UNIVERSITY OF EDUCATION, WINNEBA

THE ROLE OF FEMALE SMALLHOLDER FARMERS IN ACHIEVING FOOD SECURITY IN GHANA: A CASE STUDY OF THE BOSOME FREHO AND SABOBA DISTRICTS

ALEX DANSO

MASTER OF PHILOSOPHY

2022

UNIVERSITY OF EDUCATION, WINNEBA

THE ROLE OF FEMALE SMALLHOLDER FARMERS IN ACHIEVING FOOD SECURITY IN GHANA: A CASE STUDY OF THE BOSOME FREHO AND SABOBA DISTRICTS

ALEX DANSO

(202140078)

A thesis in the Department of Political Science Education, Faculty of of Social Sciences Education, submitted to the School of Graduate Studies, in partial fulfilment

of the requirements for the award of the degree of Master of Philosophy (Political Science Education) in the University of Education, Winneba

NOVEMBER, 2022

DECLARATION

Student's Declaration

I, Alex Danso, declare that this thesis, except quotations and references contained in published works which have all been identified and duly acknowledged, is entirely my original work, and it has not been submitted, either in part or whole, for another degree elsewhere.

Signature……..…….

Date…….

Supervisor's Declaration

I hereby declare that the preparation and presentation of this work were supervised in accordance with the guidelines for supervision of thesis/dissertation/project as laid down by the University of Education, Winneba.

Dr. George Asekere

Signature…….

Date…….

DEDICATION

To my family.

ACKNOWLEDGEMENT

Praise the Lord, oh my soul. For the Lord is good, His mercies endure forever.

My sincere thanks go to my thesis supervisor, Dr. George Asekere for his time, guidance, patience and constructive criticisms that were of immense help to me in the preparation of this study, and also to all the lecturers at the Department of Political Science Education, of the University of Education, Winneba.

I also want to acknowledge all female smallholder farmers from the Bosome Freho and Saboba Districts who accepted to participate in this study. I am also grateful to Apostle Paul Oteng Senior for the advice and prayers he offered for me through my study. I also appreciate Emmanuella Appiah for her contribution towards the completion of this thesis.

My sincerest gratitude to my parents Mr and Mrs Danso Agyeman Paul and also to my siblings, Collins Danso, Edward Danso, Danso Felix, Evans Danso and Eva Danso for being there for me throughout my academic journey.

TABLE OF CONTENT

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS

CFSVA	–	Comprehensive Food Security and Vulnerability Analysis
CHS	–	Commission on Human Security
EIU	–	Economic Intelligence Unit
FANTA	–	Food and Nutrition Technical Assistance
FAO	–	Food and Agricultural Development
GAD	–	Gender and Development
GDP	–	Gross Domestic Product
GSS	–	Ghana Statistical Service
IFAD	–	International Fund for Agricultural Development
MoFA	–	Ministry of Food and Agriculture
PFJ	–	Planting for Food and Job
SDGs	–	Sustainable development Goals
UN	–	United Nations
USAID	–	United States Agency for International Development
WAD	–	Women and Development
WB	–	World Bank
WFP	–	World Food Programme
WID	–	Women in Development

ABSTRACT

Women are regarded as key players in the socioeconomic development of societies. Similarly, female smallholder farmers are key contributors to production and food security around the world. However, several impediments challenge the efforts of women including smallholder farmers to effectively contribute to socioeconomic development. This study, therefore, explored the current level of food security among female smallholder farmers and how female smallholder farmers could help improve food security issues by identifying the possible challenges and prospects. The study adopted the descriptive and comparative research design and the mixed method approach. Simple random and purposive sampling techniques were used to select the respondents for the study. the study collected primary data with the aid of a closed and opened ended questionnaire. Descriptive statistics was adopted to analyze the data for the study. The study found that the majority of female smallholder farmers experience low food secure. It was also discovered that challenges such as lack of access to farmlands, lack of access to credit, poor storage systems, lack access of ready market and usage of traditional farming tools impede the effort of female smallholder farmers to contribute to food security in Ghana. The study further found that the government of Ghana and some non-governmental organizations have initiated policies to empower female smallholder farmers. However, these strategies have not had the desired impact on female smallholder farmers. The study makes some recommendations which include; the provision of effective training and education on modern farming practices, equipping female smallholder farmers with entrepreneurial skills, encouraging the formation of farmer's associations among female smallholder farmers and creation of food security awareness among female smallholder farmers.

CHAPTER ONE

INTRODUCTION

1.0 Introduction

This chapter introduces the entire research study. It presents the background of this study. The chapter also states the problem of the study and discusses the research questions and objectives of the study. Moreover, the chapter elaborates on the significance of the study, the purpose of the study, the scope of the study and the organization of the study.

1.1 Background to the Study

The 2030 Agenda for Sustainable Development puts forward a transformational vision recognizing that our world is changing, bringing with it new challenges that must be overcome if we are to live in a world without hunger, food insecurity and malnutrition in any of its forms (FAO, 2019). The growing trend of population and the loss of arable land demands measures to be put in place to ensure the adequate provision of food to feed the population. Because of this, the United Nations in its Sustainable Development Goals (SDGs) captured food security in goal 2 and urged individual states to work towards the attainment of food security (UN, 2017). Food security defines a situation in which all people at all times have physical and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996).

In Ghana, the Ministry of Food and Agriculture defines food security as the availability of good quality nutritious food hygienically packaged, attractively presented, available in sufficient quantities all year round and located at the right place at affordable prices (MoFA,

2017). Food security has three main components - availability of food, accessibility of food and utilization of food (Packard, 2018).

Smallholder farmers are farm owners who operate on farmland of fewer than two hectares (Herrero et al., 2019). Smallholder farming mostly relies on family labour and produce with the motive of meeting household or family consumption (Varadan et al. 2022). Smallholder farmers can produce food which will ensure the food security of about two billion people. (Ricciardi et al., 2018). The Ministry of Agriculture (MoFA) (2017), stated that agriculture is predominantly on a smallholder basis in Ghana and that about 90 per cent of farm holdings are less than two hectares in size.

The realization of the components of food security demands close collaboration with farmers across the world. Even though females contribute considerably to the food supply, their efforts are not well recognized in the formulation and implementation of policies (Aziz et al., 2020). A similar observation was made by Clement et al. (2019) who asserted that women will be more efficient in their contribution towards food security if they are supported with agricultural and non-agricultural resources. According to Savari et al. (2020), women play a significant role towards the achievement of the different components of food security. Savari et al. further indicated that women could contribute more to food security if they are trained in the methods of cultivation and food preservation. In their study, Shamadiyah and Nasution (2018) concluded that women play a key role in food security and the provision of food at the household level.

