

**THE CONTRIBUTION OF SMALLHOLDER WOMEN FARMERS TO FOOD
AND NUTRITIONAL SECURITY IN VIHIGA SUB-COUNTY, VIHIGA COUNTY,
KENYA.**

HARDLYNE LUSUI

**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF SOCIOLOGY,
SOCIAL WORK AND AFRICAN WOMEN STUDIES IN PARTIAL FULFILMENT OF
THE REQUIREMENTS FOR THE AWARD OF MASTER OF ARTS DEGREE IN
WOMEN LEADERSHIP AND GOVERNANCE IN AFRICA, OF THE UNIVERSITY OF
NAIROBI.**

MARCH, 2023

DECLARATION

I declare that this project is my original work and has not been presented for a degree in any other institution for the award of any certificate, diploma or degree.

HARDLYNE LUSUI

SIGN  DATE 2nd March 2023

REG NUMBER M10/39253/2021

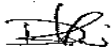
This project has been submitted for examination with my approval as University Supervisor



SIGN _____ DATE 2/03/2023

Dr. Marygorety Akinyi

Department of Sociology, Social Work and African Women Studies



SIGN:!

Dr. Dalmas Ochieng' Omia

Department of Gender, Anthropology and African Studies

DEDICATION

This project is devoted to my family, who have supported me unconditionally throughout my academic journey.

ACKNOWLEDGEMENT

First, thanks to God Almighty for helping me reach this far and for giving me the strength, knowledge as well as vitality that has helped me successfully undertake this research project. Second, I acknowledge the contribution of my supervisors, Dr. Marygorety Akinyi and Dr. Dalmas Ochieng and my course lecturers for instilling in me the knowledge and skills that have helped me reach this far. God bless you all. I also my classmates whose help and stimulating discussions came in handy in the process of putting together ideas for this project.

I would also like to acknowledge with so much appreciation the crucial role played by the Library staff, Information Technology staff and the administration staff of the African Women Studies Centre, University of Nairobi. Last but not least I wish to express gratitude to my family, especially my children – Lauryn and Terrence -who afforded me time off my triple roles through their cooperation and encouragement.

ABSTRACT

Women contribute in many ways towards food and nutritional security particularly in the rural areas. Although smallholder women farmers have great potential to guarantee food and nutritional security, they have an even bigger role as the backbone of food production owing to their reproductive roles. They face limitations due to poor access to resources because of illiteracy, marginality, customs and a lack of capacity. Notably, more needs to be done to elucidate through research and document their important role in food and nutritional security in some of the more populous counties in Kenya presently. The main purpose was to determine how women farmers have contributed to food and nutritional security in Vihiga Sub-County and to recommend possible mitigating measures to the challenges faced by the smallholder women farmers in Vihiga Sub-County in their endeavor to achieve food security at family level. Feminist political ecology theory and the social relations theory were used to anchor the study. The target population comprised women smallholder farmers in Vihiga Sub County. Data was collected using in-depth interview of 8 women from each of the four wards, focused group discussions of between 10-12 women from each ward, observation and documents analysis. The units of analysis comprised the woman smallholder farmers in Vihiga County aged 18 years and above. Purposive sampling and snowballing methods were used to select the respondents. The data collected was analyzed qualitatively using thematic analysis. The study established that smallholder women farmers in Vihiga Sub County play a key role in promoting household food and nutritional security. The smallholder women farmers grow various food crops and also keep various animals including cows, goats, sheep, and pigs. The women provide the bulk of labor from land preparation, planting, weeding, harvesting, storage and cooking for the family. While at, they face numerous challenges. These include lack of access to farm inputs, lack of financial resources and poor access to credit, lack of access to agricultural extension services, lack of access to large land, and ecological challenges including climatic changes and pests. The study concludes that while smallholder women farmers have the capacity to promote food and nutritional security they face a myriad of challenges that need to be addressed. Hence the study recommends that smallholder women farmers should be supported by the government and financial institutions to enhance food production through economic support, use of quality inputs and access to extension services. Policy makers should appreciate, acknowledge and promote smallholder women farmers with a view to increasing the acreage under production through effective land governance and management policies from the local level to the national level.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
ABSTRACT.....	v
TABLE OF CONTENTS.....	vi
ACCRONYMS AND ABBREVIATIONS	ix
LIST OF FIGURES	x
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background Information	1
1.2 Research Problem	6
1.3 Main Objective	7
1.3.1 Specific Objectives	8
1.4 Research Questions	8
1.5 Significance	8
1.6 Scope	9
1.7 Limitations	9
1.8 Definition of Terms	10
CHAPTER TWO	11
LITERATURE REVIEW	11
2.0 Introduction	11
2.1 Theoretical Framework	11
2.1.1 Feminist Political Ecology Model	11
2.1.2 The Social Relations Approach	13
2.2 Empirical Review	14
2.2.1 Land Tenure System in Africa	14

2.2.2 Small Holder farmers	17
2.2.3 Farming Activities Practised by Small Holder Women Farmers	18
2.2.4 Contribution of Women to Food and Nutritional Security	20
2.2.5 Challenges Faced by Small Holder Women Farmers	22
2.2.6 Ecological Challenges that Limit the Women’s Contribution to Food security.....	23
2.2.7 Socio Economic Challenges that Limit the Contribution of Women to Food security.....	24
2.3 Research Gaps	28
2.4 Conceptual Framework	29
CHAPTER THREE	32
METHODOLOGY	32
3.0 Introduction	32
3.1 Study Area.....	32
3.2 Research Design.....	33
3.3 Target population	33
3.4 Sample Size	34
3.5 Sampling Methods.....	34
3.6 Data Collection Methods.....	34
3.6.1 In-depth Interview	35
3.6.2 Focused Group Discussions.....	36
3.6.3 Observation	36
3.6.4 Document Analysis.....	37
3.7 Data Analysis	37
3.8 Ethical Considerations	38
CHAPTER FOUR.....	41
DATA ANALYSIS AND PRESENTATION	41
4.1 Introduction	41
4.2 Demographic Information	41

4.3 Farming Activities Practiced by Smallholder Women Farmers	42
4.4 Contribution of Smallholder Women Farmers in Food Security.	44
4.5 Access to Land as a Determinant of Food Security	45
4.6 Socio-Economic Challenges Faced by Women Farmers	47
4.7 Ecological Challenges Faced by Women Farmers	49
4.8 Discussion	51
CHAPTER FIVE	54
CONCLUSIONS AND RECOMMENDATIONS	54
5.1 Introduction	54
5.2 Summary of the Key Findings	54
5.3 Conclusions	55
5.4 Recommendations	57
5.5 Recommendations for Additional Research	57
REFERENCES	58
APPENDICES	66
Appendix 1: Consent Form	66
Appendix II: Interview Guide	67
Appendix III: Focus Group Discussion Guide	69
Appendix IV: Observation Checklist.	70
Appendix V: Maps of Kenya and Vihiga Sub-County	71
Appendix VI: Pictures from the Field	73
Appendix VII: University Introduction Letter	76
Appendix VIII: NACOSTI Research License	77

ACCRONYMS AND ABBREVIATIONS

FAO	Food and Agricultural Organization
FGDs	Focused Group Discussion
FPE	Feminist Political Ecology
NACOSTI	National Commission for Science, Technology, and Innovation
NGOs	Non-Governmental Organization
SDGs	Sustainable Development Goals
UN	United Nations

LIST OF FIGURES

Figure 1: Conceptual Framework 25

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The United Nations' 2015 Sustainable Development Goal 2 aims to achieve food security and find sustainable solutions to end all forms of hunger by 2030 (Gil, et al, 2019). The aim is to guarantee that everyone globally has access to enough nutritious food to enable them to live healthy lives. Sustainable agriculture and improved food access are necessary for this to be achieved. This implies that there is a need to encourage fair access to resources such as land, sustainable food production systems, farming equipment, markets, and resilient agricultural techniques, increase the productivity levels and incomes to smallholder and small-scale farmers, (Effenberger, 2021). Also, there is a need for increased investments via international cooperation in order to enhance the agricultural productive in developing nations.

The underperformance in agriculture and food production is a major hindrance to the achievement of Sustainable Development Goal 2. Currently, the agricultural sector and food systems face numerous challenges (Ruben *et al.*, 2021). There is a need to feed the increasing global population in the context of persisting and emerging environmental, social, and economic concerns, including market insecurity, price volatility, conflicts, protracted crises, shifts in livelihood systems and dietary patterns, and climate change among others. As a result of these challenges, there is a greater need to promote the agricultural sector and ensure it performs to its full potential. FAO acknowledges that one of the areas of concern for this to be achievable is addressing the persisting inequalities that cause the agricultural sector to underperform (Naz *et al.*, 2021). This involves women's empowerment and acknowledgment of their central role in enhancing food security.

Women hold a central role in the fight against hunger and poverty. With women making up an average of 43% of the agricultural labor force, women are an essential component of agriculture in developing nations and help to ensure nutrition and food security. Agarwal, (2018) argues that they work as farmers, unpaid farm laborers on family farms, salaried or unemployed farm laborers on other farms and agricultural enterprises, food processors and vendors, home

gardeners, cooks, and caregivers. In addition, many women are the custodians of information regarding the cultivation, processing, and preservation of nutritive and locally adapted crop varieties due to their specialized roles in food production. Such expertise can enable women to be the leading innovators in promoting sustainable food production and agricultural production.

In many regions globally where the agricultural sector is affected by economic and social factors, women's involvement in strengthening food security differs significantly with some regions have more women involvement and others low. Additionally, these roles are changing rapidly in many of these regions (Ntenkeh, Fonchamnyo, & Yuni, 2022). Women are primarily guarantors of food safety in households and communities all across the world. Women produce, buy, manage, prepare, and serve food to the family and community institutions most of the time. According to Fonjong and Gyapong (2021), between 60 and 80 percent of the food produced worldwide is produced by women, particularly those living in rural parts of developing nations.

The contribution women have to food security differs across regions in the world. The global average is dominated by Asia (Patil & Babus, 2018). Within Asia, the sub regional average is about 50% in the Southern and Eastern region. China dominates the Asian average, whereby the female share in food production has increased drastically in the past decades (Begum, 2021). In India, there has been a steady participation of women in agriculture and food production at approximately 30% (Patil & Babus, 2018). The big nations overshadow changes in other smaller nations women share in agriculture, and food security has increased considerably, exceeding over 50% in Bangladesh. Other nations in Asia, such as Malaysia, have seen a declining share of women in food production (Patil & Babus, 2018).

In Africa, the maintenance of sufficient food security level remains a major problem in many rural areas, particularly in sub-Saharan Africa (Popp, *et al.*, 2019). The responsibilities of women in rural Africa go far beyond their household duties. Most women bear heavy responsibilities for food crop production. However, the role of women is very limited as they do not have ample access to information pertaining to food production and the required resources as a result of social-

cultural institutions and structures that do not give women avenues in decision making and they are constrained from the necessary resources and technologies (Broussard, 2019).

In Ghana, for instance, women do not have sufficient access to fertile land which limits their agricultural production. Women are denied access to plots near rivers and they are denied access to riverbeds to have access to water (Fonjong & Gyapong, 2021). Also, just as the case in Kenya, women in Ghana has limited access to extension services as most of the extension services are inclined towards men who own large tracts of land. Women are also barred by cultural factors from receiving training in various food production matters (Fonjong & Gyapong, 2021) while men, who are mostly engaged in cash crop farming get training all through the year. While a large number of women partake in food production to promote food security, they are constrained by inaccessibility to the required resources, Gyapong, 2021). In Central Africa, women are mainly involved in small scale farming which makes them often resort to the kind of farming systems that draws heavily on traditional systems (Fonjong, & Gyapong, 2021).

In South Africa, the interventions geared toward food security are led mainly by women; about 52.8% practice subsistence farming as their key source of income (Masuku & Garutsa, 2021). Such strategies address gender-based imbalances that show men dominance and the consequences associated with unbalanced access to productive resources. These strategies support equitable access to plentiful resources and decision-making procedures. The interventions aim to guarantee that men and women benefit equally from and participate in interventions and changes that promote food security (Masuku & Garutsa, 2021).

In Sudan, women have been found to play a crucial role in food production, rearing small animals, and promoting food security. Closer scrutiny of the country's population composition indicates that the growth rate of women involved in rural food production is significantly higher than that of the males (Asad, Adam, & Lona, 2018). Similarly, Gebre *et al.*, (2021) identified that women in Ethiopia play crucial roles in agricultural production and promoting food security. However, while women take active roles in agricultural production in their countries, their identities as farmers are highly contested within the agricultural development frameworks. The scope of women in food production is limited to small holder farming. They are also alienated from agricultural extension services.

In Uganda, an estimated 90% of total food production is undertaken by women (Nakazi et al., 2017). However, they lack the means and assistance required to efficiently grow food on a sustainable scale, whether for personal use or for sale to generate income (Westholm & Ostwald, 2020). Although both men and women find small-scale rural farming to be a difficult occupation, women are more likely than men to find it difficult to earn a living through agriculture. Therefore, a significant portion of food insecurity can be linked to the difficulties women encounter in small holder farming.

In Tanzania, women play an essential role in food production in promoting food security. The sector is female intensive, implying that women comprise a majority of the labor force, which is about 54% (Leavens, Gugerty & Anderson, 2019). About 81% of women in the country work in the agricultural sector, which is higher than in other countries in the sub-Saharan nations. However, the role women play towards food security is limited due to inadequate access to resources. For instance, despite the proportion of active men in agricultural production being lower than that of women, they have higher access to irrigation farming and farming technologies than women. The majority of the women farmers depend on labor-intensive manual irrigation techniques which are linked to poor production (Leavens, Gugerty & Anderson, 2019).

In Kenya, women have been instrumental in food production and in promoting food security. They play an important role in food production and promoting food security. According to FAO, women, particularly in rural areas, could enhance farming production and food security if offered access to productive activities (Fonjong & Gyapong, 2021). However, irrespective of their role, they remain constrained because they lack resources and other necessary resources. In most instances, women are barred from owning land which is a basic requirement for food production in addition to other factors that enhance production. This limits them from exploiting their full potential in food production and promoting nutritional security yet regular availability of quality food in the household remains their responsibility.

They frequently cultivate little parcels of land for subsistence purpose and to feed their families (Osabuohien et al., 2019). In remote rural communities, women perform at least 50% of the work required in agricultural and food production as well as rearing animals. In addition to food production, women also contribute to food security by working and earning to purchase food for the households. Female controlled income is used mostly to purchase food for the household. In some cases, they also attempt to do both in order to meet the fundamental family needs. As a result of this, women are considered as the cornerstone of community food security (Onyalo, 2019). However, despite this significant role of women in food production, in some instances, the contribution of women is much less than that of men towards the value of recorded production both quantitatively in labor force participation and qualitatively in educational attainment and skilled workforce. The interventions aimed at promoting food security give less attention to programsthat suit woman’s needs, education, and cultural backgrounds or their aspirations for improving their economic and social conditions.

