in completing this questionnaire. Your contribution is integral to the success of our study.

Appendix III: Structured Interview

THE RELATIONSHIP BETWEEN GENDER-INCLUSIVE ACCESS TO AGRICULTURAL CREDIT AND HOUSEHOLD FOOD SECURITY: EVIDENCE FROM KIRINYAGA COUNTY

Interviewer Information:

- Interviewer Name: Benson Murimi Muchira
- Contact Information:+254711985375

Interviewee Information:

- Participant ID:
- Date of Interview:
- Location of Interview:

Introduction: "Thank you for participating in this interview. Your perspectives contribute significantly to our research. Before commencing, kindly grant permission for the interview."

Section 1: Demographic Information

1. How old are you?
2. What is your marital status?
3. How many dependents do you have?

Section 2: Educational Background

4. What is the total number of years of your schooling?
5. Have you received any specific training or education related to agriculture or cooperative activities?

Section 3: Gender Dynamics

6. In your community, how do you characterize the duties and responsibilities assigned to men and women in agricultural pursuits?

Section 4: Empowering women and ensuring food security within households.

8. Have you ever accessed agricultural credit or loans?
9. How does credit or loans affect the empowerment of women in agricultural activities?

10. When women are more involved in farming, do you think it helps the family have enough food? Why or why not?
11. Do you know of any programs or activities that help women in farming in our area? Can you give an example?

Section 5: Cooperative Membership

12. Do you belong to any Kirinyaga agricultural cooperatives?
13. What benefits or challenges have you experienced as a cooperative member?

Section 6: Gender Disparities

14. Do you believe there is an equitable opportunity for both men and women to access financial resources for agricultural pursuits? Please explain your answer
15. What do you think makes it harder for men or women to get money for farming? Can you give some examples?

Section 7: Household Food Security

16. How would you rate the state of food security in your family?
17. Have you noticed any changes in household food security since becoming involved in cooperative activities?

Section 8: Overall Reflections

18. In your opinion, what causes a household's food security?
19. Is there anything else you would like to share about your experiences related to gender dynamics, credit, cooperative membership, or food security?

Conclusion Remarks: "We appreciate the time you've dedicated and the valuable insights you've provided. Should you have any further comments or thoughts, feel free to share with us.

Appendix IV: Institutional Ethical Review Letter



11th April 2024

Mr Muchira Benson,
muchira.murimi@strathmore.edu

Dear Mr Muchira,

RE: The Relationship between Gender-Inclusive Access to Agricultural Credit and Household Food Security: Evidence from Kirinyaga County

This is to inform you that SU-ISERC has reviewed and approved your above SU-masters research proposal. Your application reference number is SU-ISERC2098/24. The approval period is from 11th April 2024 to 10th April 2025.

This approval is subject to compliance with the following requirements:

- i. Only approved documents including (informed consents, study instruments, MTA) will be used.
- ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by SU-ISERC.
- iii. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to SU-ISERC within 72 hours of notification.
- iv. Any changes anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to SU-ISERC within 72 hours.
- v. Clearance for the export of biological specimens must be obtained from relevant institutions.
- vi. Submission of a request for renewal of approval at least 60 days prior to the expiry of the approval period. Attach a comprehensive progress report to support the renewal.
- vii. Submission of an executive summary report within 90 days of completion of the study to SU-ISERC.

Before commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology, and Innovation (NACOSTI) <https://research-portal.nacosti.go.ke/> and obtain other clearances needed.

Yours sincerely,

A handwritten signature in blue ink, appearing to read "Ambrose Rachier".

Mr Ambrose Rachier,
Chairperson; SU-ISERC



APPENDIX V: NACOSTI Research Permit

Republic of Kenya
Ministry of Science, Technology and Innovation
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 668263
Date of Issue: 19/April/2024

RESEARCH LICENSE



This is to Certify that Mr., Benson Mufimi MURIMI of Strathmore University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Kirinyaga on the topic: **THE RELATIONSHIP BETWEEN GENDER-INCLUSIVE ACCESS TO AGRICULTURAL CREDIT AND HOUSEHOLD FOOD SECURITY: EVIDENCE FROM KIRINYAGA COUNTY** for the period ending : 19/April/2025.

License No: NACOSTI/P/2434842

Applicant Identification Number: 668263

Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Verification QR Code



NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

See overleaf for conditions

APPENDIX VI: Cooperative Introductory Letter