The liberal feminism theory associated with Mary Wollstonecraft, William Gordon, John Stuart Mill and Harriet Taylor (Heywood, 2018) argues that customary practices and

cultural beliefs limit women from contributing to the socio-economic development of their societies. The theory further posits that females should be given equal opportunity as men, to contribute to socio-economic development. Also, the theory of access posits that people in society may have access to resources but might not necessarily benefit from these resources (Ribot and Peluso, 2003).

From the lens of this theory, the study argues that female smallholder farmers may be food insecure, though they are producers of food. The United Nations' sustainable development goals (SDGs); goal two (2), put forth a framework that seeks to guide countries towards the eradication of hunger and attainment of food security (UN, 2017). The World food programme has developed a strategic plan to improve food security in Ghana between 2019 and 2023 (WFP, 2018). Also, the Planting for Food and Jobs (PFJ) policy of Ghana seeks to improve the quantity and quality of food produced in the country and to promote food security (MoFA, 2017). The government of Ghana through the ministry of food and agriculture has introduced the Women in Agricultural Development (WIAD) directorate which recognizes women as principal agents through which food security could be achieved in Ghana (MoFA, 2021).

From the foregoing, it is evidenced in the literature that there is an ongoing debate about the position of females in the attainment of food security around the globe. This current study, therefore, seeks to contribute to this debate by focusing on female smallholder farmers in Ghana; using the Bosome Freho and the Saboba Districts as case studies.

1.2 Statement of the Problem

Numerous measures and policies have been put forth by governments, non-governmental organizations and international organizations to deal with food insecurity (Osabohien et al., 2020). For instance, the United Nations gives attention to food security in its sustainable development goals and urges governments of member states to work towards the eradication of hunger and the attainment of food security by the end of 2030 (UN, 2017).

After several years of working towards the food security framework put forth by the United Nations, little success has been attained (Matthew et al., 2021). The number of individuals who suffer food insecurity is still rising, even though at a slower rate. The Food and Agriculture Organization (FAO) (2019) reported that more than 820 million of the world's population were still food insecure. The report further indicated that food insecurity is more prevalent on the African continent where about 20 per cent of the population is undernourished and food insecurity is increasing in almost all countries in the sub-regions. In the view of the Food and Agricultural Organization, this phenomenon highlights the enormous challenge of eradicating hunger by the end of 2030 (FAO, 2019).

The Comprehensive Food Security and Vulnerability Analysis (2020) reported that about 3.6 million, representing almost 11.7 per cent of the Ghanaian population are food insecure. The Economic Intelligence Unit (EIU) (2019) in its 2019 Global Food Security Index (GFSI) ranked Ghana 59th out of 133 countries and 3rd in sub-Sahara Africa. The EIU attributed this performance to the Planting for Food and Jobs Programme. Notwithstanding this performance, Ghana can realize more food security if more possibilities are explored and utilized.

Female farmers cannot be neglected in the quest to attain food security because they play the role of producers, processors and consumers of food (Neel, 2018). A greater part of the women population in most African countries devotes about 60 per cent of their life working in the agricultural sector (FAO, 2019). About 60 per cent of employed women in Africa work in the agricultural sector (FAO, 2019). Women constitute about 46% of the total labour that is engaged in primary agricultural production (World Bank, 2019).

Women farmers in most African countries generally farm on subsistence food crops while men concentrate on the production of cash crops (Vercillo, 2020). The role of females as producers or farm labourers has been heightened by the increase in rural-urban migration. According to Barkume et al. (2018), more males move from rural areas and settle in urban centres. This results in the scarcity of male farm labourers, hence women have to perform the farm activities that were traditionally dominated by males (et al., 2018). Female farmers could increase food production by 30 per cent and increase food security by 17 per cent if they gain equal access to farming resources as men (Tsige et al., 2020). It is evidenced that empowering female farmers could help increase food security and improve livelihoods for Africa's growing population, which is expected to quadruple within the next 90 years (Sinyolo, 2020).

Female smallholder farmers are not only producers of food, they are also food consumers. Most female smallholder farmers prepare food for their households. Kara and Kithu (2020) opined that food insecurity is prevalent among females, less educated and low-income earners. Also, food insecurity in Ghana is higher in rural areas than the urban areas (Acheampong et al., 2022). In accordance, Ankra et al. (2020) concluded that most female

smallholder farmers in Ghana are less educated, earn low incomes and dwell in rural areas. Consequently, female smallholder farmers in Ghana are prone to food insecurity.

Several studies have sought to explore the relationship between smallholder farmers and food security. Wodajo et al. (2020) studied how small ruminants help smallholder female farmers attain food security in Ethiopia. The study discovered that ruminants contribute to the food security of smallholder farmers. The authors further indicated that women have a significant role to play in the promotion of household food security. Carranza and Niles (2019) focused on the availability and usage of credit among smallholder farmers in Uganda, Kenya and Senegal. The authors found that it was difficult for female farmers to get access to credit compared to male farmers. The study further discovered that while male farmers invest their acquired credit in agricultural production, female farmers are more likely to use the credit they secure to buy foodstuffs than to invest it in their agriculture. The authors asserted that the findings of their study suggested that further studies should investigate female farmers' access to financial resources and food security. Moreover, Ezirigwe (2018) concentrated on how the law could be enforced to help small-scale female farmers overcome cultural and societal barriers to agricultural productivity in Nigeria. The author recommended that comprehensive laws and policies, policy awareness, and commitment to promoting the rights of females will empower female farmers to contribute significantly towards the achievement of food security. Furthermore, Asitik and Abu (2020) investigated how women's empowerment in agriculture could enhance food security in the Savannah Accelerated Development Authority region of Ghana. The study revealed that women's empowerment could contribute positively to food security. Also, Nara et al. (2021) focused on how customary land rights implicate food security among smallholder

farmers in the northwestern part of Ghana. The authors discovered that women could contribute more to food security if they easily get access to farmland.

It is evidenced that many studies have been conducted on smallholder farmers and food security. Nevertheless, few studies have concentrated on only female smallholder farmers and food security in Ghana. Also, few studies have focused on a comparative study of female smallholder farmers between the northern and southern parts of Ghana. The research seeks to address a gap in the current body of literature by focusing on the essential role of female smallholder farmers in advancing food security in Ghana. The primary goal is to provide valuable insights into how these female farmers can be empowered, thereby increasing their contributions to food security within the country. The main problem of this thesis therefore is to investigate the situation of food security of female smallholder farmers and their role in ensuring food security in Ghana.