In Vihiga Sub-County, which is the focus area of this study, the stallholder women farmers play a profound role in promoting food and nutritional security. In this county, a large proportion of people, about 62 %, live in absolute poverty, and about 60% of them are faced with food insecurity problems (Josephert, Wilberforce, Caroline, & Ong’anyi, 2019). The population below the poverty line has increased, with unemployment and underemployment remaining the significant contributors to distress in the county. The people in Vihiga Sub-Countypredominantly rely on subsistence agriculture as a livelihood. However, food production is mainly practiced on a small scale.

Women hold a central position in food production. In most instances, women farm in small pieces of land, about 0.5 ha(Komatsu et al, 2022). A large number of women have less than 1 hectare, which implies that most women operate on small amounts of land linked to the continuous cultivation of crops and rearing of animals because of increasing land fragmentation. This means that they struggle to maximize crop farming to enhance production and foster food security. Maize, beans and vegetables production is the major activity undertaken by smallholder women farmers in Vihiga Sub-County.

Smallholder women farmers in Vihiga Sub-County have identified the significance of modern farming technologies. According to Mukoya and Mulinya (2018), most of them practice intercropping, use fertilizer, use certified seeds, practice plant spacing and population, and apply other agrochemicals like herbicides and pesticides. In addition, a proportion of smallholder women farmers practice agroforestry, irrigation, mechanized, and greenhouse farming. However, despite the central role women play, their participation is significantly constrained (Josephert et al, 2019). While there is much advancement in agricultural technologies generated through research, the role played by these technologies among most smallholder women farmers is yet to be felt. Women are highly alienated, which poses a considerable challenge to their livelihoods owing to the central role they play in enhancing food security.

1.2 Research Problem

In Vihiga Sub-County, just like in other Counties in Kenya, women hold key positions in food production and in preserving traditional knowledge and conserving and protecting the biodiversity (Awino & Ngutu, 2022). They play these roles in their quest to overcome food insecurity even with very glaring underprivileged conditions of factors of production. Policymakers still pay little attention to how women especially small holder women farmers who engage in non-mechanized farming activities contribute to agricultural output and the promotion of food security. All too often, the contribution of women in promoting food security goes unrecorded in reports and statistics (Lutomia *et al.*, 2019). Therefore, their real contribution is not well defined and as such, may be underestimated. For them to be effective at what they do, there is need to examine the various barriers they encounter and the strategies that can be utilized to overcome the challenges thereof.

In view of the above, this study seeks to shed light on the role played by the women in promoting food and nutritional security as well as their capacity to control the periodic scarcity. Also, research shows smallholder women farmers have not fully exploited their potential as pertains to the promotion of food security (Smidt & Jokonya, 2022). Of particular concern is the fact that in Kenya today, agricultural extension officers are demand driven and not supply driven. This basically means that if one has no financial capacity to pay the extension officers, they will not benefit from the much needed services. Therefore, there was a need to conduct this study to

determine the various challenges that limit the rural women's efforts towards realizing and utilizing their full potential in contributing to food security in Vihiga sub-county.

Besides the policy gaps, this study was also inspired by the research gaps as not much has focused on how women contribute food security as envisaged by SDG 2. Among the studies conducted in Kenya, Liru (2014) analyzed the contribution of women towards food security in Malava constituency in Kakamega County and concluded that women play an active role in promoting food and nutritional security and have developed various coping strategies. In another study, Ikutwa and Magani (2020) analyzed the gender perspectives in fostering food security in the dry regions in Kenya. They concluded that while women are pivotal in food production, there is a need to mainstream the gender divide and promote accessibility to inputs. In a more recent study, Ingutia and Sumelius (2022) analyzed the contribution of women in food production in rural areas in Kenya. The study identified that the smallholder women farmers in cooperatives had better access to resources such as credit services which contributed to food production and food security. No study has been undertaken in Vihiga Sub-County to determine how women have contributed to food security and the challenges they face.

With the foregoing conditions the role of small holder women farmers in Vihiga Sub-County must be recognized and responded to. The focus of this research was to explore the nature of small holder women farmers' agricultural activities in Vihiga Sub-County, the role they play as they strive to ensure food and nutritional security and the constraints they face. The findings of the study would illuminate on how the County Government can work with smallholder women farmers to improve on agricultural activities in the area and hence food security. The study will contribute to the discourse on the role the women smallholder farmers play in promoting food security. It will add to the existing knowledge hence a foundation for other researchers with interest in the same area.

1.3 Main Objective

The main purpose in this research was to assess the contribution of smallholder women farmers to food and nutritional security in Vihiga Sub-County.

1.3.1 Specific Objectives

The study sought to meet the following specific objectives;

- i. To establish the farming activities practiced by smallholder women farmers in Vihiga Sub-County to promote food security and nutritional security.
- ii. To examine how women's farming activities secure the nutritional and food security demands for the households in Vihiga Sub-County in Western Kenya
- iii. To examine, if any, the ecological and socio-economic challenges faced by smallholder women farmers in meeting food and nutritional security demands thereof.

1.4 Research Questions

- i. What farming activities do smallholder women farmers in Vihiga Sub-County practice to promote food security and nutritional security?
- ii. How do small holder women farmers in Vihiga Sub-County in Western Kenya contribute to food and nutritional security?
- iii. Do smallholder women farmers in Vihiga Sub-County face any challenges in meeting food and nutritional security?

1.5 Significance

The study is important in various ways. The study would help enlighten the public how smallholder women farmers contribute to food and nutritional security. This way, people would appreciate, acknowledge and promote smallholder women farmers to play active roles in enhancing food security. The study would offer critical insights to NGOs and other stakeholders whose functions revolve around the promotion of food security. The NGOs and the stakeholders would utilize the insights of this study to work out policies that would promote the women's role in fostering food security. The policies would aid in building capacity among smallholder women farmers to promote food security. The Ministry of Agriculture and Livestock would use the findings to design and shape policies geared towards promoting food security. The findings would also enrich the literature on food security. It would form a basis for other studies and act as a reference source for scholars and researchers with interest in the same area and other related areas.

1.6 Scope

The focus of this research was in Vihiga Sub-County. The study was done in all the four wards of Vihiga Sub-County; Mungoma, Maragoili Central, Lugaga - Wamuluma and Maragoli South. Gender wise, the study only focused on the smallholder women farmers and did not focus on the men. The findings would therefore be limited to Vihiga Sub-County in Vihiga County. The content scope of the study highlighted the farming activities practiced by smallholder women farmers in Vihiga Sub-County, the contribution the women have to food security, and established the ecological and socio-economic challenges faced by smallholder women farmers in meeting food and nutritional security demands.

1.7 Limitations

Several limitations were faced in this study. One of the limitation was the likelihood of the respondents being biased. The study relied entirely on the perspectives and they were likely to give skewed data and information. To mitigate this, the respondents were requested to be truthful in order to ensure that the results are valid for policy making. This was also resolved by use of triangulation. Triangulation helped to corroborate data and information collected using various means. The other limitation expected was non response and reluctance of the women to participate in the study. To mitigate this, the researcher assured the respondents that their identity would not be revealed and confidentiality would be upheld.

The other limitation was the vastness of the study area. To resolve this, a sample comprising of women from all administrative wards was selected as a representative. The other limitation faced in the study was nonrepresentation of all age categories in the sample. Most youthful women do not engage in farming activities as most are in employment in urban areas. Language barrier was the other limitation faced in this study. This was mitigated by translating the questions to Swahili for those who could not understand English. Poor road networks posed a challenge in study as well. Some areas were inaccessible due to poor road network. To mitigate this, the researcher used alternative means of transport mainly the motorcycle commonly referred to as Bodaboda.

1.8 Definition of Terms

Economic challenges	Lack of sufficient monetary resources to undertake food production to enhance food and nutritional security.
Food access	This is a condition when households and everyone living in them have enough resources to buy the right food for a healthy diet.
Food security	This is a situation where all people, at all times, have physical, social, and economic access to enough, safe, and nutritious food to meet their dietary needs all year long.
Small holder farmers'	Small farmers who produce relatively small volumes of produce on relatively small plots of land usually less than two acres using non mechanized farming methods
Social challenges	These are problems and challenges faced at the society setup that hinder women from contributing towards food and nutritional safety.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

Thus section covers the prevailing debates regarding the role women play in promoting food security. The first section covers theoretical framework. This chapter discusses the theories that will anchor the study. The second section covers the empirical framework. This covers a review of other studies related to the role of small holder women farmers in promoting food and nutritional security. It also discusses the various farming practices carried out by smallholder women farmers and the challenges that limit the role of women in promoting food security. The third section presents the research gaps while the last section framework of the study.

2.1 Theoretical Framework

Feminist Political Ecology Theory and The Social Relations Model were used to anchor the study. These models helped explain smallholder women farmers' role in promoting food security and the various challenges they face that limit their capacity to contribute to food and nutritional security.

2.1.1 Feminist Political Ecology Model

Feminist Political Ecology theory emerged in 1990s from feminism movements and women-centered scholarship and activism (Elmhirst, 2011). During this period, feminist sensibility and perspectives were used by most activists and scholars when addressing society and nature issues. This approach was characterized by persistently associating political and personal matters. The feminist movement's varied political aims were brought about by the feminist environmental engagements. This was meant to offer means of bearing with the most intimate aspects of daily life which includes the relations humans have with non-human things, food consumption and the human general wellbeing (Rocheleau et al., 1996).

The FPE model adopts a feminist perspective by incorporating feminist political economy, feminist geography, and feminist cultural ecology (Rocheleau et al. 1996). The feminist

perspective framework rejects essentialist theories that assume that there is a close biological linkage between women and the nature. Instead, this theory acknowledges that the relationships and interactions human beings have with the environment are constructed socially. In relation to food security, this implies that social relations like patriarchy are necessary to acknowledge in explaining how women may or may not experience food insecurity and the role they play in contributing to food security (Jarosz 2011).

Feminist Political Ecology theory, similarly to political ecology, tends to create an understanding of how material relationships in social settings determine how resources are accessed and distributed (Nygren & Rikoon, 2008). The FPE, however, differentiates itself from political ecology by considering gender as a central social variable that intersects with other axes of power to determine the control and distribution of resources and environmental decision-making (Thomas-Slayter, Wangari, & Rocheleau., 2011). The FPE model can be used to highlight how gendered access to agricultural knowledge, resources, and political activism determine the relationship of women with resources and land (Rocheleau et al., 1996). In other words, the models explain that women and men interact with the environment differently as a result of gendered opportunities and expectations that are socially structured.

The FPE model has three key themes: gendered knowledge, gendered environmental rights and responsibilities, and gendered environmental politics and grassroots activism (Rocheleau et al., 1996). This implies that the relationship women have with resources is determined by the gendered knowledge of agriculture and the environment and gendered access to resources including capital. Gendered knowledge can be considered as what is regarded as a science and the various manners farming can be undertaken (Rocheleau et al., 1996). The skills of women regarding farming and food production differ from that of men as they are based on different formal and informal knowledge of agricultural processes that might be gleaned through access to extension services (Robbins., 2012). Also, the women farmers in the rural settings have various roles that they play as producers, reproducers, and consumers in the household, on the land, and in the community, which vary from the knowledge and practices of men as farmers.

In this study, the FPE model was utilized as an approach to examine human-environmental change and conflict critically by focusing on the uneven power relations mediating resource access, governance, and control across multiple scales (Elmhirst 2015). It was used to analyze the gendered access to resources necessary for the smallholder women farmers to contribute to food and nutritional security. The theory underscores the notion that in the contemporary world, women also hold central position in different spheres including promoting food and nutrition security.

Rural-urban migration by men in search of paying jobs was also examined using the FPE model and it emerged that most women are left to fend for their families alongside the other roles that they play. As a result, most households remain women headed and this clearly demonstrates just how much effort by small holder women is directed towards food and nutritional security. The theory however fails to highlight the socioeconomic challenges that face women and the sources of the challenges.

2.1.2 The Social Relations Approach

Social relations theory was developed by Kabeer (1994). This model demonstrates how gender and other inequalities are created and structured within the society, family, and nation (Kabeer, 1994). According to the theory, social disparities in society are created by and maintained by institutions and social structures humans have created. These main institutions include the family, the state, the market, the community, and social networks. They create regulations that specify what must be done and who to do it. The theory also explains the gender roles and decision-making in most institutions. At the family and community levels, most of the decisions are made and controlled by men. Therefore, the theory can be utilized to explain the disadvantage and inequalities women face in the agricultural sector in their effort to contribute to food security.

The social relations theory stresses the institutions that are the major causes of the various challenges women face in society. The theory states that the institutions can be either informal or formal and, regardless of their nature, have an influence (Ridgeway & Correll, 2004). In the

context of smallholder women farmers, this theory helps explain why women face numerous challenges in farming and food production and the manner the challenges are structured socially. The model helped to elaborate on the factors that cause gender inequalities in farming and agricultural production and why women farmers are faced with numerous challenges, yet they are the key players in farming at the household level.

In this study, the social relations theory was used to explain why smallholder women farmers are faced with numerous challenges that limit their capacity to contribute to food and nutritional security. The theory will explain why women, regardless of being the most involved in promoting food and nutritional security, face numerous challenges that limit their contribution towards promoting food and nutrition security. The theory hypothesizes that the challenges faced by women that limit their contribution to food security are due to specific institutions, the family, the local community, the society, and the state. According to the model, the capacity of the women farmers to contribute to food security is influenced by socially constructed norms.

2.2 Empirical Review

In this section, we review the land tenure system in Africa, focusing on the small holder women farmers, the farming activities they engage in and their contribution to food and nutritional security. We further look at the challenges faced by small holder women farmers in general, and the ecological and socio-economic challenges in particular.

2.2.1 Land Tenure System in Africa

Land Tenure is defined as the means by which people or organizations acquire, hold, transfer, or transmit their ownership interests in land (Michler & Shively, 2015). Land tenure define the rights and duties of individuals with respect to each other in their use of land, the rules governing the access and the nature of rights such as transfer, use, inheritance, rental and of land as collateral in the acquisition of credit. The land tenure also indicates the circumstances under which an individual has no right to land.

Land tenure in Africa is portrayed as either traditional/customary or state/statutory. Land tenure systems in the continent have undergone significant changes over the past (Bohannan, 2018). African economies and cultures have undergone significant transformations in recent decades, including population expansion, urbanization, monetization of the economy, diversification of livelihoods, increased economic interaction with the rest of the world, and cultural changes. Significant effects of these processes have been seen in regional land tenure structures (Chimhowu, 2019). Although it asserted that these systems have been given legitimacy by traditions, they have been greatly altered by government interference. Additionally, they are being adapted constantly and reinterpreted due to economic, political and social reforms.

The various ways the customary structures react to such differ a lot due to extreme diversity of local contexts (Chimhowu, 2019). Despite the fact that in some instances customary authorities have gained their power, they have seen their influence undermined by changes in the demographic makeup of the local people, competition from central and local government institutions, and evolving power dynamics in local communities (Jayne et al, 2016). In other instances, however, the collegiate bodies that used to oversee the work of the customary authority are no longer effective in regulating access and control of land, which has led to a lack of accountability and the privatization of common lands.