1.3 Purpose of the Study

The main purpose of this study is to explore the situation of food security among female smallholder farmers and how female smallholder farmers could help improve food security issues by identifying the possible challenges and prospects.

1.4 Research Questions

1. How is the food security situation of female smallholder farmers in the Bosome Freho and Saboba districts?

2. What barriers do female smallholder farmers in Ghana face that impact their capacity to contribute to food security?

3. What strategies and resources have been initiated to empower female smallholders in Ghana to contribute to food security?

1. 5 Research Objectives

The primary objectives of this study are to analyze the role of female smallholder farmers in achieving food security in Ghana, identify the challenges and opportunities that female smallholder farmers face in this regard, and suggest effective strategies for empowering them. Additionally, the study seeks to assess the current level of food security among female smallholder farmers and make recommendations for future policy interventions.

The study is guided by the following specific objectives

1. To ascertain the food security situation of female smallholder farmers in the Bosome Freho and Saboba districts.
2. To explore the barriers faced by female smallholder farmers in Ghana that impact their capacity to contribute to food security.
3. To identify the strategies and resources that have been initiated to empower female smallholders in Ghana to contribute to food security.

1.6 Significance of the Study

This study is significant in several ways. In the first place, this study assessed the level of food security among female smallholder farmers. The findings will therefore inform female smallholder farmers on the measures to adopt to enhance food preparation and food utilization to promote food security. The findings will also reveal the challenges faced by female smallholder farmers in the production of food. Consequently, the study will make recommendations that will expose female smallholder farmers to the best and most modern

farm and nutritious practices that will improve food production. The improvement in food production can increase the income of female smallholder farmers and alleviate poverty.

The findings will also enable the government of Ghana, Non-governmental organizations, and stakeholders of gender development to initiate policies that are aimed at enhancing food security among female smallholder farmers. The findings will help inform governmental and non-governmental organizations on the policies to be implemented to promote food production and food utilization among female smallholder farmers.

Moreover, the study will add to the existing body of knowledge on smallholder farmers and food security. The study will provide a comprehensive understanding of the challenges faced by female smallholder farmers and their ability to utilize food. The findings of this study will also serve as the basis upon which further studies will be conducted. Thus, the study will serve as a reference for students and researchers to conduct further studies.

In sum, the study of the role of female smallholder farmers in achieving food security in Ghana is significant due to the importance of empowering local populations to meet their own food needs, thus contributing to national efforts to promote economic and environmental sustainability. Additionally, smallholder farming is an important source of employment for women in Ghana, who often lack access to other livelihoods. By studying women's roles in smallholder farming, we can gain a better understanding of how to create policies that will empower female farmers and help them achieve food security.

1.7 Scope of the Study

The study focuses on female smallholder farmers in the Bosome Freho District in the Ashanti region and the Saboba district in the Northern region of Ghana. The study selected

these two districts because of the dominant activities of female smallholder farmers. Moreover, these two districts were selected because the study sought to obtain data about female smallholder farmers in both the southern and northern parts of Ghana. This will enable a fair generalization of the research findings. Contextually, the study focused on female smallholder farming and food security.

1. 8 Organization of Research Work

This study is structured into five chapters. Chapter One deals with the introduction which is sub-headed as follows: background of the study, statement of the problem, objectives of the study, research questions, significance of the study, methodology, organization of research work and delimitation of the study. Chapter Two reviews related literature. Chapter three centres on the research methodology used in conducting this study. Chapter four presents and interprets the findings of the study. Chapter Five, the last chapter looks at the summary, conclusion and recommendation of the research work.

1.9 Definition of Terms

Food security: Food security defines a situation in which all people at all times have physical and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.

Female smallholder farmer: Female or women who are farmers and operate on farmland of fewer than two hectares

CHAPTER TWO

REVIEW OF LITERATURE

2.0 Introduction

The study focuses on female smallholder farmers and food security in Ghana. This chapter will review relevant literature on food security, agriculture, and smallholder female farming. The chapter is divided into three sub-sections; the theoretical review, the conceptual review and the empirical review.

2.1 Theoretical Framework

This section of the chapter discusses the theories that underpin this study. This study is conducted through the lenses of the liberal feminism theory and the theory of access.

2.1.1 The liberal feminism theory

The liberal feminist theory is part of the broader feminism wave and it is associated with Mary Wollstonecraft, William Gordon, John Stuart Mill and Harriet Taylor (Heywood, 2018).

The liberal feminism theory debunks the knowledge that the difference between males and females is biological. In the view of liberal feminists, the disparities between men and women are socially constructed (Tong, 2009). The subordination of women in society is caused by the lack of access to basic human rights, resource allocation, and employment opportunities. The theory further argues that customary practices and cultural beliefs limit women from succeeding in the public domain (Jackson and Scott, 2002).

The liberal feminism theory hinges on the patriarchal nature of societies which widens the inequality gap between men and women through the deprivation and exclusion of women

from socio-economic development (Onwutuebe, 2019). The proponents of the liberal feminism theory advocate for equal access to employment and opportunities for all individuals. The theory highlights the need for societies to give all individuals equal access to resources irrespective of differences in gender, geographical location, social status, or disability. The proponent of the liberal feminism theory further advocates for affirmative action as a measure to promote girls' and women's access to resources, education and employment opportunities (Chege & Sifuna, 2006). The liberal feminism theory will be useful for this study because it recognizes that women are disadvantaged in society as compared to men. The theory calls for the equal and fair treatment of boys and girls by society. The theory further seeks the empowerment of girls and women through education, training accessibility and ownership of productive resources. Through the lens of this theory, this research seeks to explore the challenges faced by female smallholder farmers and how they could be empowered.

The argument of the liberal feminism theory has been supported by the findings of several empirical studies. For example, Bungu (2019) studied the role of women in the agriculture sector in Zimbabwe. The study discovered men benefited more from agriculture programmes that were initiated in Zimbabwe than women. Again, the findings of Topic et al. (2020) revealed that women in the public relations industry have suffered from discrimination and prejudice within the last four decades. The authors further suggested that women are prevented from realizing their full potential in society in areas such as education, politics and employment. Also, Amusan et al. (2021) adopted the liberal feminist theory to study how women are neglected in fostering agricultural development in Nigeria. The authors found that women farmers are limited in terms of land ownership and access to

credit facilities. Furthermore, Islam et al. (2018) identified that, factors such as cultural influences, patriarchal structure within organizations and gender stereotyping limit women from advancing into key leadership positions in the ready-made garment industry in Pakistan.

The findings from these previous studies are in line with the argument of the liberal feminist theory that women suffer legal and customary constraints. The argument of the liberal feminists and the findings of these empirical studies informed the current exploration of the challenges faced by smallholder farmers in food production and food consumption.

Nevertheless, critics argue that the assumptions of liberal feminists are not clear on the ways by which societal values and structures limit women (Bryson, 1999). Critics are of the view that even when women are empowered to be independent of men, women will be dependent on the patriarchal state. Also, liberal feminist theory is critiqued to have focused too much on seeking to transform women into men and in that sense, the liberal feminist gives no regard to the traditional functions of women (Tong, 1992). Moreover, critics argue that liberal feminism originated in Europe and among middle-class women. Therefore, the philosophies of liberal feminists are not significant to working-class women, women of colour and other women around the world (Heywood, 2018). Furthermore, the liberal feminist theory fails to explain why women are unable to benefit from the resources or properties such as food that are traditionally available to them.

2.1.2 Theory of Access

The study adopts the theory of access put forward by Ribot and Peluso (2003). The theory of access argues that the meaning of "access" must be ascertained outside its traditional

understanding. Ribot and Peluso posit that conventionally, access is conceptualized as "the right to profit from a particular resource". However, in the view of the access theorist, access should be understood as the ability of an individual to derive the needed benefit from the resources available to them (Ribot and Peluso, 2003).

The theory assumes that the fact that an individual has access to a particular resource does not automatically mean that the individual derives benefits from such resources. The theory further argues that the ability of individuals to benefit from resources is influenced by several factors such as level of education, knowledge about the market, level of income, technological know-how, and social relations (Ribot and Peluso, 2003).

This theory is relevant to this study because it resonates with the objectives of this study. The access theory sheds light on the food security situation of female smallholder farmers by emphasizing the critical role of access to resources and opportunities in determining their ability to produce and access an adequate food supply. In this context, female smallholder farmers may face structural inequalities and barriers that limit their access to land, credit, education, agricultural inputs, and markets (Graham et al., 2021). These access constraints significantly impede their agricultural productivity and income, making it challenging for them to ensure consistent access to nutritious food for their households (Acheampong et al., 2022). As a result, the food security of female smallholder farmers is intricately linked to their ability to overcome these access challenges and effectively participate in agricultural activities, which highlights the importance of policies and interventions aimed at addressing gender-based disparities in resource access and promoting women's empowerment in agriculture for achieving food security. In the lens of the access theory, coupled with the

findings of empirical studies, the study argues that even though female smallholder farmers may have access to food, they may still be food insecure.

Several researchers have adopted the theory of access in their studies. For example, Abiodun (2021) adopted the theory of access in his study on the challenges of small-scale agribusiness and aquaculture in Nigeria. The study discovered that food insecurity was prevalent in Nigeria because of individuals' inability to produce more food and purchase enough food. Also, a study by Alipio, (2020) on the barriers between health care services and the utilization of health care among people who are publicly insured in the Philippines was grounded on the theory of access. The study revealed that some people who were publicly insured were not able to make use of health care services in the Philippines because the health care centres were physically far from them. Thus, similarly, the theory will guide this study to assess the extent to which female smallholder farmers benefit from the food they provide to ensure food security.

2.2 Gender and Development Approaches

Scholars and development stakeholders have recognized the role of females in the development of societies and have adopted measures that seek to empower women and promote gender equality (Reynolds et al., 2020). Because of this, different approaches have been developed to promote the integration of women into the development process.

Ester Boserup envisaged the first investigation into how women could be integrated into the development of societies (Elliott, 2013). Ester Boserup's *Women's Role in Economic Development*, published in 1970 asserted that women were continuously being marginalized in agricultural production as the sector witnessed an increase in technological advancement

(Elliott, 2013). Boserup asserted that women are equally productive as males however; differences in access to technology make women appear less productive compared to men. The argument by Boserup provided the foundation upon which various gender and development models would be envisaged.

2.2.1 Women in Development (WID) Model

Ester Boserup's *Women's Role in Economic Development* formed the foundation upon which the Women in Development approach was modelled and gained prominence in the 1970s (Anyidoho, 2021). Boserup's *Women's Role in Economic Development* influenced the United Nations to declare 1976 – 1985 as the decade for women during the 1975 World Conference in Mexico. The declaration urged and informed member-states and governments to initiate policies and programmes that sought to integrate women into the development of societies (Anyidoho, 2021).

The government machinery established and promoted policies that aimed at empowering women economically which became synonymous with the Women in Development (WID) approach. The Women in Development approach contributed significantly to the development of societies by improving the relationship between the status of women and women's work (Rai and Ravi, 2011). Benería (2011) observed that the WID approach is still significant to the development of societies as the effort of women is continually underrated and unappreciated, especially in subsistence production, and informal, domestic, and volunteer work (Benería 2011)

2.2.2 Women and Development (WAD) Approach

Women and Development (WAD) gained popularity in the mid-1970s. The proponents of the WAD approach sought to level an argument against the WID approach (Jonhson-Odim, 1991). The proponents of the WAD argued that the Women in Development approach over-emphasized gender as the reason why women were neglected in social and economic development. The advocates of WAD argue that factors such as colonialism, neo-colonialism and disparities in global relations hinder the capacity of both men and women in the global south (Johnson-Odim, 1991). Thus, in the view of WAD, the case is not that women in the global south are left out of the developmental process as put forth by the WID approach; rather the outcome of the labour of women in the global south is transferred to men and women in the global north (Rathgeber, 1989). The WAD approach suggested women should be given a greater share of resources such as land, increased salaries and access to decent employment opportunities for them to contribute effectively to the development process. Rathgeber (1989) opined that the WAD approach rendered an important critique of the WID approach, however, the solutions it offered were similar to the WID approach.