In Kenya, in the precolonial era, unwritten laws governed most aspects of land tenure. These were passed down orally from generation to generation, much like any other laws that controlled the communities (Akinola, 2018). The Chiefs, who served as a governmental body, assigned people access and usage rights to land. Land, however, was never the subject of individual ownership or the freedom to dispose of it as one pleased. This arrangement worked successfully for both community members and non-members who were frequently given gifts or allotted land by the chiefs. However, although everyone had equal rights under the customary system of land tenure, there was a bias in favor of men.

In the colonial era, all of the country's land, whether inhabited or not, became Crown territory (Wakoko, 2014). During this era, tenure instability became a recognized phenomenon. It was

portrayed by the coercive land acquisition method by which the best fertile land in the country was allotted to the Europeans. The indigenous landowners and users were relocated to native reserved little rainfall had inadequate pasture and poor soil (Wanyonyi et al., 2015). Those who were unable to settle established themselves as squatters and were forced to work as unpaid laborers.

After Kenya attained independence in 1963, the Europeans decided to depart the nation and the territories which they had were placed under the presidential executive order to begin resettlement plan (Boone, 2015). However, this settlement plan was characterized by the corruption whereby large tracks of land were seized. This was facilitated by improper land distribution, as well as subsequent collusion with the authorities to obliterate transaction proof (Khamisi, 2018). The new dawn in land tenure came after the promulgation of the 2010 constitution as it called for lawful land reforms in the country. It called for the establishment of transparent and long-lasting organizations and infrastructure for land administration in the country.

The constitution groups land ownership as either public, private or community owned. Under private ownership, there is right to absolute enjoyment, exclusivity and disposal of land (Wily, 2018). All individuals are able to enjoy these right regardless of their age, marital status or gender. Public land is assigned to the government who allocates rights to access and utilize the land. This land can be leased or converted to private ownership. In customary or traditional tenure system, land is held based on customary laws which are recognized in the constitution under the Community Land Act 2015 (Wily, 2018).

In Vihiga Sub County, the basic holding unit of land is the extended family and land is passed from generations through inheritance. The land tenure is highly influenced by cultural barriers. In this regard, land ownership among the women is very low. This lack of legal rights to land coupled with the multiple demands placed on women by both their families and the community and the tiny size of their farms explains why women are more prone to carry out subsistence

farming solely, which gives them very little excess for sale. Thus, they do not exercise their rights to property nor enjoy the benefits that are gained from it (Ekabten, 2017).

Kenya National Land Policy offers guidance towards equitable, efficient, and sustainable land use for the current and future generations. The Policy's mission is to foster beneficial reforms for the enhancement of Kenyans' quality of life. This is done by establishing land-related laws and systems. The National Land Policy has an overarching goal to protect land rights while fostering investment, sustainable growth, and poverty reduction. Specifically, the policy provides a structure to guarantee the upkeep of a land administration and management system that gives all citizens the chance to access, beneficially occupy, and use land.

2.2.2 Small Holder farmers

Smallholder farmers undertake farming in small scale. A smallholder farm is usually a family-owned enterprise that mainly caters for the food and nutritional needs of the family. Small holder farmers are frequently described as family farmers since many depend on family members' labor to meet their production demands (Meemken, 2020). This is also the case since they often keep some of their harvest for household consumption.

Small holder farming is characterized by use low input and low output agricultural systems. The main factor affecting smallholder farmers' profitability and competitiveness is low yield (Ebel, 2020). Many smallholder farmers are also ill-equipped to handle the intricate requirements of the agricultural industry. Most lack the knowledge and resources needed to participate in commercialized agriculture. For these reasons, a large number of smallholder farmers continue to produce only enough for survival.

While the smallholder farmers face a myriad of challenge such poor access to productive resources, they contribute greatly to agricultural production, food and nutritional security in the conservation of the biodiversity (Giroud & Huaman, 2019). In Southeast Asia, there is an estimated 100 million smallholder farmers. In India, around 80% of farmers are smallholders while in China, about 98 percent of farmers are smallholder and grow crops in farms less than 2 hectares. These farmers are the main producers of staple crops like rice, wheat, and maize as well

as products like palm oil, rubber, cocoa, and coffee. The production of these farmers is however low. They are mostly faced with food security challenges and live in poverty.

In Africa, these farmers contribute about 80% of food particularly in the sub-Saharan region. There are about 33 million people actively involved in smallholder farming in different parts of the continent (Nyong & Martin, 2011). They typically farm on small portions of land, mostly not more than one hectare. These farmers cultivate common crops like sorghum, cassava, wheat, and rice. They also engage in agroforestry and crop diversification as important strategies to support environmental sustainability and conservation.

Women comprise a large proportion of smallholder farmers. In developing nations, the proportion of women working in agriculture ranges from an average of 43% to approximately 50% in Eastern and Southeastern Asia and sub-Saharan Africa (Patil & Babus, 2018). Women are considered as key change agents with the ability to push for more sustainable food production and a broader, healthier diet. While they are faced with various challenges and the limited operating scale, they supply food for a substantial share of the population. They grow a wide variety of crops, which generally promote healthy nutrition and diversification. They also act as environmental stewards by using techniques like mulching, intercropping, and agroforestry that are crucial for both short-term drought risk reduction and long-term development of resilient, sustainable, and productive food systems.

2.2.3 Farming Activities Practised by Small Holder Women Farmers

Women are mostly involved in food production more so in the non-agricultural segments of the food systems (Berchin et al., 2019). In most regions, particularly developing nations, women carry a hefty burden of farm work and are the primary food producers. According to UN (2015), smallholder women farmers contribute to all pillars linked to food and nutritional security. The available data and statistics indicate that on average, women contribute to food security (Akram-Lodhi, 2021). In the sub-Saharan region, women contribute about 70% to 80% of food and dietary security (Aoyagi, 2021). In Kenya, in the rural areas, smallholder women farmers account for about 50% of food and nutrition security (Onyalo, 2019).

Women undertake various farming activities to promote food security. In a study conducted by Ragasa, Aberman, and Mingote (2019), the findings indicated that women take part in all farming practices and food production. They also participate in livestock keeping. The analysis concluded that women farmers are involved in various activities, including cultivation, harvesting, distribution, and alimentation.

Balik et al. (2019) did a study to determine the long-term behavior of an integrated home garden intervention in Bangladesh. They concluded that smallholder women farmers who cultivate the home gardens contribute to food and nutritional security. The home gardens, which are primarily owned and operated by women, have the potential to satisfy the subsistence needs of the household. Smallholder women farmers who operate these gardens are involved mainly in fruits and vegetable farming, the production of starchy staples, medicinal plants, and animal proteins. These home gardens offer effective means of increasing access to nutritious food among households, mainly in the poor households in rural areas. The study recommended the need to enhance the women's skills and knowledge to enhance the management of the home gardens as a pathway to boost nutrition in the longterm.

Locally, Mwabu (2018) conducted a study to determine the challenges faced by women in food production in Makueni County. The study concluded that women contribute significantly to food and nutritional security. Most of the activities involved in food production for households are often considered female activities. The study concluded that the smallholder women farmers are involved in various activities, including land clearing and preparation, weeding, fertilizers, and harvesting. The women are also engaged in activities such as tending and milking livestock. In addition to being involved in farm activities, women facilitate labor provision in farms. This is where they offer intermediary roles of coordination and cooking for the people working on farms.

In another study, Nthenya (2018) analyzed the role played by women in Lamu and concluded that they contribute to food and nutritional security. The smallholder women farmers have

adopted different farming activities such as crop rotation, cropping, mixed farming, terracing, and weed control. The purpose was to diversify the diet and promoting food security. They produce various crops in order to diversify dietary. The study also identified that smallholder women are actively involved in animal production.

2.2.4 Contribution of Women to Food and Nutritional Security

Over the recent past, there has been unparalleled attention given to the food security issue, with special recognition on the role of smallholder women farmers. The research shows that smallholder women farmers are a crucial component of food production and food security promoters, particularly in developing nations. In a study by Özçatalbaş and Sogué (2021), the findings concluded that smallholder women farmers comprise a significant portion of the labor force in the agricultural sector and contribute significantly in promoting food security. They are mainly the laborers in family farms, food processors and vendors, and home gardeners, among other roles.

Muzari (2016) conducted a study to analyze agricultural productivity and food security in Sub-Saharan Africa and identified that smallholder women farmers are critical players in food production and contribute significantly to food security. Smallholder women farmers are involved in all farming aspects, from sowing to harvesting. However, despite the crucial role played by women, the study identified that they are faced with numerous challenges that lag them behind in food production. The women are affected by gender inequalities that reduces their access to productive resources. Concerning land, for instance, across the sub-Saharan region, chances of women owning land is consistently low, and usually have access to small tracts of poor quality. In addition, the women are restricted by customary laws and societal structures to access and control land and other vital assets and resources required for farming and food production. The biased inheritance arrangements in the region favor males leaving women disadvantaged. Therefore, offering women access to sufficient productive resources would help to increase yields.

Fonjong and Gyapong (2021) studied the contribution of women in their pathways towards zero hunger in Ghana and Cameroon. The specific focus of the study was to analyze the aspects of gender relations in communities affected by plantation land deals and the implications on food production and food security. Based on the analysis, the study concluded that smallholder women farmers contribute to food security through various farming activities such as mixed cropping and mixed farming. They grow different crops and keep multiple types of livestock to promote food security. The smallholder women farmers also practice crop rotation to maximize yields and retain soil fertility. The study recommended the need to provide the women with resources such as farm inputs to increase their productivity and promote food security.

El Neel (2018) did a study to how women contribute to enhance food security in Eastern Sudan and concluded that women in these areas have a central role to play in promoting food security. They participate in the whole food production process, particularly in secondary crops such as vegetables and legumes. In another study, Palacios-Lopez, Christiansen, and Kilic (2015) analyzed the contribution of women in food production in Africa and identified that they play a crucial role particularly in Africa. The study identified that women farmers account for 43% of the agricultural labor force in developing countries and contribute significantly to the promotion of food security.

Locally, Mwabu (2018) conducted a study to analyze the challenges faced by women in agricultural production in rural areas in Makeni county and identified that women contribute a lot to the promotion of food security. Regardless of their numerous challenges, women farmers play significant roles in ensuring food security and working against environmental degradation, hunger, and poverty alleviation. In another study, Nthenya (2018) analyzed the contribution of women to food security in Mpeketoni Location and concluded that smallholder women farmers contribute greatly in ensuring the households have sufficient food. They achieve this through dietary diversity and are engaged in numerous farming activities.

2.2.5 Challenges Faced by Small Holder Women Farmers

Women and men smallholder farmers often faced with different barriers when accessing agricultural resources. This is unfortunate considering the key role women farmers play in promoting food security. Women farmers particularly in sub-Saharan Africa are susceptible to disparities in education, training, authority over agricultural decision-making, access to land and other essential resources, and agricultural production which to a large extent limit their role (Shimeles, Verdier-Chouchane & Boly, 2018).

The challenges faced by smallholder women farmers mainly emanate for the inherent gender bias in the social and economic systems. This bias frequently restricts women's access to land, resources, and credit facilities (Mtshali & Akinola, 2021). This is especially true for female smallholder farmers in poor countries, especially in Africa, where cultural norms and a lack of collateral might occasionally prevent them from borrowing money. Compared to men, women farmers are less likely to buy and use fertilizer, drought-resistant seeds, sustainable farming practices, and other cutting-edge agricultural tools and techniques that increase crop yields. These factors keep their yields relatively modest.

Smallholder women farmers are rarely recognized in most societies and their efforts in food production and other socio economic spheres go unnoticed (Fenet & Alemayehu, 2019). This is because, most systems in the developing countries are patriarchy and various stereotypes play together to limit the role of women. This makes the smallholder women farmers to be ignored in all areas including policy making, accessing inputs, research and government support. They do not receive the support they need in order to exhibit their full potential in regards to food production and participation in other socio economic areas.

The elimination of gender based barriers would go a long way in empowering women farmers and increasing their participation in food production. According to the FAO, removing barriers that are specific to gender in agriculture will help women achieve their full economic potential as well as assist end world hunger (Agholor, 2019). According to the FAO, the majority of people who are undernourished today reside in developing nations where women play a crucial role in

food production. Giving women the same opportunities and access to education as men will enable them to produce up to 30% more food, contributing to the eradication of hunger.

2.2.6 Ecological Challenges that Limit the Women's Contribution to Food security.

Food production is highly influenced by ecological challenges. The challenges threaten to reverse the progress so far made in the fight against food insecurity. The ecological challenges that impact on crop production are climate, water, terrain, and soil and water properties (Cottrell et al, 2019). In most cases, a combination of these factors influence how crop production is done in different areas. The women farmers are the most affected by ecological challenges because they lack skills to manage the ecological factors. Most women farmers particularly the smallholder ones lack the awareness and skills to use climate friendly farming technologies, and soil and water management skills and technologies (Duffy et al, 2021). This impacts on production and leading to poor yields.

The effect of ecological challenges on smallholder women farmers is evident in the available studies. This was evident in a study by Oliver et al (2020) in South west China in whereby it emerged that awareness on the use of climate smart technologies was lower among the female farmers as compared to the male farmers. The findings indicated that women farmers lacked the knowhow to manage environmental problems such as drought and flooding which posed huge challenges to food production. This lack of skills was attributed to poor access to training among the women farmers.

In a study done in the Sudan savannah agro-ecological zone of northeastern Ghana by Antwi-Agyei, Dougill, and Abaidoo (2021) on the challenges and opportunities for using climate information for developing resilient agricultural systems, the findings indicated that while women small holder farmers play crucial role in food production and in promoting food security in Africa, they do so under numerous ecological challenges as for this reason, they are hardly ever able to achieve their full potential in production. The production capacity of eh women is limited by overreliance on poor climate change adaptations. A large number of the women had

lower literacy levels which prevented them from acquiring information that could enable them adopt climate change adaptation methods to increase their yields.

Zamasiya, Nyikahadzoi and Mukamuri (2017) did a study to determine farmers' adaptation to climate change in transitional climatic zones in Hwedza District in Zimbabwe and identified that the adoption of climate adaptation methods by the farmers varied with gender with the male farmers showing higher level of adoption of these methods as compared to the female farmers. This was attributed to poor access to climate information among the female farmers as a result of low literacy level and exposure to information. Also, the study identified that the women farmers had low membership to social groups in which climate adaptation information was shared which explained the low adoption. Further, women had negative attitudes towards prescribed climate change adaptation techniques as they lack sufficient information about the techniques.

Dave (2020) conducted a study to find out the contribution the women have in food production focusing on opportunities and constraints. The study identified that women farmers lacked rich experience about irrigation, cropping patterns, pests' control and soil management. The women farmers were faced by uncertainties caused by climate change, rainfall and different disasters such as drought, floods, cyclones, and other uncertainties. The women lacked skills and training on how to effectively address the ecological challenges and manage land sustainably without causing environmental degradation.

2.2.7 Socio Economic Challenges that Limit the Contribution of Women to Food security.

Smallholder women farmers contribute to food production and promoting food and nutritional security. This is particularly the case in Sub-Saharan region whereby women play an instrumental role increasing accessibility to food. However, the capacity of women in food production is limited by socio economic factors that impact the accessibility of women to the productive resources (Ogunniyi et al., 2021).

The effect of social economic challenges on smallholder women farmers has been researched widely. In a study conducted by Ingutia and Sumelius (2021), the results showed that empowering women economically, socially, and politically depends on their access to and control over property. The attempts of women to access land are, however, limited by customary structures as well as a lack of enforcement of land policies and laws that promote gender equality in accessing and controlling land. The husbands of rural women, on the other hand, grant them modest plots of land to grow food for their personal sustenance. Cash crops are grown on huge tracts of land.

Bashir, Kitenge and Berry-West (2020) conducted a study to establish the barriers to financial access in the agricultural sector in the US and concluded that female farmers face barriers when trying to get finance and loans to expand their farming activities. The findings indicated that only about 1% of all agricultural loans go to female farmers, which reduces their incentives to pursue more productive food production. This is because the women farmers lack collateral. Typically, the conditions of access to rural loans favor commercial firms while ignoring critical elements of food production and household nutrition which are mainly undertaken by smallholder women farmers.

The study found that women experience additional barriers such limited mobility, a lack of extension officials, and timings that are occasionally inconvenient for women's daily tasks. Many extension agencies focus their projection on crops that have historically been cultivated by men, and in other instances, the women farmers are barred from cultural barriers prevent women from receiving training. Because of the far-off and subpar market facilities, smallholder women farmers frequently face marginalization. Market amenities that encourage women to participate in marketing have not received enough attention. Also market information continues to be restricted to the literate farmers at the disadvantage of women in the rural areas. Female farmers are unable to access information, especially on food security.

Galwab (2017) conducted a study to assess the impacts of climate change on food and nutrition security at household level and concluded that the lack of access productive resources is mostly

caused by the exclusion of women from extension programs and the overall denial of government-subsidized inputs to women. The study established that women frequently lack the funds necessary to buy the discounted inputs. Due to a lack of proper equipment, women's output is primarily labor-intensive, with the majority of farm work being completed by family and child labor. Access to the advantages of research and innovation is hampered by the high rates of illiteracy among rural women. Food crops, which are primarily grown by female farmers, are of low research significance, and yet their functions and demands are sometimes disregarded in the development and application of new technology.

Koirala et al., (2015) conducted a study on pesticide application and food safety issue in Nepal and concluded that despite women playing a leading role in food production and fighting food insecurity, they are affected dramatically by gender inequities in providing the necessary resources. This is primarily the case in developing nations where women are denied sufficient access to critical resources. This disparity makes them even more vulnerable to food insecurity. In most instances, women lack access to land, and even when they have, they lack the capacity to utilize fertilizers and other inputs that would boost production. Also, decisions concerning food production are mainly made by men, which further limit the capacity of women.

Nyantakyi-Frimpong (2019) studied the climate information service delivery among farmers involved in small scale farming in northern Ghana. The study identified that despite smallholder women farmers being in a central position in food production, they face numerous challenges that limit their full capacity and potential. Time restrictions, patriarchal views, and gender norms and expectations were some of the challenges that were noted. The study also found that women are embedded in other subject positions besides gender. Seniority, class, religion, and positions within include those that further reconfigure access to the necessary resources.

Rickenbrode (2019) conducted a study to analyze gender-differentiated food security and identified that the smallholder women farmers are faced with numerous challenges. The study identified those smallholder women farmers in rural areas are caught up in a gender-differentiated low productivity trap. They have limited participation in more lucrative

commercial agricultural markets and they have low access and control of resources. This bars them from accumulating wealth and valuable inputs. The study identified that the smallholder women farmers in Malawi experience gendered knowledge in multiple ways. They are less likely to adopt new and efficient farming technologies due to low formal education and lack of agriculture and food production training. They have little or no chance to participate in organizations that give information on agricultural practices. The study also identified that smallholder women farmers are disadvantaged regarding access to extension services, which in turn make them over-reliant on traditional methods of production with low yields.

El Neel (2018) conducted a study in Eastern Sudan to determine how women contribute to food production and concluded that they have a central role to play in promoting food security. However, they are faced with various challenges which limit their full potential. The study established that there is widespread marginalization of women based on numerous factors. The challenges include the introduction of large-scale farming overlooking women farmers, the deterioration of the environment due to drought, which has increased the burden of the women, and the outmigration of the majority of the men leaving the women with the obligations of heading the households. The women farmers are also faced with gender bias challenges regarding access to credit facilities and land ownership, which further curtail their contribution to food and nutritional security.

Locally, Mwabu (2018) conducted a study to analyze the challenges faced by women in agricultural production in rural areas in Makueni county and identified that while women contribute significantly to food security through food production, they are faced with numerous challenges that curtail their capacity. The study identified that women farmers suffer from social and economic disempowerment and gender inequality, limiting their potential to contribute to rural food production fully. They grossly lack access to vast tracts of land and other resources required for food production. They also face challenges accessing agricultural support services such as credit facilities and agricultural training, which would help to promote production. The study further noted that even when such services are available, priority is first given to the men who own almost all the land they mainly dedicate to cash crop production. Besides inaccessibility to resources, the women farmers are faced with climate challenges. The study

observed that the women farmers use unsuitable climate change adaptation measures due to a lack of proper training.

Nthenya (2018) conducted a study in Mpeketoni location in Lamu to determine how women farmers contribute to food security and concluded that while women play a crucial role, they lack knowledge regarding the use of farming inputs which contributes to their inability to have sustainable food security. The women also had access to low acreage, which further limited their capacity to promote food security. The study concluded that the women had less tenure security than men and lacked access to sufficient, safe, and clean water for farming and domestic use.

2.3 Research Gaps

The reviewed research shows that smallholder women farmers hold a central role in ensuring there is food security. They engage in various activities such as land preparation, planting, harvesting, all post-harvesting activities and keeping and taking care of domestic animals. They undertake the farming practices and partake in the production of different crops to make sure there is dietary diversity (Mwabu, 2018; Nthenya, 2018). The studies identified that women farmers, in most cases, have access to small home gardens that can only meet the subsistence needs of small households (Balik et al., 2019).

The reviewed literature has identified that through the farming activities the women are engaged in, they have contributed significantly to food and nutritional security (Mwabu (2018; Muzari, 2016; Fonjong and Gyapong, 2021; El neel, 2018; & Nthenya, 2018). However, the reviewed studies established that the capacity of the smallholder women farmers to contribute to food and nutritional security is restricted by lack of resources such as extension services, capital, and other productive resources that would help would boost production (Koirala et al., 2015; Nyantakyi-Frimpong, 2019; Rickenbrode, 2019; El neel, 2018; Mwabu, 2018; & Nthenya, 2018).

A scrutiny of the available research shows that although much research has been conducted, no study has focused how women contribute to food security in Vihiga Sub-County, hence the

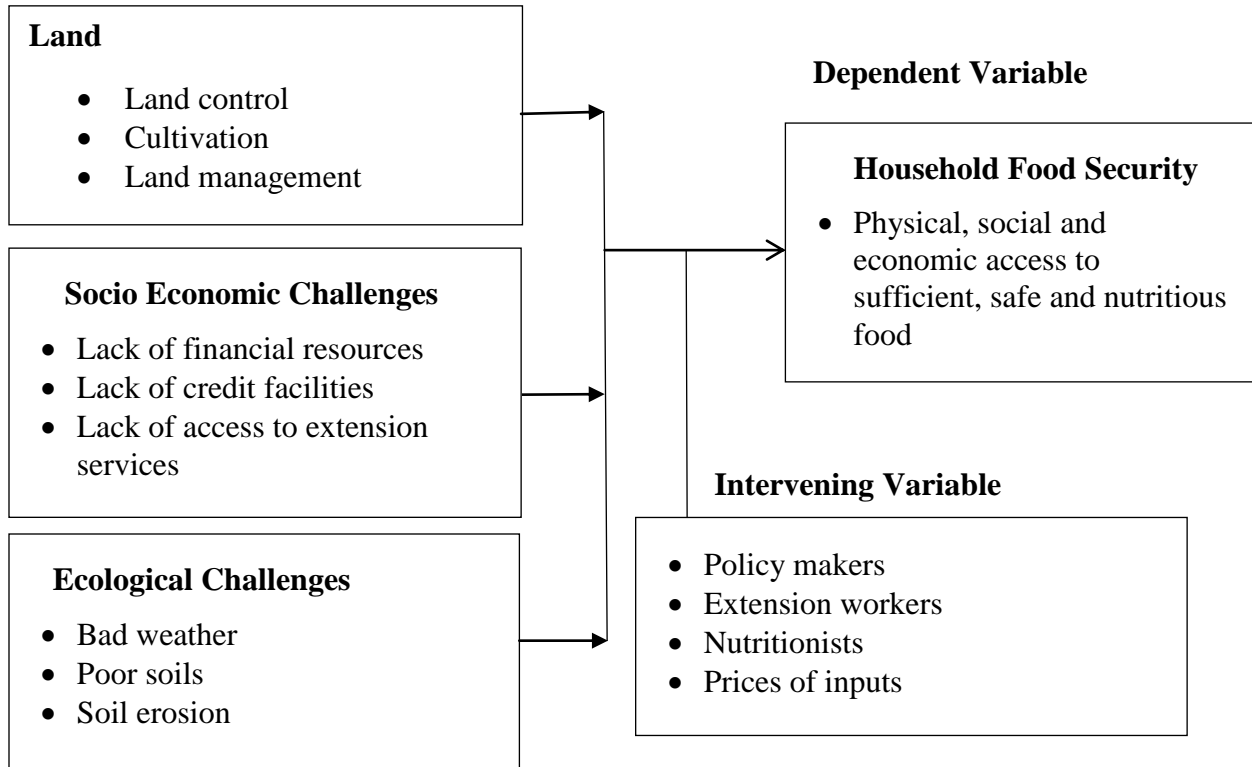
rationale of the research. The study would go a long way toward offering critical insights to stakeholders whose work revolves around promoting food security. The study would help in building capacity among smallholder women farmers to promote food security.

2.4 Conceptual Framework

The study variables and the connection between the independent and dependent variables are presented in a conceptual framework (Varpio et al., 2020). It is a framework that presents the study variables, the constructs of the variables, and the inherent relationship between the variables (Britton & McGonegal, 2007). The framework is presented as follow:

Figure 1: Conceptual Framework

Independent Variables



In this study, the independent variables are the roles played by smallholder women farmers and the challenges the women face that limit their capacity to contribute to food security. The dependent variable is food security. This was evaluated in terms of having constant, adequate, safe, and nutritious access to food that satisfies their dietary needs and food preferences for an active and healthy lifestyle. Several factors influence how much of a role women have in promoting food and nutritional security. The study's intervening variables included policymakers, extension personnel, nutritionists, and input price levels.

Based on the conceptual framework smallholder can contribute to food security is they have access to land, and if they have rights to manage and cultivate land. Also, their contrition to food security would be promoted by access to financial resources needed to purchase farm inputs, credit facilities and access to extension services. Additionally, the role women play to food

production would be enhanced by training them on how they can utilize farming technologies to mitigate the effects of bad weather, poor soil, soil erosion and the effects of pests and diseases.

The promotion of women role in food security calls for effective policies that abolish the gender based socio economic systems that bar women from owning land and property and that advocate for women's access to farming inputs. There is a need for smallholder women farmers to have access to extension services in order to be trained on the best methods of production to use as well as the services of nutritionists to train them on how to ensure the nutritional needs of the household are met. In addition, the prices of farming inputs should be regulated and subsidized in order to make them affordable for the smallholder women farmers.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The procedures and methods used to conduct the study are described in this chapter. This chapter covers the research design, target population, sample size, sampling techniques, and data collection procedures. Techniques for data analysis are also covered in this section.

3.1 Study Area

The research was undertaken in Vihiga Sub-County. The area lies between Latitudes 0°0'00"N and 00 3'20"N and Longitudes 34°40'00"E and 34o 43'20"E. The sub-county borders Hamisi Sub County to the East, Emuhaya Sub County to the West, Sabatia Sub County to the North, and Kisumu East Sub County to the South. The population in Vihiga sub county is approximately 91,616 (KNBS 2019). The sub-county has four wards that is Mungoma, Maragoili Central, Lugaga - Wamuluma, and Maragoli South (Cf. Appendix V).

Vihiga Sub County has a population of 45,788 people as per the 2019 census. The subcounty is about 90.2 Km² with an average land ownership of 3 ha. The sub county, on average receives about 1800mm to 2000 mm of precipitation and the average temperature is about 24 degrees. Agriculture is the principal economic activity in the Vihiga sub-county. Tea, coffee, bananas, and horticulture crops are the main crops grown. Maize, beans, cassava, sweet potatoes, vegetables, millet, and sorghum are some additional food crops in the area. The most common breeds of animals kept include zebu cattle, dairy cattle, poultry, sheep, goats, pigs, and rabbits. The common type of the poultry kept in the sub-county is indigenous chicken. There are other emerging economic activities in South Maragoli Guinea such as pig farming, apiculture, and small-scale gold mining (Vihiga County Integrated Development Plan, 2018).

3.2 Research Design

A research design is a conceptual plan that outlines how a study is done (Kothari, 2004). The researcher used a qualitative research design to carry out the study. Qualitative study designs are crucial for specific studies that seek to offer unique insights into particular social contexts. Qualitative studies are conducted in order to gain a deep, in-depth understanding of a certain subject, problem, or meaning based on personal experience. The studies involve a small and focused sample since the data collection process takes much time. This approach was preferred as it allows for a thorough analysis of the case.

The qualitative research design helped to engage the small holder women farmers, the different activities they engage in in order to promote food and nutritional security, the different social, economic and ecological challenges they face that limit their capacity to contribute to food and nutritional security. Qualitative research basically involves an inductive process that privileges a direct observation of experiences (Mohajan, 2018). The various qualitative data collection techniques employed helped to highlight access the smallholder women farmers have to different resources such as a land, farm inputs, extension services and other inputs that are necessary to farming and how this determine their capacity to contribute food and nutritional security in Vihiga Sub-County.

3.3 Target population

A target population comprises of all the units the researcher is interested in (Dahabreh et al., 2020). The target population has common traits, and it is from this population that the researcher draws a sample to sample and generalize the findings. In this study, the target population comprised women smallholder farmers in Vihiga Sub-County. The units of analysis comprised the women involved in smallholder farming who are aged 18 years and over.

3.4 Sample Size

A sample is a small population proportion that is selected and studied as a representative of the whole population. In qualitative studies, no definite sample size is used. The purpose was instead to obtain a sample that is considered large enough to give a sufficient description of research phenomenon and address the research questions (Braun *et al.*, 2021). Therefore, this study aimed to recruit women smallholder farmers to a point saturation, where no more data generated would make a difference to what has already been collected.