2.2.3 Gender and Development (GAD) Approach

The Gender and Development (GAD) approach evolved in the 1980s and sought to further integrate gender into development. The GAD approach envisioned gender as an analytical concept of development (Anyidoho, 2020). The GAD approach provided a universal approach by considering the activities and roles that society expected from males and females (Kumari, 2013). The GAD approach recognized the relationship between men and women in society as the source of women's oppression and exclusion from the development

process. The GAD approach argued that gender issues should be recognized by policymakers and development stakeholders and developmental policies, programmes and interventions should be formulated taking into consideration the oppression of women in society (Kumari, 2013). Thus, according to the GAD approach, policymakers and development stakeholders should create interventions that seek to improve women's participation in the development of society by removing all forms of biases created through social construction (Kumari, 2013).

2.3 Conceptual Review

This section reviews concepts that are relevant to this study. The concept includes security, food security, agriculture and smallholder farming.

2.3.1 The concept of security

The concept of security is as old as the origin of the state (Bijan, 2020). As put forth by Thomas Hobbes, the absence of security will mean the presence of threat and fear (Grabińska, 2019). In the situation of insecurity, Hobbes is of the view that human life will be solitary, poor, nasty, brutish and short. Hobbes further postulates that the absence of security will also mean the absence of industry and society (Bijan, 2020). In this regard, the issues of security should form part of major local and international discussions around the world (Kononov and Zhukov, 2020).

Several debates surround the meaning and component of security and the means through which the dangers and threats in society and around the globe could be prevented or removed. Though the concept of security has been part of major international debates, it has

no concise definition and its meaning has evolved in several ways throughout human history (Nicol, 2020).

The traditional definition of security

The traditional definition of security was used to refer to a situation where a state was free from external military oppression (Nicol, 2020). The traditional view of security focuses on the protection of the state from external attacks. The traditional definition of security perceives security through the lens of national security. The main focus of traditional security hinges on the protection of the sovereignty and integrity of the state (Nihas, 2021). The traditional view of security implies the building of an army and the strengthening of the artillery of a nation-state (Malik, 2021). The threat to traditional security has declined following the end of the cold war; consequently, much attention is being focused on a modern view of security (Meng, 2019).

Non-Traditional definition of security

The non-traditional view of security shifts focuses from the state to the individual. The modern view of security is conceptualized as human security. The concept of human security suggests that security and development should be centred on the individuals more than the state (Jacobs et al., 2021). In other words, human security gives less attention to the development of the military and protection of states' territories and focuses more on the development and well-being of the individuals.

The concept of human security strives to protect the most important aspect of individual lives and provide an environment that promotes self-actualization by promoting the basic rights and freedom of all human beings (Commission on Human Security (CHS), 2003). The

main aim of the Human Security paradigm is to protect the individual's freedom from fear and want (Tanaka, 2019). The concept of human security analysis focuses on identifying the sources and interconnections of dangers that tend to limit the fulfilment of rudiment goals and ambitions in the lives of ordinary persons and the generation and interconnection of those threats.

Human security has formed part of major local and international deliberations on peace, international relations and development since its inception in the 1994 report on human development (Tanaka, 2019). In recent times, the concept of human security has been the main focus among security analysts and international organizations and Non- Governmental Organizations that are concerned with socioeconomic development and form an integral part of modern security and environmental studies (Gasper, 2020). The concept of human security has seven main components which include economic, health, food, environment, political, personal and community security (Ojakorotu, 2019). However, for this study, much attention will be dedicated to food security

2.3.2 Food security

The idea of food security surfaced in 1974 and has remained one of the main topics discussed among global leaders (Ambros and Granvik, 2020). The rate of food insecurity and the need to adopt efficient measures to improve food security is a major challenge that confronts policy and decision-makers around the world (Ujunwa et al., 2017). The issue of food insecurity is not a concern of only one country but it remains an issue of global concern (Ajadi et al., 2019). In the view of Gubarkov et al. (2021), food security represents an important aspect of the security of every country. Almost every country around the world, irrespective of their territorial size, the buoyancy of their economy, and the territorial and

population size should see the threat posed by food insecurity (Gubarkov et al., 2021). This argument is reinforced by the action of the United Nations to give much attention to the issue of food security among the seventeen goals in its Sustainable Development Goals (Ayinde et al., 2020). The United Nations captures food security in goal two of the Sustainable Development Goal (SDG 2) and calls on individual member states to adopt measures to "end hunger, achieve food security and improve nutrition, and promote sustainable agriculture" by the end of 2030 (UN, 2017).

Even though food security is widely discussed among policymakers, it has no watertight definition. Food security has almost two hundred different definitions with about two hundred and fifty corresponding indicators (Dam Lam et al., 2017). Food security is a situation where there is stability in the availability and accessibility of safe and diverse food in its quantity and quality to meet the cultural, societal, and dietary preferences of all individuals at the household, national and global levels (Leroy et al., 2015).

Food security is when individuals can obtain enough food produced under suitable environmental conditions which can satisfy their nutritional and cultural preferences irrespective of their physical location or financial status (Mundhe, 2019). The Ministry of Food and Agriculture (MoFA) (2017) of Ghana, defines food security as;

> *"The existence of good and quality nutritious food hygienically packaged, attractively presented, available in sufficient quantities all year round and located at the right place at affordable prices"* (Ministry of Food and Agriculture, 2017).

This study adopts the definition put forth by the World Food Summit (1996). Food security is defined as;

> *"As a situation in which all people at all times have physical and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life"* (Shaw, 2007).

2.3.3 Components of food security

There are three main modules of food security. These include; availability of food, accessibility of food and utilization of food (Food and Nutrition Technical Assistance (FANTA), 2018). The Food and Agriculture Organization (FAO) (2015) identifies the fourth component of food security to be the stability of the three components outlined by the Food and Nutrition Technical Assistance. All four dimensions of food security have equal importance and should therefore be accorded the same levels of consideration (Aborisade and Bach, 2016).

Food availability

The availability of food deals with the consistent supply of food to individual consumers. The attempt to eradicate hunger and achieve food security will be successful only when adequate food is made available (Aborisade and Bach, 2016). Food availability is dependent on the food production systems, the amount of food in stock, and the trade. A robust food production system that is fortified by the availability of a skilled labour force, modernized technology and improved agricultural practices will increase the quantity of food produced (Mundhe, 2019). The system of food preservation and food processing is also a determinant of the availability of food. In most instances, the supply of some foodstuffs exceeds its demand. To ensure that these excesses are not wasted, there should be robust food preservation, storage, and processing that will keep food for a longer time without being

spoilt. This will ensure that food is always available at all times throughout the year (Mundhe, 2019).

Food accessibility

The accessibility dimension of food security focuses on physical and economic access to quality and adequate food (Clapp et al., 2022). This module of food security deals with the ability of households and individuals to acquire food irrespective of their financial status, and social and cultural orientation. This pillar of food security suggests that the prices of food should not be too high such that the poor are unable to purchase (De-la-Torre, 2020). Also, food accessibility implies that food should not be physically far away from consumers. In simple terms, individuals should not travel a longer distance from their locations before they get access to food. In this dimension of food security, an individual or household should have the needed income and other resources to acquire enough food that meets their nutritional preferences (De-la-Torre, 2020). Food accessibility comprises three main fundamentals. These are the affordability of food, food preferences and food allocation. The module considers issues such as income and purchasing power of individuals and households, and infrastructures such as means of transportation and food market centres.

Food utilization

Food utilization deals with the way the human body makes use of the nutrition that food provides. This component of food security demands that individuals fully exploit the essentials that food offers (McCarthy et al., 2018). In this module, much attention is focused on quality care for food, good feeding behaviours, methods of preparing food, the various varieties of diets and the distribution of food among households. In simple terms, utilization

of food refers to the ability to use food effectively. McCarthy et al. (2018) indicated that about fifty per cent of the produce is not consumed and eventually goes to waste. This component demands the judicious usage of food to improve nutrition and good health.

Stability

This component demands that food be made available throughout the year. In many parts of the world, food production is seasonal, intermittent or periodic. This usually leads to the unavailability of food at certain seasons of the year. Mundhe (2019) observes that factors such as drought, natural calamities, and political unrest usually create instability in food production which leads to scarcity of food at certain times of the year. Thus, stability as a component of food security implies the capacity to sustain the availability, accessibility and utilization of food irrespective of the numerous adverse conditions (Ene, 2020). An individual is considered food insecure if he or she has access to adequate food today, but may intermittently lack access to food.

2.3.4 Food security policies and frameworks

International organizations, governments of individual states and non-governmental organizations have developed several policies, measures and frameworks that aim to improve global hunger and food security. This section will focus on the discussion of some of the major policies developed to improve eradicate hunger and improve food security.

The Millennium Development Goals (MDGs)

The Millennium Development Goals are eight (8) goals designed and agreed upon by the United Nations and its member states (Assefa et al., 2017). These goals were set to be

achieved from 2000 to 2015. The first objective of the MDGs was to eradicate extreme poverty and hunger. Thus, the United Nations made a provision to tackle the issue of hunger in its MDGs (Lianglian et al., 2019) The United Nations sort to eradicate extreme poverty and hunger could be achieved by following specific guidelines (Rahmah et al., 2019). These included investing in agriculture, creation of jobs, expansion of the social safety nets, expansion of nutritional programmes with a focus on children under 2 years, promotion of basic education and gender equality and defending weaker and vulnerable countries against and in times of crises and disasters (Rahmah et al., 2019).

Though the United Nations could not achieve its aim of eradicating hunger and poverty across the globe, the United Nations report on the success of the MDGs indicated the efforts by the United Nations and its member states resulted in a significant decline in extreme poverty and hunger (United Nations, 2015). The report indicated that the implementation of the MDG resulted in the reduction of people living in extreme poverty in developing countries from 50% in 1990 to 14% by the end of 2015 (United Nations, 2015). It was also reported that extreme poverty around the globe was reduced by almost 50% between 2000 and 2015. Moreover, it was revealed that the implementation of the MDGs led to a reduction in the number of undernourished populations from 23% to 12.9% (United Nations, 2015).

The Sustainable Development Goals (SDGs)

The reflection on the successes and weaknesses of the MDGs framework contributed significantly to the development of the Sustainable Development Goals (SDGs) (Assefa et al., 2017). The SDGs represent a development agenda adopted by the United Nations and its member states, as a blueprint to sustain the environment, and society and to make human and animal life (UN, 2017). The second goal of the 16 SDGs seeks to eliminate hunger, achieve

food security, improve nutrition and promote sustainable agriculture (Conner and Garnett, 2016). SDG goal 2 is set to meet the following targets by the end of 2030.

To eradicate hunger and ensure that all people, especially the poor and individuals in vulnerable situations, together with infants, have access to safe, nutritious and sufficient food all year round (UN, 2017).

To end all kinds of malnutrition to achieve the internationally agreed target of stunting and wasting in children under 5, and to provide for the nutrition of adolescent girls, pregnant and lactating women and people of old age (UN, 2017).

Also, sustainable development goal two seeks to double agricultural production and income of smallholder producers, with a focus on women, and natives by providing aid such as availability of market, access to land and other agricultural inputs (UN, 2017).

To ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, help maintain ecosystems, strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and progressively improve land and soil quality (UN, 2017).

Ghana country strategic plan (2019–2023)

The Ghana country strategic plan is a food security strategy developed by the World Food Programme based on the reflections, review and evaluation of the Zero Hunger goal set by the United Nations (WFP, 2018). The country's strategic plan development is in alignment with other government policies such as the Coordinated Programme of Economic and Social Development Policies (2017–2024), Planting for Food and Jobs and One District, One Warehouse (WFP, 2018).

The world food programme seeks to support the government of Ghana to improve agriculture, food production and food security (WFP, 2018). The Ghana country strategic plan of the World Food Programme seeks to attain a long-term vision of achieving efficient, inclusive, equitable and resilient food systems that may improve malnutrition and reduce deficiencies such as stunting growth among children (WFP, 2018). The WFP Ghana seeks to achieve this long-term goal through the provision of technical and policy support that will enhance nutrition sensitivity, champion gender-responsive social protection programmes and promote public-private partnerships (WFP, 2018). The WEP through the Ghana country strategic plan (2019–2023) seeks to collaborate with public institutions and private sector actors to improve awareness of good eating habits, targeting smallholder farmers, food processors, children aged 6–23 months, pregnant and adolescent girls (WFP, 2018). The implementation of the Ghana strategic plan (2019-2023) is ongoing at the time of writing.

The Planting for Food and Jobs Policy

The Planting for Food and Jobs (PFJ) policy is a flagship agricultural policy developed and implemented by the government of Ghana (Pauw, 2022). The programme was officially launched on April 19, 2017 (Pauw, 2022). The main aim of the policy is to promote food security through the provision of enough food and making it accessible in the nearest market and also to serve as a source of employment to the Ghanaian population (MoFA, 2019). The planting for food and jobs policy has five modules. These modules include; planting for food and jobs, planting to export and promotion of rural development, promoting greenhouse technology in villages, rearing to provide food and jobs and Mechanization of agricultural services (MoFA, 2017). PFJ policy seeks to motivate and empower farmers through the

provision of improved and subsidized agricultural inputs such as fertilizer and improved seeds, the provision of extension services and market information (MoFA, 2017).