3.5 Sampling Methods

The first respondents from each ward in this study were sampled purposively with the help of the ward administrators. This method, also known as judgment sampling, involves the deliberate selection of respondents based on their desired traits (Campbell *et al.*, 2020). This method involves a nonrandom method that does not require a set number of informants or an underlying theory. This implies that it is the researcher who decides the data to be collected and sets out to determine who are willing and can give the required data and information (Bernard, Wutich & Ryan, 2016). The purpose of using purposive sampling method is that interest was only on women and there was no need of including men involved in smallholder farming. After the initial respondent was identified the remaining seven for each ward were selected through chain referral sampling also known as snowballing. This allowed the researcher reach out to populations that would have otherwise been difficult to sample and it was cost efficient. The total number of respondents is provided in Chapter 4.

3.6 Data Collection Methods

Qualitative data collection methods were used. Qualitative research starts by observing social interaction and interviewing social actors in-depth and then, through thematic inferences, developing explanations for the findings. Thus, investigating women smallholder farmers' contribution to food and nutritional security will involve an exploration of their views and experiences.

Data triangulation was used in this study; that is collection of data using various methods. This involved the use of various data collection methods (Noble & Heale, 2019). This approach was considered as a crucial principle in a study involving a case study. In this regard, multiple data collection methods were used in this study, including structured interviews, focused group discussions, and observation methods. Appropriate tools for each method were developed. All these are common qualitative methods in ethnographic research. The different methods that were used were interviews and FGDs. The observation method served as a supplement to the two ways (Brujić, 2022).

3.6.1 In-depth Interview

The tool was utilized to obtain data from 32 respondents i.e. 8 respondents from each of the four wards. The rationale for choosing this tool was that it allows a certain degree of flexibility during the interview process. Also, the interview method gives the respondents room to elaborate and probe more, thus making it possible to gather much data (Deterding & Waters, 2021). Accordingly, this method allows the interviewer to explore fully all the factors that underpin the respondents' responses to the questions, such as feelings, reasons, beliefs, and opinions. Cooperation is built between the interviewers and the respondents due to sharing experiences, perceptions, and ideas. Furthermore, this interview method allows the researcher to create a conducive environment which makes the respondent free to give data. It helped the researcher in getting rich insights on land ownership patterns in Vihiga Sub-County, land ownership among women, the different activities undertaken by women to promote food security, the different challenges they face and how they cope with the challenges.

Creating a good rapport between the interviewer and the respondents is vital to make them comfortable giving data (McGrath, Palmgren & Liljedahl, 2019). In this regard, the researcher created a good relationship with the women smallholder farmers by showing interest and respecting them. For instance, the researcher did a pre-study to familiarize with the area and create a good rapport with the community members and the target respondents. In the piloting process, the researcher interacted with smallholder women farmers in different areas in order to determine how they contribute to food and nutritional security.

Data recording was done for the data collected through interviews. Data was recorded using the field notebooks, interview schedules, and audio recorders. Recording made it easier for the researcher to gather extra information and to refer to in case of need for clarification during analysis. The field notebooks were utilized to record the agricultural activities of the women smallholder farmers, including their day-to-day activities. Audio recorders were used with the respondents' permission. Audio recording was done with the informed consent of the participants.

3.6.2 Focused Group Discussions

FGDs involve gathering people from similar backgrounds and experiences to discuss and share various experiences, ideas, attitudes, and beliefs (Scheelbeek et al., 2020). FGDs were conducted using the FGD Guide (see Appendix III) after the interviews had been completed and were based on emerging issues that require further probing and probation. The researcher conducted 4 FGDs, i.e. one FGD in each of the 4 wards. Each FGD comprised of 10-12 smallholder women farmers. The FGDs comprised of women with different demographic characteristics including age, economic status, and educational level among other traits in order to get diverse views as pertains to the role the women in Vihiga Sub-County play in contributing to food and nutritional security.

The FGD participants had the opportunity to discuss the general food and nutritional security in Vihiga Sub-County, land ownership and control based on gender, and the different activities undertaken by smallholder women farmers in promoting food and nutritional security. The FGD participants also got the chance to discuss the various strategies used by smallholder women farmers to cope with food and nutritional challenges as well as recommend measures that can be used utilized by smallholder women farmers to increase food production.

3.6.3 Observation

The observation method was used to supplement the data collected using other methods. In this method, the researcher watched and listened to interactions and phenomena as time unfolded. Through observation (see the Appendix IV), the researcher had the ability to determine and find

out what people do in certain contexts, their interactional routines and patterns, and their day-to-day lives (Barrett & Twycross, 2018). Since this study involves smallholder farming, observation was crucial as it enabled the researcher to observe the different farming activities undertaken by women smallholder farmers. The researcher observed different food crops grown by smallholder women farmers, the livestock kept by the women, and the amount of land used among the smallholder women farmers. It also enabled the researcher to observe and witness the day to day activities of the women smallholder farmers, progress of their effort and real time hitches that they faced. Pictures were taken to help explain further what had been discussed in the FDGs.

3.6.4 Document Analysis

Document review is a method in which data is collected by reviewing the existing documents relevant to a given area of interest (Bretschneider et al., 2017). Document review and analysis is vital as it is relatively less expensive. It helps to supplement other data sources by bringing up issues not noted by other means (Busetto, Wick & Gumbinger, 2020). In this study, document review was done by reviewing various sources, including extension officer's reports and Vihiga County Integrated Development Plan 2018-2022.

3.7 Data Analysis

Data was analyzed using qualitative methods. This was done using thematic analysis. This method consists of searching across data sets to identify repetitive patterns. The thematic analysis in this study involved several steps. The first step was familiarization. In this phase, data transcription was done, and data was reviewed with the aim of determining repetitive themes and concepts (Kiger & Varpio, 2020). Based on the bulkiness of the data, familiarization did not include the whole dataset. It only involved a careful selection of data as per the research objectives and questions. This process was done up to a point where the researcher felt that all the characteristics and circumstances within the data had been well understood. Based on this understanding, the entire research process was scrutinized in terms of what will be significant and crucial from the study.

After familiarization, identification of initial themes and concepts was done. Since this study is based on an interpretivist framework, all the objects, events, and actions were based on the statements that were given by the respondents (Braun & Clarke, 2021). A summary of the data recorded from the interviews offered an opportunity to develop initial themes and concepts and identify the key themes and concepts. After identification of key themes and concepts, coding was done. Coding allows the researcher to sift through the data by summarizing and pulling together themes and label identification.

Data labeling was done after coding process. This involved reading each transcript in details to ascertain if specific parts are relevant to given codes (Castleberry & Nolen, 2018). After data labeling, the codes identified were connected with the identified concepts and themes. When linking the themes and codes, differences and similarities between various data groups were identified, noting areas of consensus.

The last step involved the interpretation of themes. This was done to determine the emerging explanations from the data collected. This stage involved going forward and backwards between the data collected and the emerging explanations until the explanations fit the theoretical underpinning of the study. At this level, the analysis is based on the explicit reasons that the participants infer themselves or the implicit reasons that are inferred by the analysis. The themes directly represented the study's research objectives. Accordingly, phrases and expressions were retained as much as possible from the respondents' own language. Secondly, interpretations were kept to a minimum to ensure opportunities to revisit the original expressions were minimized. Lastly, the researcher ensured coherence through the synthesis to ensure that the research is well understood without the need to revert to the original materials.

3.8 Ethical Considerations

This being a social science research, some ethical issues were a crucial concern, and the research process was bound by ethical considerations. The researcher had a set of moral principles that acted as guidelines throughout the research process. The principles also guided how the researcher conducted themselves concerning issues such as anonymity, confidentiality, legality,

professionalism, and privacy when interacting with the respondents and when collecting data (Mertens, 2018).

Several ethical guidelines were observed during the study. An authorization letter was first obtained from the University. Secondly, a license from NACOSTI was obtained before starting data collection (Cf. Appendix VIII). During data collection, the researcher first introduced and explained the aim of the research study for the respondents to give informed consent. It is worth noting that for the participants to make informed consent on whether to partake in the study, they must have sufficient apprehension of all the study details and information that they consider vital for them to grant consent (Capron, 2018).

There are further points to consider to ensure informed consent (Xu et al., 2020). First, the respondents need to comprehend, and secondly, the respondents to voluntarily partake in the study. This implies that the respondents need to understand the nature of the study they participate in and the roles they are supposed to participate in. Therefore, the researcher ensured the respondents are well informed before they make the decision to participate. The respondents who did not have the ability to give written consent utilized third parties to indicate their willingness by signing on their behalf.

The other ethical consideration is avoidance of harm to the respondents. In any field of research, it is vital to consider how to avoid causing harm to the participants (Keusch et al., 2019). Further, the harm can be either physical or psychological. However, any social research is likely to cause an unavoidable degree of discomfort, psychological distress, social disadvantage, and privacy invasion. The study tried to minimize these negative effects to the best of the researcher's ability. The other ethical consideration included voluntary recruitment to the study. It was crucial to recruit the women without coercion. As such, all the participants were recruited based on their personal choice to take part in the research process. The respondents had the right to decline or discontinue participation anytime they wanted to without any adverse consequences (Silvano, Eriksson & Henriksson, 2020).

Lastly, confidentiality and privacy applied. It is worth noting that as Rudolph, Young & Havens, (2020) aver, lack of trust between the researcher and the respondent reduces the guarantee of the validity and data worthiness. The researcher should clearly inform the interviewees and guarantee that confidentiality and privacy of their data will be upheld. The researcher must assure them that high confidentiality would be upheld. The researcher will be the only one who will have access to the interview schedule and the schedule will be kept confidential after the completion of the study. Additionally, privacy will be maintained by not disclosing the names of the participants and by using pseudonyms for the interviewees. During the data collection exercise, all the devices, such as the cameras and other research instruments used were under restrictions (Fox & James, 2021).

CHAPTER FOUR

DATA ANALYSIS AND PRESENTATION

4.1 Introduction

This section covers data analysis. The first section analyses the farming activities practiced by smallholder women farmers in Vihiga Sub-County to promote food security and nutritional security. The second section analyses the role the women play in promoting food and nutritional security in Vihiga Sub-County in Western Kenya. The third section covers the analysis of the effect of land access on the ability of the women to contribute to food security. The fourth section analyses the social and economic challenges that impact the contribution of women to food security, and the fifth section analyses the ecological challenges the women face. The last section covers the discussions.

4.2 Demographic Information

The analysis of socio economic and demographic data indicated that most were married and aged between 30 years to 50 years. The women in this category are active economically and their major responsibility is to make sure the families are looked after. The majority of women in this category are married and they had the primary responsibility of looking after the family. Regarding land ownership, the women reported that culturally, they are not allowed to own and the land they cultivated was owned by the husbands for those who were married or by the fathers for those who were not married.

The study noticed that the proportion of young women was small. The reason behind this was that younger women were mostly engaged in other types of jobs particularly in towns and were only involved in smallholder farming to a small extent. Most of the women had primary and secondary education which shows low education attainment. Only a few women had attained high education. Almost all the women participated in smallholder farming as their main source of livelihood. Only a small proportion were involved in other economic activities such as business and formal employment.

Regarding the role women play in making decisions, the study identified that men were the dominant decision makers regarding the management of the land and made decisions regarding the crops to be grown. There are gender based social norms that bar women from owning property including land. Also, the gender based norms limit women from accessing credit facilities and financial resources to purchase productive resources required for food production.

4.3 Farming Activities Practiced by Smallholder Women Farmers

The purpose of the analysis here was to find out the major farming activities that smallholder women in Vihiga Sub County engage in to promote household food and nutritional security. Based on the findings, it emerged that women are central to food security in Vihiga Sub-county. The Sub-county is endowed with fertile arable land, giving it substantial agricultural potential. As a result, the study established that women have greatly ventured into smallholder farming to cater to the family's subsistence needs. The study identified that women carry a hefty burden of farm work and are the primary food producers in households. Basically, women bear the responsibility of preparing land, planting, harvesting, and storing. Also, the women are responsible for ensuring all the family members have access to food. They are also responsible for dairy and poultry farming activities (see Appendix VI, pictures 3 and 4)

The study further identified that smallholder women farmers in Vihiga sub-county mainly grow maize and beans through intercropping. The reason for intercropping was that the land was small, and they could not plant them separately (Appendix VI, picture 1 and 2).

The women reported that they mainly prefer these crops because they provide much of the food requirements of the family. Also, maize and beans can be planted together on the same land in alternate rows, which economizes on space. The women reported that maize is adaptable to various climatic conditions. One respondent had this to say;

Maize and beans are the main food here. They can be planted together and do not require much space. This is good because our land is small here (Respondent 5, Mungoma Ward).

While maize and beans were the key crops grown, the production was low due to the small size of the land. The low yields were also attributed to lack of information on how to increase production on the available land. The women expressed desire and willingness to access this information but unfortunately, they reported that there are no extension officers to train them.

Besides maize and beans, the smallholder women also grow vegetables mainly kales, pumpkins, sweet potatoes, cassava, millet, and sorghum. The plants like sweet potatoes, finger millet, arrow roots, cassava and sorghum were preferred by some women farmers because they are resistant to drought and they do not have high requirements in terms of labor and inputs. These crops help to supplement maize and meet the dietary needs of the family. The women who kept cows set aside some portions to plant napier grass (Appendix VI, picture 2).

In addition to food crop farming, the women engage in livestock keeping commonly chicken farming, dairy farming, sheep and goat keeping. The respondents reported that milk production is low but it is enough for the family (Appendix V, picture 3). They also sell the surplus to get income. The indigenous chicken are mainly reared in this area and the hybrid ones are not common ((Appendix V, picture 4). One informant said:

Here we mostly plant maize, beans and sweet potatoes. We also grow Sukuma wiki to make sure the family has food. Here we also keep cows and chicken (Respondent 4, Maragoli Central Ward).

This was corroborated by a key informant from Maragoli South who reported that to cater for the family needs, smallholder women grow crops and rear animals as a diversification means.

Mostly, it is women who prepare the land for planting. We also ensure weeding is done and we also harvest the crops. In my case, I also have to ensure the cows and the pigs are fed. In some cases, my husband helps me but mostly he is away from home (Respondent 12, Maragoli South ward).

4.4 Contribution of Smallholder Women Farmers in Food Security.

The analysis here sought to determine the role played by smallholder women farmers towards ensuring there is food security in Vihiga Sub County. The study identified that smallholder women farmers play an instrumental role ensuring the households have sufficient food and that their nutritional needs are met. They have the ability to make use of the resources they have to promote and enhance the welfare of the household particularly in regards to food, nutrition and health aspects.

The smallholder women farmers are involved in all attempts to enhance food security by effectively using the productive resources. The smallholder women farmers undertake all the farming activities from land preparation to harvesting and storage. They are also involved in keeping domestic animals such as goats, cows, sheep and rabbits. The contribution of men is less and they only do so when the produce is not enough for the family.

Most of the women are housewives, they have successfully increased diversification of their livelihoods to ensure the households have food security. The study identified that smallholder women farmers comprise the significant proportion of the labor force and that all the activities they engage in ensure their households are food secure. They are involved in cultivating the land, planting, weeding, harvesting, storage and selling of surplus produce. The women engage in various activities to ensure dietary diversity for the household. One respondent had this to say;

We women here carry the whole burden of feeding the family and ensuring there is enough food kept for the farming. We undertake all the farming activities and keep chicken and cows. After harvesting, we make sure we store some food to cater for the family until the next season (Respondent 3, Mungoma Ward)

Similar findings emerged from the interview of smallholder women farmers in Maragoli Central ward who reported that it is women who are expected to ensure the family has enough food. In this regard, one of the FGD participant had this to say;

Only women are responsible in ensuring the family has food. Even if I am unemployed, I must make sure the kids and husband have eaten well (FGD participant 2, Maragoli Central Ward).

Women further emphasized that ensuring there is food security is the sole role of the women as men play an insignificant role regardless of whether they are employed or not. The women reported that most men do casual jobs. However, even though they make money, they do not spend it on the needs of the family, including purchasing food.

Our men show no effort in feeding the family. Even when they go work, they do not help in buying food. It is role of the women to get food, cook and ensure the remaining food is kept for the family (Respondent 5, Lugaga-Wamuluma Ward)

4.5 Access to Land as a Determinant of Food Security

One of the major challenge that emerged was lack of access to productive farming land. The land tenure system is based on patrilineal inheritance system which has resulted to smaller tracks of land that are owned by men. This system does not allow women to own land and other property and they can only utilize land and property owned by the husbands. Based on this land tenure system, inheritance of family land is typically passed down to the men making it hard for the women to be automatic heirs. Women can only land in cases where the husband is deceased. However, even under such circumstances, they do not fully control the land since they still have to consult with male members of the family on how to manage and utilize the land. As a result of this, the pieces of land they use to undertake farming activities are small and not enough to cater for the household food needs. The respondents reported that land is culturally owned and managed by men and it is their duty to allocate land. This makes the men the key decision makers on how the land is utilized.

There is no equal rights to land as women are not permitted to own property in their fathers' land unless they buy and again not everyone can afford to buy (FGD participant 8, Mungoma Ward).

Similar concerns were echoed by another participant who reported that in Lugaga-Wamuluma ward, the existing cultural norms consider land ownership by women as a taboo and women therefore the land they can consider as there is the one owned by the husbands

Owning land in our place is considered a taboo. Those with money are forced to purchase land in other areas (FGD participant 10, Lugaga-Wamuluma Ward).

Besides lack of land ownership rights, women do not make key decisions on how to utilize the available land. Men are considered as the heads of the family and they are the sole decision makers regarding the management and use of the available land. In some instances, this goes even as far as to determine the crops to be cultivated on the land and the size of the land to be used for what purpose. Also, they make decisions on the types of animals to be reared on the farms.

One FGD participant said:

In our area women have no voice. The land is for the men and women can only ask the husband permission to grow some vegetables and other crops. It is also the husband who make decision on what to be planted (FGD 10, Maragoli Central Ward)

Similar sentiments emerged in Lugaga-Wamuluma and Maragoli central wards where one of the interviewees had this to say;

The males are responsible for land allocation, and as the land is theirs, they have the authority to decide how to use the land allocated. It is impossible for the women to have land and eve decide how to use the family land due to these cultural barriers. (Respondent 6, Lugaga-Wamuluma Ward).

Here you cannot own land as a woman. Even if you have money you cannot buy and own land here. It is considered a taboo (Respondent 2, Maragoli central Ward)

The women further decried that the land they are allocated is very small and not enough to meet the food needs. Generally, the land ranges between 1 acre to 1 and half acres.

The land here is divided a lot and is very small. In my case, the land is just enough for the family but I cannot produce more to sell. I would want to have larger piece of land (Respondent 9, Maragoli South ward).

4.6 Socio-Economic Challenges Faced by Women Farmers

The purpose of the analysis here was to find out the challenges that limit the women's role to food security. Among the challenges identified that limit women farmers are unsupportive gender norms and relations. It was clear from the findings that there are underlying traditional gender inequalities within the communities in Vihiga sub county. The major issues that emerged were linked to land ownership and decision making. Land is primarily owned by men and since it is not customary acceptable for women to own land and property. The gender norms also affect the women who have the resources and capability of buying land. They are forced to purchase land in far place. One informant had this to say;

Women do not own land as it is considered a taboo. The land is for the husband and this is a big challenge to us (Respondent 14, Mungoma ward).

Similarly, other respondents echoed that women are faced with social norms that limit them from owning;

In this place, women can only use the land owned by the husbands. They don't own land. This prevents us from making major decisions on how to use it. Like in my case, it is only the husband who can decide how we can use this land (Respondent 9, Maragoli South Ward).

Women are not given equal rights since they are women. Also they cannot access inputs such as seeds (Respondent 5, Lugaga-Wamuloma Ward).

Women are also not allowed to make key decisions and it is men who mostly give directives on how to manage and cultivate the land. Also, it is also men who decide when to sell the produce and the quantity to sell. The inability of women to partake in decision making on household matters is having negative effects on their effectiveness in providing food for the households. One informant had this to say:

It is the men who make most decisions. If we decide to sell lets says chicken or goats for school fees and other basic needs, we have to consult first from our men. For cattle, it is only men who make the selling decisions (Respondent 7, Maragoli central ward).

From FGDs, men were clearly portrayed as obstacles to food security as they do not mostly contribute to it. They are typically involved in the selling of the farm produce. It was worse for men who drink alcohol because in some instances they steal stored dry food or fresh from the farm to be able to afford and sustain their drinking habits.

Sometime after harvesting, the husband can take the produce and sell the produce or take to neighbors and family members in case of funeral and other functions. We allow it because we do not have any say (FGD participant 4, Mungoma Ward)

It is the husband who makes all the decisions. Our men only want to be involved during the harvesting season. They sell and what is left is not enough for the family (FGD participant 9, Lugaga-Wamuluma Ward).

The capacity of the women to promote food and nutritional security is also impacted by lack of financial resources. It is worth noting that for the women to maximize production and safeguard food security, they need financial resources to purchase farm inputs. Most smallholder women farmers Vihiga sub county had no stable incomes which limited their investment in farming and to buy food for the households. One informant had this to say:

In this area, there are no jobs and we do not have enough incomes to help us buy farm inputs and to buy flood. This is a major challenge to us. If only we had enough financial resources, we can have the ability to improve production feed our families and sell part of it to get income (Respondent 8, Lugaga-Wamuluma Ward).

This view is best captured by these maize crops near each other in Mungoma Ward, merely separated by the road. One farmer was able to use fertilizer and the right seeds while the other could not afford proper farm inputs such as fertilizer (Appendix VI, picture 5).

The women are predominantly involved in farming and they do not have alternative sources of livelihood. The only alternative sources of income are small businesses which mainly deal in farm produce. This therefore mean that they do not have enough disposable income to buy food items when they deplete the produce and during the dry seasons. In such cases, the families are likely to go without to go without food the contribution of the husband is very minimal.

Lack of financial resources among the smallholder women farmers is compounded by poor or lack of access to credit services. This has been a serious obstacle to promoting farming since without credit services, the women farmers are not able to buy farm inputs. Although men farmers also face similar challenges, this problem is more serious for the women as a result of socio economic disadvantages that have been embedded in the community's culture.

The major issue we have is a lack of credit facilities. High input costs, such as the high cost of seeds and fertilizers are the other difficulties (FGD participant 8, Mungoma ward).

Poor access to credit is linked to lack of or poor information about the credit services. This is blamed on poor or lack of sensitization of the available banks and microfinance institutions that give loans to the farmers. They did not have sufficient information on the microfinance loans requirements. The other factor that came into place was lack of collateral needed to secure loans and high interests attached to the loans. The women are not allowed to own property and therefore, they lack assets to give as security for the loans. The high interests made the women fear that would fail to service the loans.

4.7 Ecological Challenges Faced by Women Farmers

The women farmers in Vihiga Sub County are affected by ecological challenges. The key factors that emerged here are weather, climate and soil. The respondents reported that in Vihiga Sub County, the major challenge is climate change what has altered the rainfall pattern in the area. They were mainly affected as they predominantly rely on rainfall to grow crops. Soil and terrain did not emerge as key factors since most areas within the sub county have fertile soil suitable for farming and the terrain is good.

The respondents reported that in most cases, the region experience prolonged dry seasons and since they do not practice irrigation farming, their production is affected. Having enough food in such circumstances becomes a major problem. One informant had this to say in this regard;

In my view, the soil here is good and lack of rainfall sometimes is the major problem. We don't have irrigation here and we depend on weather signs and signals to start preparing land and to start planting (FGD participant 2, Maragoli South Ward).

Similarly, respondents from Lugaga-Wamuloma and Mungoma wards had similar concerns;

There is a problem of short rains. The crops we plant do not do well and we do not have water for irrigation. The crops dry out and our produce goes down. This causes shortage of food (Respondent 1, Lugaga-Wamuloma central ward)

To maintain food security, we often plant certain crops that do not take long and those that are resistant to climate such as cassava. Even in the presence of drought, such crops can thrive (FGD participant 8, Mungoma ward).

To mitigate the rainfall scarcity, the respondents the need for boreholes and dams in order to ensure there is water security to enable them farm throughout the year. This would help to ensure their households have enough food and they have enough to sell to make income.

The government needs to provide us with water solutions such as digging water pans and boreholes to make sure we have water all the time (Respondent 6, Lugaga-Wamuloma ward).

The farming and food production capacity of the women is constrained by overreliance on poor climate change adaptations. A good majority of the women do not have the skills and knowledge to manage ecological factors mainly changes in weather and climate. They do not have skills and know-how to use climate friendly farming technologies as well as water management technologies and skills. Lack of skills and knowledge was linked to lack of training among the women. The respondents reported that they do not have membership to any groups in which they get training on climate adaptation. The low knowledge on climate adaptation caused negative attitudes towards prescribed climate change adaptation techniques.

Lack of pest control skills and knowledge also emerged as a major challenge that smallholder women farmer's face. The respondents agreed that they do not have knowledge on the suitable

chemicals to use and in most cases they tend to copy from their neighbors. This makes them end up using wrong pesticides. In this regard, they suggested the need for extension officers to train them on pest control measures. One FGD participant had this to say;

We do not know how to control pests and we copy from our neighbors. We end up using wrong pesticides which does not help and in some cases destroy our crops (FGD Participant 3, Mungoma Ward)

Generally, the smallholder women farmers hardly had contact with extension officers. The women highlighted the need for the extension services in order to learn how to adopt climate smart technologies, methods of pesticides control and other skills that would help to improve farming.

4.8 Discussion

The study sought to determine how smallholder women farmers contribute to food and nutritional security in Vihiga Sub County. From the interaction with the women, it emerged that they are key contributors to food security. They do this through different activities including offering farm labor, food processing, storage, and feeding the family. Also, they play a crucial role in managing livestock such as poultry, dairy cows, and pig farming. The study yielded various indicators that the smallholder women farmers contribute greatly to food and nutritional security. It is easier for women to use the available resources to cater for the household needs as compared to men particularly in regards to food security.

These results in tandem with Ragasa, Aberman, and Mingote (2019) who identified that in Malawi, smallholder women participate in a variety of farming activities in order to promote food security. The study identified that women participate in all activities from land preparation to harvesting. They engage in cattle rearing as well as a means of supplementing the farm produce. Similarly, Balik et al. (2019) identified that smallholder farmers in Bangladesh engage in numerous farming activities to contribute to food security. The women cultivate kitchen gardens which help them meet the subsistence needs of their family. The women were mainly involved in vegetable and fruits farming, starchy staples, and medicinal plants. These farms enabled the women to increase access to nutritious food among households.

Despite the central role the smallholder holder women farmers play in promoting food and nutritional security, they face numerous constraints that limit their potential which are mainly linked to gender inequalities that are culturally embedded. The women are faced with social economic factors that limit their access to land and other resources required for food production. The culture of the communities living in Vihiga Sub County does not allow women to own land and therefore, they only rely on the husband's land to undertake farming. Also the pieces of land owned by the husbands is small and not enough to sustain the needs of the households.

The results here are in tandem with the findings of Koirala et al. (2015) who identified that lack of access to land is a major challenge faced by smallholder farmers in Nepal which limit their contribution to food and nutritional security. The study identified that despite the crucial role they play in increasing food security, their accessibility to land is restricted as a result of gender inequities that exist in accessing productive resources. Similarly, the findings corroborate to the findings of Nthenya (2018) who identified that while smallholder women in Mpeketoni in Lamu played a crucial role in promoting food security, they have limited access to land. This limited access to land was a result of culturally acknowledged norms that denies women access to productive resources.

The women farmers in Vihiga Sub County are also affected by inadequate access to financial resources. Most of the women in Vihiga Sub County do not have sources of income which makes it hard to purchase farm inputs. Also, the women have limited access to credit which makes it hard for them to have loans. The social-cultural institutions here do not allow women do not own property and therefore, they do not have collateral to get loans.

These findings are in tandem Bashir, Kitenge and Berry-West (2020) who identified that female farmers in the US face barriers when trying to access credit facilities to expand their farming activities. According to the findings, female farmers only receive around 1% of total agricultural loans, which lessens their incentives to pursue more productive food production. This is because they lack collateral for the loans. The terms of loans are only favorable to commercial businesses and ignore the crucial aspects of food production and household food and nutritional security.

Similarly, Mwabu (2018) identified that women in agricultural production in rural areas in Makueni County and established that although women contribute significantly to food security, they face numerous challenges among them being inaccessibility to loans to improve their agricultural production.

The efforts of women were also limited by ecological challenges. The study found out that the women farmers are affected by environmental factors, climate, soil properties, water and pesticides. Climate change and the associated effects such as changes in rainfall patterns were the major ecological challenges that impacted on the capacity the women to contribute to food security. This was mainly the case as they predominantly relied on rainfall to grow crops and did not practice irrigation farming. Also, the smallholder women farmers did not have knowledge on soil properties and therefore did not know the crops to grow based on the soil properties. On pest control, the smallholder women farmers do not have skills and knowledge on how to control pests.

The findings are in agreement with Duffy et al., (2021) argument who identified that most women are disadvantaged in food production as social structures deny them access to information, resources and skills that can help cope with ecological challenges. They lack awareness and skills to use climate friendly farming technologies, and soil and water management skills and technologies. This impacts on production and leading to poor yields. In this way, their contribution to food security is limited. Similarly, Oliver et al., (2020) in study in a South west China whereby the findings indicated that awareness on the use of climate smart technologies was lower among the female farmers as compared to the male farmers. The women did not have skills and knowledge on how to manage environmental problems such as drought and flooding which posed huge challenges to food production. This greatly impacted on their food production capacity.

CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This section covers the conclusions. The first section covers a summary of the key results. The second chapter covers the conclusions of the study as guided by the research objectives and the third section covers policy recommendations. The last section covers suggestions for other research areas.