The PFJ policy gives special attention to smallholder farmers (Pauw, 2022). MoFa (2017) indicated the farmers who will benefit from the PFJ policy should be resource-poor smallholder farmers cultivating on land of fewer than 2.0 hectares. The policy states that about 40 per cent of smallholder farmers who will participate in the programmes should be women (MoFA, 2017). The first implementation phase of the PFJ policy was set to impact 1.6 million smallholder farmers between 2017 and 2020 (MoFA, 2017). Though the implementation of the PFJ policy is ongoing at the time of writing, Pauw (2022) asserted that an estimated 2.6 million smallholder farmers benefited from the PFJ policy by the end of 2020. However, no official publication was made on the total number of female smallholder farmers who participate in the programme (Pauw, 2022)

2.3.5 The trend of food security around the globe

Despite all the efforts put forward to eradicate hunger and achieve food security, the world is still in a very dangerous situation as far as food security is concerned (Delgado et al. 2021). The Food and Agricultural Organization of the United Nations in its 2021 reports observed that though individual member states and the world at large were nowhere near the realization of their commitment to end world hunger and to improve nutrition by the end of 2030, the emergence of the COVID-19 pandemic has to a greater extent marred the capacity of individual states to eradicate hunger by the end of 2030 (FAO et al., 2021).

The state of food security at the global level

The 2020 Global Food Report indicated that 135 million of the population in a total of fifty-five countries faced severe food insecurity in 2019 (Ambros and Granvik, 2020). According to FAO, almost 928 million people, representing 12 per cent of the world's population were affected by hunger in 2020. The report suggests that globally, 320 million more people were faced with hunger in 2020 as compared to 2019. The situation of hunger is more devastating observing that about 148 million more people suffered severe hunger in 2020 compared to 2019 (FAO et al., 2021). The report further indicated that moderate and severe hunger affected more than 10 per cent of women than men in 2020 compared to the gender gap of 6 per cent in 2019 (FAO et al., 2021). This suggests that women are mostly affected as much as food insecurity prevails.

The situation of malnutrition increased to 9.9 per cent showing an increment of 1.5 per cent in the year 2020 (FAO et al., 2021). The majority of the people who are undernourished as shown by the FAO, (2021) report are living in Asia. In Africa, almost 280 million people suffered from undernourishment which is the second record for 418 million undernourished populations in Asia (FAO et al., 2021). In comparison, the report realized that about 46 million and 57 million more people suffered from undernourishment in 2020 compared to 2019 in Africa and Asia respectively. The situation of undernourishment was not any better in Latin America and the Caribbean which recorded 14 million more undernourished population in 2020 as compared to 2019 (FAO et al., 2021).

The current situation of global food security suggests that there is danger ahead (Delgado et al., 2021). The 2021 Global Hunger Index estimates that about forty-seven countries will not be able to achieve zero hunger by 2030. The emergence of COVID-19 has daunted the efforts

being made by member states and the world as a whole. As a result, approximately 657 million, representing 8 per cent of the world's population will be food insecure by the end of 2030 (IFAD et al., 2021).

The trend of food security in Africa

The continent of Africa is endowed with rich resources which would ensure the production of adequate food to cater for the dietary and nutritional needs of its growing population (FAO, 2012). Despite this observation by the Food and Agriculture Organization, Africa has not been able to utilize its available resources to effectively deal with food insecurity, as such, the continent has a long way to go as far as food security is concerned (Bonuedi et al., 2019). The African continent has not put in much effort to ensure the eradication of hunger and improve nutrition by the end of 2030 (FAO, 2021).

In its 2020 report, the Food and Agriculture Organization of the United Nations identified that over 280 million African populations suffered undernourished in 2020 (FAO, 2020). This suggests an increment of a little over 89 million in the last seven years. The situation of food insecurity is prevalent in the Eastern part of Africa where 125 million people are undernourished (FAO, 2020). The West African region recorded a total of 75.5 million of her population to be insecure whilst Central and Northern Africa follow with 57.1 and 17.4 million respectively (FAO, 2020). In the southern part of Africa, an estimated 6.8 million people were identified to be food insecure (FAO, 2020). Almost 7 out of the 10 most food-insecure countries in the world are found in Sub-Saharan Africa (Fahey et al., 2021).

The situation of food security in Ghana

The commitment of successive Ghanaian governments towards the attainment of food security and eradication of hunger has been recognized by organizations around the Globe. Nevertheless, the current trend of food security in the country demands that more effort be put into completely eradicating hunger and promoting food security.

A Comprehensive Food Vulnerability Analysis (CFSVA) spearheaded by the Ministry of Food and Agriculture of Ghana (MoFA), the Ghana Statistical Service (GSS) in corporation with the United Nations World Food Programme (WFP) and the Food and Agriculture Organization of the United Nations (FAO) in 2020 identified that 11.7 per cent depicting 3.6 million of the total Ghanaian population are food insecure (MoFA, et al., 2020). An estimated 1.6 million of the total 3.6 million are suffering from severe food insecurity while 2 million people are moderately food insecure. The difference in the severity of food insecurity is a result of factors such as sex, level of income, level of education, access to land and location of the individual (MoFA, et al., 2020). The CFSVA showed that the majority of people who are food insecure in Ghana live in rural areas. A total of 78 per cent representing 2.8 million people who are food insecure in Ghana live in the rural areas whilst 0.8 million people in urban areas are food insecure. Households with female heads were more food secure compared to male-headed households (MoFA, et al., 2020). This highlights the significant contribution females make towards the achievement of food security. The report also indicated that households with heads who have attained a high level of education were more food secure than a household with heads who have lower education. This implies a direct relationship between educational level and food security. The higher the educational level, the more food secure and vice versa (MoFA, et al., 2020).