5.2 Summary of the Key Findings

Smallholder women farmers play a central role in ensuring there is food and nutritional security in Vihiga Sub County. To achieve this, they engage in various activities which include preparing land, planting, weeding, harvesting, storage and preparation of food for the family. They plant different types of crops which include maize, beans, sweet potatoes, vegetables such as kales and other food crops. The women contribute most of the labour need in the farms and also constitute a large proportion of casual laborers in farms. The women also keep various animals such as dairy cows, goats, sheep, rabbits and pigs. Other activities the women engage in to promote food security were casual labour in order to purchase food and running small businesses which mostly deal in farm produce.

Besides farming, the study identified that women in Vihiga Sub County are involved in various saving schemes and money generating activities which help them gain income. Most of the women are members to women groups which help them develop a saving culture. With such activities, the women reported that during drought and when the yield are poor, they have the ability to purchase food for the family. They reported that they are forced to do this as the role of caring for the family has been placed on the culturally since men do not play significant role in promoting security. Men are often involved in cash crop farming and providing wage labor.

In addition to cultivation, the smallholder women farmers are also preservers of knowledge of indigenous crops. Since they are charged with the responsibility of feeding their families, they

have special knowledge about various indigenous plants particularly vegetables that contribute to health and nutrition of family. They grow and preserve different types of vegetables which they include in the family diet to promote nutritional security.

While the study identified that women play an instrumental role in promoting food security, they reported that they faced numerous challenges that limit their potential. The study identified that the land the women have access to is small and not sufficient. They are barred by cultural norms to own land and they are forced to cultivate the small pieces of land owned by the husband. The land tenure system in Vihiga Sub County disregard women and does not allow them to own land and other property. The other factor that limit women role in promoting food security is lack of financial resources. Most of the women are housewives and do not have sources of income. Therefore, it becomes hard for them to get inputs. Additionally, they have constrained access to credit and do not have the capacity to purchase inputs. With credit, they would have the ability to attain farm inputs and boost production. The limited access to credit was a result of lack of collateral required by the lending institutions.

The smallholder women farmers are faced with ecological challenges in their endeavor to contribute to food security. It was identified that they are affected by climatic changes and pests. The women predominantly depend on rainfall and the climate change has greatly altered the rainfall patterns. This has made it hard for the women to produce throughout the year. The smallholder women farmers do not have skills and knowledge on how to control pests which make them end up using wrong pesticides. This underscores the need for agricultural extension offices in order to educate them.

5.3 Conclusions

A number of recommendations were made. A conclusion was made that there is not much diversification in terms of crops grown. Maize, beans and potatoes were the commonest. This impacts on nutritional security. The study also concludes that most farming activities are undertaken by women although the parcels of land are owned by the men. This had an impact on economic viability of the agricultural activities for the smallholder women farmers. Additionally,

the study concludes that there were no extension services available in all the four Wards. This was counterproductive to the smallholder women farmers' efforts to enhance the quality of the crops and livestock.

5.4 Recommendations

The following measures are recommended;

1. The study recommends targeted training to smallholder women farmers in Vihiga Sub-County to consider diversification to cut down on market-sourcing of other food requirements.
2. The 2013 Matrimonial Property Act recognizes spouses as equal property owners but most of that is on paper. The study recommends the need to support smallholder women farmers to own land so that they can use title deeds to access credit
3. In order to enhance the quality and quantity of their farming outputs, smallholder women farmers in the sub county need to have access to agricultural extension services with the help of the County Government. The current policy of demand driven extension services is far out of reach of the small holder women farmers.
4. The study recommends a quantitative experimental research that would measure the impact farm inputs and training for smallholder women farmers would have on output for the same parcels of land.

5.5 Recommendations for Additional Research

The following areas are suggested for further studies;

1. The study was only done in Vihiga Sub County and the findings are therefore applicable to Vihiga Sub County. There is therefore a need for other studies in other areas in Vihiga County and in other counties in Kenya in order to gain more insights.
2. The study was only confined to the smallholder women farmers and hence the need for another study to be done focusing on the role men play in promoting household food and nutritional security in Vihiga Sub County.

REFERENCES

- Agarwal, B. (2018). Gender equality, food security and sustainable development goals. *Current opinion in environmental sustainability*, 34 (1), 26-32.
- Agholor, A. I. (2019). Gender gap in Sub-Saharan Africa, reminiscence of rural extension and advisory services: delineation, challenges and strategies. *South African Journal of Agricultural Extension*, 47(3), 46-60.
- Asad, S. Q., Adam, J. A., & Lona, A. T. (2018). Farmers' perceptions, practices, and proposals for improving agricultural productivity in South Sudan. *African Journal of Agricultural Research*, 13(44), 2542-2550.
- Awino, O. C., & Ngutu, J. A. (2022). Effects of Emotional Violence on Women's Socio-economic Development in Luanda Sub-county, Vihiga County, Kenya. *Educational Research (IJM CER)*, 4(1), 230-250.
- Baliki, G., Brück, T., Schreinemachers, P., & Uddin, M. (2019). Long-term behavioural impact of an integrated home garden intervention: evidence from Bangladesh. *Food Security*, 11(6), 1217-1230.
- Barrett, D., & Twycross, A. (2018). Data collection in qualitative research. *Evidence-Based Nursing*, 21(3), 63-64.
- Bashir, S., Kitenge, E., & Berry-West, W. (2020). Barriers to Financial Access in the US Agricultural Sector. Available at SSRN 3654643.
- Begum, A. (2021). Women's Role in Agriculture. *International Journal of Modern Agriculture*, 10(2), 3012-3020.
- Berchin, I. I., Nunes, N. A., de Amorim, W. S., Zimmer, G. A. A., da Silva, F. R., Fornasari, V. H., ... & de Andrade, J. B. S. O. (2019). The contributions of public policies for strengthening family farming and increasing food security: The case of Brazil. *Land use policy*, 82(1), 573-584.
- Bernard, H. R., Wutich, A., & Ryan, G. W. (2016). *Analyzing qualitative data: Systematic approaches*. SAGE publications.
- Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative research in psychology*, 18(3), 328-352.

- Bretschneider, P. J., Cirilli, S., Jones, T., Lynch, S., & Wilson, N. A. (2017). *Document review as a qualitative research data collection method for teacher research*. SAGE Publications Ltd.
- Broussard, N. H. (2019). What explains gender differences in food insecurity? *Food Policy*, 83(1), 180-194.
- Brujić, M. (2022). In Torlak we (would) trust: domestic vaccine production in contemporary Serbia. *Medical Humanities*.
- Busetto, L., Wick, W., & Gumbinger, C. (2020). How to use and assess qualitative research methods. *Neurological Research and practice*, 2(1), 1-10.
- Campbell, S., Greenwood, M., Prior, S., Shearer, T., Walkem, K., Young, S. & Walker, K. (2020). Purposive sampling: complex or simple? Research case examples. *Journal of research in Nursing*, 25(8), 652-661.
- Capron, A. M. (2018). Where did informed consent for research come from? *Journal of Law, Medicine & Ethics*, 46(1), 12-29.
- Castleberry, A., & Nolen, A. (2018). Thematic analysis of qualitative research data: Is it as easy as it sounds?. *Currents in pharmacy teaching and learning*, 10(6), 807-815.
- Clark, K. R., & Vealé, B. L. (2018). Strategies to enhance data collection and analysis in qualitative research. *Radiologic technology*, 89(5), 482CT-485CT.
- Dahabreh, I. J., Robertson, S. E., Steingrimsson, J. A., Stuart, E. A., & Hernan, M. A. (2020). Extending inferences from a randomized trial to a new target population. *Statistics in medicine*, 39(14), 1999-2014.
- D'Annolfo, R., Gemmill-Herren, B., Amudavi, D., Shiraku, H. W., Piva, M., & Garibaldi, L. A. (2021). The effects of agroecological farming systems on smallholder livelihoods: A case study on push-pull system from Western Kenya. *International Journal of Agricultural Sustainability*, 19(1), 56-70.
- Deterding, N. M., & Waters, M. C. (2021). Flexible coding of in-depth interviews: A twenty-first-century approach. *Sociological methods & research*, 50(2), 708-739.
- Ebel, R. (2020). Are small farms sustainable by nature?—Review of an ongoing misunderstanding in agroecology. *Challenges In Sustainability*, 8(1), 17-29.

- El neel, F. A. M. H. (2018). The Role Of Women In Household Food Security Among Small Scale Farmers In Gedarif and Rahad Localities of Eastern Sudan. *Journal of Social And Humanities Sciences Research (JSHSR)*, 5(25), 2103-2117.
- Elmhirst, R. (2011). Introducing new feminist political ecologies. *Geoforum*, 42(2), 129-132.
- Elmhirst, R. (2015). Feminist political ecology. In *The Routledge handbook of political ecology* (pp. 519-530). Routledge.
- Fenet, B., & Alemayehu, O. (2019). Review on gendered perspective of household's participation in agricultural activities in Ethiopia. *Journal of Agricultural Extension and Rural Development*, 11(1), 1-10.
- Fonjong, L. N., & Gyapong, A. Y. (2021). Plantations, women, and food security in Africa: Interrogating the investment pathway towards zero hunger in Cameroon and Ghana. *World Development*, 138 (1), 105293.
- Fox, G., & James, T. L. (2021). Toward an understanding of the antecedents to health information privacy concern: a mixed methods study. *Information Systems Frontiers*, 23(6), 1537-1562.
- Galwab, A. M. (2017). Assessing The Impact of Climate Change on Food and Nutrition Security at Household Level in Garba Tulla Subcounty. *International Journal of Climatic Studies*, 1(1), 1-23.
- Gebre, G. G., Isoda, H., Amekawa, Y., Rahut, D. B., Nomura, H., & Watanabe, T. (2021). What explains gender gaps in household food security? Evidence from maize farm households in Southern Ethiopia. *Social Indicators Research*, 155(1), 281-314.
- Giroud, A., & Huaman, J. S. (2019). Investment in agriculture and gender equality in developing countries. *Transnational Corporations*, 26(3), 89-113.
- Ikutwa, C., Magani, G (2020). Perspectives on Gender Roles in Enhancing Food Security in Kenya's Drylands. *International Journal of Multidisciplinary Sciences and Advanced Technology*, 1 (8), 83–90
- Ingutia, R. A., & Sumelius, J. (2021). Do farmer groups improve the situation of women in agriculture in rural Kenya?. *International Food and Agribusiness Management Review*.

- Ingutia, R., & Sumelius, J. (2022). Determinants of food security status with reference to women farmers in rural Kenya. *Scientific African*. International Food and Agribusiness Management Association 25(1),1-22
- Jaka, H., & Shava, E. (2018). Resilient rural women's livelihoods for poverty alleviation and economic empowerment in semi-arid regions of Zimbabwe. *Jambá: Journal of Disaster Risk Studies*, 10(1), 1-11.
- Jarosz, L. (2011). Nourishing women: toward a feminist political ecology of community supported agriculture in the United States. *Gender, Place & Culture*, 18(3), 307-326.
- Josephert, A. A., Wilberforce, C., Caroline, M., & Ong'anyi, P. O. (2019). Access and use of seasonal climate forecasts information on maize crop production in Vihiga County, Kenya. *International Journal of Research and Innovation in Social Science*, 3(3), 328-338.
- Kabeer, N. (1994). *Reversed Realities: Gender Hierarchies in Development Thought*, London and New York: Verso Press and India: Kali for Women Press
- Keusch, F., Struminskaya, B., Antoun, C., Couper, M. P., & Kreuter, F. (2019). Willingness to participate in passive mobile data collection. *Public opinion quarterly*, 83(S1), 210-235.
- Kiger, M. E., & Varpio, L. (2020). Thematic analysis of qualitative data: AMEE Guide No. 131. *Medical teacher*, 42(8), 846-854.
- Koirala, P., Dhakal, S., and Tamrakar, A. (2009). Pesticide Application and Food Safety Issue In Nepal. *The Journal of Agriculture and Environment*, 1(1),111-114
- Komatsu, H., Ambel, A. A., Koolwal, G., & Yonis, M. B. (2022). Gender norms, landholdership, and rural land use fee and agricultural income tax in Ethiopia. *Land Use Policy*, 121, 106305.
- Lawhon, M., Ernstson, H., & Silver, J. (2014). Provincializing urban political ecology: Towards a situated UPE through African urbanism. *Antipode*, 46(2), 497-516.
- Leavens, M. K., Gugerty, M. K., & Anderson, C. L. (2019). Gender and agriculture in Tanzania. *Gates Open Res*, 3(1348), 1348.
- Liru, P. N. (2014). *The contributions of women towards food security in Malava constituency, Kakamega County, Kenya* (Doctoral dissertation).

- Lutomia, C. K., Obare, G. A., Kariuki, I. M., & Muricho, G. S. (2019). Determinants of gender differences in household food security perceptions in Kenya's Western and Eastern regions. *Cogent Food & Agriculture*, 5(1), 1694755.
- Masuku, M. M., & Garutsa, T. (2021). Enhancing Food Security Through Systematic African Women Empowerment in South Africa. *Mediterranean Journal of Social Sciences*, 12(6), 141-141.
- McGrath, C., Palmgren, P. J., & Liljedahl, M. (2019). Twelve tips for conducting qualitative research interviews. *Medical teacher*, 41(9), 1002-1006.
- Meemken, E. M. (2020). Do smallholder farmers benefit from sustainability standards? A systematic review and meta-analysis. *Global Food Security*, 26, 100373.
- Mertens, D. M. (2018). Ethics of qualitative data collection. *The SAGE handbook of qualitative data collection*, 33-48.
- Mohajan, H. K. (2018). Qualitative research methodology in social sciences and related subjects. *Journal of Economic Development, Environment and People*, 7(1), 23-48.
- Mtshali, L., & Akinola, A. O. (2021). Small-Scale Farming, Fourth Industrial Revolution and the Quest for Agriculture Development. In *The New Political Economy of Land Reform in South Africa* (pp. 161-177). Palgrave Macmillan, Cham.
- Mukoya, W., & Mulinya, C. Gender Roles in Climate Change Adaptation of Crop Production Vihiga Sub-County, Kenya. *Journal of Environmental Science, Toxicology and Food Technology* 12 (1), 18-26
- Muzari, W. (2016). Agricultural productivity and food security in sub-Saharan Africa. *International Journal of Science and Research*, 5(1), 1769-1776.
- Mwabu, R. M. (2018). *Challenges Facing Rural Women in Agricultural Production in Kanthuni Location of Makueni County, Eastern Kenya* (Doctoral dissertation, University of Nairobi).
- Nakazi, F., Njuki, J., Ugen, M. A., Aseete, P., Katungi, E., Birachi, E., & Nanyonjo, G. (2017). Is bean really a women's crop? Men and women's participation in bean production in Uganda. *Agriculture & Food Security*, 6(1), 1-11.

- Naz, M., Khan, I. A., Tahira, S. S., Maan, A. A., Shahbaz, B., Chaudhry, A., & Afzal, M. Y. (2021). The role of females in the provision of domestic food security in rural communities:(a comparative research of rural zones of province Punjab, Pakistan). *J. Agric. Res*, 59(1), 109-118.
- Noble, H., & Heale, R. (2019). Triangulation in research, with examples. *Evidence-based nursing*, 22(3), 67-68.
- Ntenkeh, B. T., Fonchamnyo, D. C., & Yuni, D. N. (2022). Women's Empowerment and Food Security in Cameroon. *The Journal of Developing Areas*, 56(2), 141-153.
- Nthenya, K. T. (2018). *Role Of Women Farmers In Household Food Security In Mpeketoni Location, Lamu County, Kenya* (Doctoral dissertation, KENYATTA UNIVERSITY).
- Nyantakyi-Frimpong, H. (2019). Combining feminist political ecology and participatory diagramming to study climate information service delivery and knowledge flows among smallholder farmers in northern Ghana. *Applied Geography*, 112, 102079.
- Nyantakyi-Frimpong, H. (2021). How identity enriches and complicates the research process: Reflections from political ecology fieldwork. *The Professional Geographer*, 73(1), 38-47.
- Nygren, A., & Rikoon, S. (2008). Political ecology revisited: Integration of politics and ecology does matter. *Society and Natural Resources*, 21(9), 767-782.
- Nyong, P. A., & Martin, N. T. (2019). Enhancing agricultural sustainability and productivity under changing climate conditions through improved agroforestry practices in smallholder farming systems in sub-Saharan Africa. *African Journal of Agricultural Research*, 14(7), 379-388.
- Olumba, C. C., & Alimba, J. O. (2022). An assessment of discriminatory factors contributing to gender inequality among farmers participating in urban agriculture in Southeast Nigeria. *SN Social Sciences*, 2(4), 1-26.
- Onyalo, P. O. (2019). Women and agriculture in rural Kenya: role in agricultural production. *International Journal of Humanities and Social Science*, 4(4), 1-10.

- Osabuohien, E. S., Efobi, U. R., Herrmann, R. T., & Gitau, C. M. (2019). Female labor outcomes and large-scale agricultural land investments: Macro-micro evidence from Tanzania. *Land Use Policy*, 82, 716-728.
- Özçatalbaş, O., & Sogué, B. (2021). Improving women's role in agricultural production and food security promotion. *Gender Equality. Encyclopedia of the UN Sustainable Development Goals. Cham: Springer*, 816-829.
- Patil, B., & Babus, V. S. (2018). Role of women in agriculture. *Int J Applied Res*, 4(12), 109-114.
- Petrovics, D., & Giezen, M. (2022). Planning for sustainable urban food systems: an analysis of the up-scaling potential of vertical farming. *Journal of Environmental Planning and Management*, 65(5), 785-808.
- Popp, J., Oláh, J., Kiss, A., & Lakner, Z. (2019). Food security perspectives in sub-Saharan Africa. *Amfiteatru Econ*, 21(51), 361-376.
- Ragasa, C., Aberman, N. L., & Mingote, C. A. (2019). Does providing agricultural and nutrition information to both men and women improve household food security? Evidence from Malawi. *Global food security*, 20, 45-59.
- Rickenbrode, V. R. (2019). *Gender Differentiated Food Security: Productivity Traps in Malawian Agriculture*. Michigan State University.
- Ridgeway, C. L., & Correll, S. J. (2004). Unpacking the gender system: A theoretical perspective on gender beliefs and social relations. *Gender & society*, 18(4), 510-531.
- Rocheleau, D., Thomas-Slayter, B., & Wangari, E. (1996). A feminist political ecology perspective. *Feminist political ecology: Global issues and local experiences*, 1(1) 3-26.
- Rudolph, A. E., Young, A. M., & Havens, J. R. (2020). Privacy, confidentiality, and safety considerations for conducting geographic momentary assessment studies among persons who use drugs and men who have sex with men. *Journal of Urban Health*, 97(2), 306-316.
- Savary, S., Akter, S., Almekinders, C., Harris, J., Korsten, L., Rötter, R., ... & Watson, D. (2020). Mapping disruption and resilience mechanisms in food systems. *Food Security*, 12(4), 695-717.

- Scheelbeek, P. F., Hamza, Y. A., Schellenberg, J., & Hill, Z. (2020). Improving the use of focus group discussions in low income settings. *BMC medical research methodology*, 20(1), 1-10.
- Shimeles, A., Verdier-Chouchane, A., & Boly, A. (2018). Introduction: understanding the challenges of the agricultural sector in Sub-Saharan Africa. In *Building a resilient and sustainable agriculture in sub-Saharan Africa* 1(1),1-12
- Silvano, A. P., Eriksson, J., & Henriksson, P. (2020). Comparing respondent characteristics based on different travel survey data collection and respondent recruitment methods. *Case Studies on Transport Policy*, 8(3), 870-877.
- Smidt, H. J., & Jokonya, O. (2022). Factors affecting digital technology adoption by small-scale farmers in agriculture value chains (AVCs) in South Africa. *Information Technology for Development*, 1-27.
- Varpio, L., Paradis, E., Uijtdehaage, S., & Young, M. (2020). The distinctions between theory, theoretical framework, and conceptual framework. *Academic Medicine*, 95(7), 989-994.
- Westholm, L., & Ostwald, M. (2020). Food production and gender relations in multifunctional landscapes: a literature review. *Agroforestry Systems*, 94(2), 359-374.

APPENDICES

Appendix 1: Consent Form

Greetings. My name is Hardlyne Lusui. I am undertaking a study to determine how smallholder women farmers contribute to food security in Vihiga Sub-County. You have been identified as a suitable respondent for this study on the basis that you are one of the smallholder women farmers in this area.

Please note that your role in this exercise is giving your honest views in regards to the role smallholder women farmers in promoting food security as well as the socio economic and ecological challenges they face. Please note that high confidentiality will be upheld and the data and information you will share will be kept confidential.

Your participation is strictly based on your willingness to participate and you have the freedom to withdraw from the process anytime you wish. You also have the freedom to omit the questions you will not be free to answer.

Please sign below if you accept the request to take part in this exercise.

Sign.....

Date.....

Appendix II: Interview Guide

My name is Hardlyne Lusui. I am undertaking a study to determine how smallholder women farmers contribute to food security in Vihiga Sub-County. You have been identified as a suitable respondent for this study on the basis that you are one of the smallholder farmers in this area. Thank you for sparing time to share with me your experiences regarding as a small holder farmer in promoting food and nutritional security. I wish to assure you that high confidentiality would be upheld and your identity would not be revealed.

1. Who owns the land where you live?
2. What are the major farming activities in this area?
3. What type of farming activities are you engaged in as a small holder farmer?
4. What is the size of the land you cultivate? Do you think it is enough for you?
5. Is what you produce enough for your family? What are the other sources of food for your family?
6. Do you entirely rely on rain for your farming activities or do you employ irrigation sometimes?
7. Do your neighbors have enough food for their families?
8. In this area, can you say that women have the same access as men to land for food production?
9. What do you do with any extra harvest/milk?
10. Do you think social norms disadvantage smallholder women farmers in accessing resources including land, fertilizers, quality seeds, and extension services? Please elaborate
11. Do you think lack of financial resources, inaccessibility to loans and other economic challenges impact limit the contribution of smallholder women farmers in promoting food and nutritional security? Please elaborate
12. In your view, are smallholder women farmers affected by ecological challenges such as bad weather, poor soils, and soil erosion in their endeavor to ensure there is food security? Please elaborate

13. What other challenges do you encounter as a woman involved in farming? Any suggestions on how these challenges could be overcome?
14. Given necessary resources, do you think smallholder women farmers like you can have huge contribution to food security in Vihiga?
15. What are some of the strategies do you think the County government can put in place to ensure that women contribute to food security locally?
16. What measures do you recommend that would help to improve food and nutritional security in this locality?

Appendix III: Focus Group Discussion Guide

My name is Hardlyne Lusui. I am undertaking a study to determine how women contribute to food security in Vihiga Sub-County. You have been identified as a suitable respondent for this study on the basis that you are one of the smallholder farmers in this area. Thank you for sparing time to share with me your experiences regarding as a small holder farmer in promoting food and nutritional security. I wish to assure you that high privacy will be upheld and the findings will be used for academic purposes only.

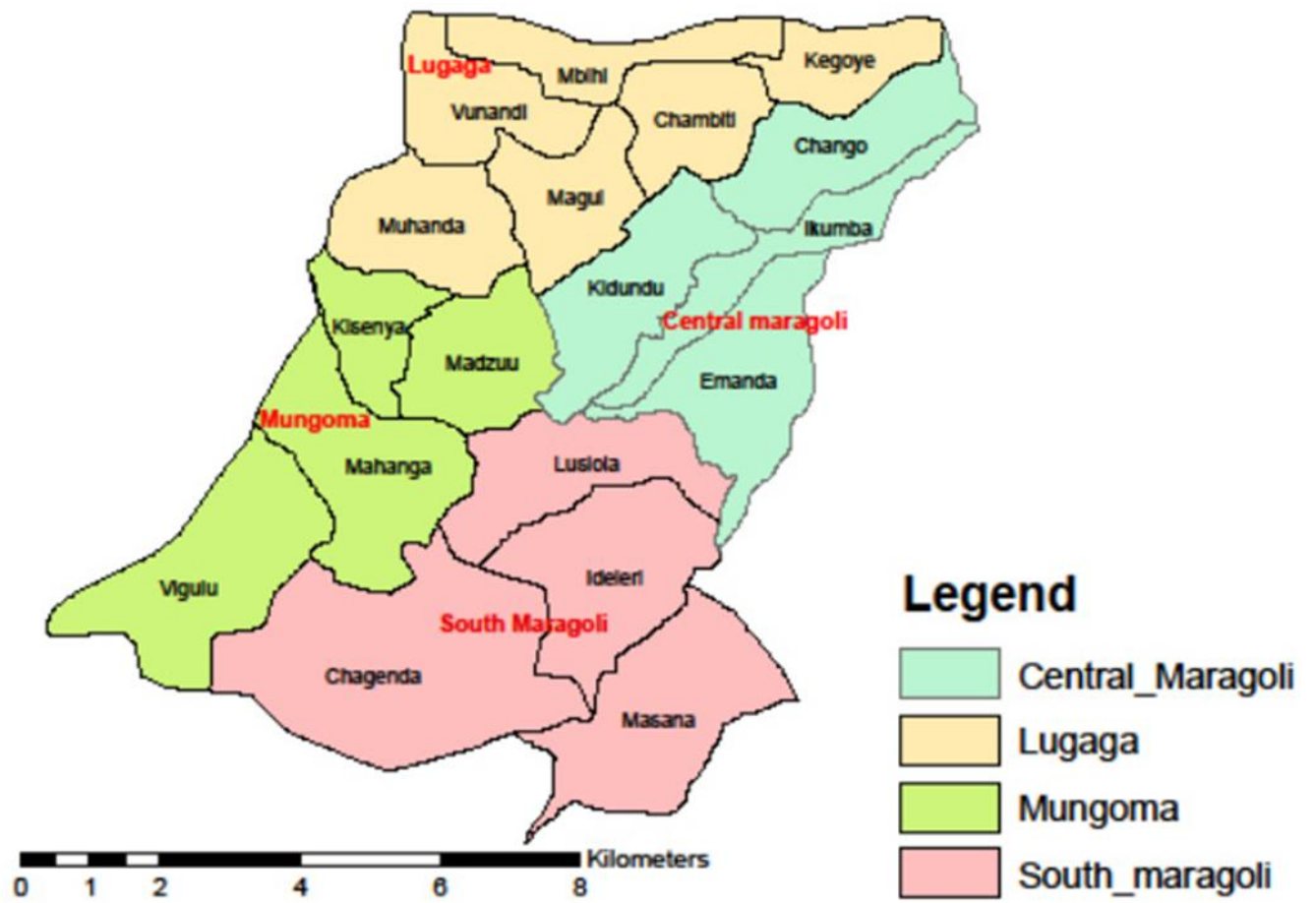
1. What livelihood activities are people mainly involved in in this area?
2. Are your families' food secure?
3. Do you think women contribute to food security in this area?
4. As smallholder women farmers, what are the main activities that you are involved in to promote food security?
5. What are the major challenges that you face as small holder women farmers towards ensuring food and nutritional security in this area?
6. What strategies do you employ to ensure you have enough food for your families every day?
7. What strategies do you recommend that would help to enhance your contribution to food security and better nutrition in this area?
8. Do you receive any support from men in your efforts to provide food for the families?
9. What are some of the measures you undertake to cope with food shortage?
10. What measures do you recommend to be used to improve food security in this locality?

Appendix IV: Observation Checklist.

	ITEM	OBSERVATION (S)	REMARKS
1.	Main farming activities/practices		
2	Types of crops grown		
3	Quality of crops in terms of maintenance		
4	Quality of animals if any		
5	Size of land under cultivation		
6.	Number of chickens kept, any eggs?		
7.	Availability of storage space for any harvest?		
8.	Food stuffs eaten in homes?		
9.	What farm produce products are sold at the local markets?		

Appendix V: Maps of Kenya and Vihiga Sub-County





Map of Vihiga Sub-County

Appendix VI: Pictures from the Field



Picture 1: Intercropping



Picture 2: Bananas and napier grass plantation



Picture 3: Dairy farming



Picture 4: Chicken rearing



Picture 5: Two contrasting maize farms

Appendix VII: University Introduction Letter



**UNIVERSITY OF NAIROBI
DEPARTMENT OF SOCIOLOGY, SOCIAL WORK & AWS**

Fax 254-2-245566

Telex 22095 Varsity Nairobi Kenya
Tel. 0204913217

P.O. Box 30197
Nairobi

Kenya

October 7, 2022

Director General,
National Commission for Science, Technology and Innovation
Off Waiyaki Way, Upper Kabete,
P. O. Box 30623, 00100,
Nairobi, Kenya.

**RE: INTRODUCTION LETTER FOR MS. HARDLYNE LUSUI
(MA STUDENT)**

This is to confirm that **Ms. Hardlyne Lusui (M10/39253/2021)** is a registered MA student at the Department of Sociology, Social Work & African Women Studies, University of Nairobi. She is currently working on her research proposal entitled, *"The Contribution of Smallholder Women Farmers to food and Nutritional Security in Vihiga Sub County, Vihiga County, Kenya."*

Any assistance accorded her will be highly appreciated.


A handwritten signature in black ink, appearing to be 'G.G. Wairire'.

Prof. G.G. Wairire
Chairman
Department of Sociology, Social Work & African Women Studies



Appendix VIII: NACOSTI Research License


REPUBLIC OF KENYA


**NATIONAL COMMISSION FOR
SCIENCE, TECHNOLOGY & INNOVATION**

Ref No: **388759** Date of Issue: **22/October/2022**


RESEARCH LICENSE



This is to Certify that Ms.. Hardlyne Lusui Lusui of University of Nairobi, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Vihiga on the topic: The contribution of smallholder women farmers to food and nutritional security in Vihiga Sub County, Vihiga County, Kenya for the period ending : 22/October/2023.

License No: **NACOSTI/P/22/21129**

388759
Applicant Identification Number


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