The trend of regional food security in Ghana

The CFSVA established that the issue of food insecurity is a challenge identified in almost all the regions in Ghana. The rate of food insecurity was found to be more prevalent in the northern part of Ghana compared to the southern (MoFA, et al., 2020). The Upper East region recorded the highest food insecurity situation whilst the Oti region recorded the lowest. An estimated six hundred people in the Upper East Region suffer from food insecurity. 17% of the total food insecurity situation in the country was found in the northern region (MoFA, et al., 2020). Five hundred thousand people in the Ashanti Region are food insecure while less than a hundred thousand people are food insecure in the Oti region (MoFA, et al., 2020). The Eastern and Volta regions recorded food insecurity situations ranging between two hundred thousand and three hundred thousand (MoFA, et al., 2020). A total population ranging between a hundred thousand and two hundred thousand were found to be food insecure in ten regions - Western, Bono East, Upper West, Western North, Central, Greater Accra, Ahafo, North East, Bono and Savannah regions (MoFA, et al., 2020).

2.3.6 Factors that influence food security

Several factors seem to challenge the efforts made by the United Nations and member states to achieve food security by 2030 (Calicioglu et al., 2019). The current developments around the world such as an increase in population, urbanization, climate change, and the emergence of pandemics and conflict endanger food production and expose the world to the threats of food insecurity (Ansah, et al., 2019).

Population growth, urbanization and loss of farmlands

The continuous increase in the global population poses a real challenge in achieving food security (Ambros and Granvik, 2020). An increase in population puts pressure on farmlands.

The increase in the global population has a resultant effect on urbanization. An increase in population will demand that existing farming land be cleared for human settlement (Calicioglu et al., 2019). In many cases, lands which were once used to grow crops are used for the construction of houses, roads and other infrastructure (Calicioglu et al., 2019). The increment in population will demand a corresponding increment in food products such as to meet the increase in demand and prevent food shortages. However, the increase in global population alternatively results in a decrease in farmlands, which in effect causes a reduction in food production. For instance, Wang et al. (2016) observed that the rapid increase in China's population coupled with urbanization and city sprawl led to a decrease in the size of farmlands, and water bodies which in turn reduced the quantity of food produced. Ampim et al. (2021) indicated that an increase in population in Kenya led to a reduction in the size of forest cover in some parts of the country. Similarly, Ghana lost grassland cover in 12 out of the 16 regions in the country as a result of the increase in population (Ampim et al., 2021). The global population is expected to increase to about 11 billion by the end of 2050 (United Nations, Projected Population Growth 2017). There will be a continuous increase in the demand for food as the global population increases. The main problem for the world will be the scarcity of farmlands (Acuto et al., 2018)

Rural-Urban Drift

The movement of people from rural areas to urban centres serves as a major threat to the production of food and food security (Wang et al., 2020). Residents in rural areas are mostly attracted to the improved facilities and infrastructure as well as enhanced services in urban centres. This situation usually causes rural dwellers to migrate to urban centres to seek an improved standard of living and opportunities in urban centres. Frequent rural-urban drift

causes a reduction in agricultural labour in rural areas which also leads to a decrease in food production. Rural-urban migration deprives rural areas of youth who will provide labour for agricultural production (He et al., 2016). The movement of people from the rural areas to the urban areas reduces the labour force in the rural areas; which implies a reduction in the farm market produce in the local areas (Adaku and Amanor-Boadi, 2020). Factors such as means of transportation, level of farmers' determination, inadequate labour, and availability of a market for farm produce can endanger food security (Inegbedion, 2020).

Climate Change

The impact of climate change is being experienced in almost every part of the world (Kumar et al., 2021). Climate change has brought about unpredictability and variations in weather conditions which usually result in flooding, erosion of riverbanks and salinity (Kumar et al., 2021). The unpredictability of weather conditions usually makes farming and food production difficult. Climate change and its excesses have a recognizable effect on all four components of food security, food production and global hunger (FAO et al., 2018). The effects and cost of climate change on food production are evidenced in almost all the regions around the world but there has not been any fully developed mechanism to contain its effects (Masson-Delmotte et al., 2021). Almost 78 million more of the world's population will be affected by hunger in 2030 as a result of climate change and the greater part of this effect will be seen in Sub-Sahara Africa (Sulser et al.,2021).

Global pandemics, Political Instability and Conflict

The emergence of pandemics, political instability and conflicts could limit the production of food in the areas where these events occur (Prosekov and Ivanova, 2016). In many instances, farmers, food producers and transporters find it very difficult to transport foodstuff to areas

that are affected by wars and pandemics (Lipton and Shanghai, 2017). The 2017 State of Food Security and Nutrition in the Worlds reported that severe food insecurity and undernutrition were high among countries affected by prolonged conflict. Conflict is a major and current factor spearheading global hunger (Fahey et al., 2021). More than 60% of the people who are affected by hunger live in conflict-prone regions (Fahey et al., 2021). Conflict drives people away from their homes to become refugees in other regions where they have no source of livelihood (Fahey et al., 2021). Such refugees often do not have access to food and are always food insecure. Moreover, conflict may force farmers to flee from their lands and abandon their farms. In other instances, farmers do not get access to the farm and agricultural inputs which eventually leads to a shortage of food production and food insecurity (Fahey et al., 2021).

The emergence of pandemics has a daring effect on food security. Factors associated with pandemics such as economic recessions and an increase in poverty reduce the capacity of individuals and households to access food (Swinnen and McDermott, 2021). Individuals and households often shift from the consumption of a balanced diet to consuming food products which are relatively cheaper and less nutritious (Headey et al., 2020). People do not have access to fresh food such as fruits and vegetables due to interruptions in food supply chains during pandemics (Headey et al., 2020).

2.3.7 Measures to promote global food security

The trends of global food security demand the exploration of new and innovative measures which are aimed at improving food production. Food and Agriculture Organization set out initiatives through which the production of food could be strengthened (Ogundare, et

al.,2016). The approaches set out by the FAO form the foundation upon which food security would be achieved under the sustainable development goals (Akinyetun, et al., 2019).

Promotion of gender equality with a focus on women-empowerment

Reduction in gender inequality and empowerment of women can improve food security. The author argued that women should be seen as the main stakeholders in food production and preparation (Galiè et al. (2019). Similarly, Sharaunga et al. (2019) opined that women should be at the centre of the discussions on measures to promote household food security. Equality in society through women's empowerment tends to increase food production, utilization and preservation (Sharaunga et al., 2019). The empowerment could focus on training and educating women on food conservation and the significance of good nutrition (Alonso et al., 2018). Also, female farmers can increase the production of food if they are empowered through access to extension services, credit facilities and land (Agarwal, 2018).

Provision of nutritious food to individuals and households in a holistic approach

The quest to achieve food security could be realized by making nutritious food available to individuals (Giller, 2020). Government and other development stakeholders should formulate and implement policies and programmes to improve food security (Widiana et al., 2022). The programmes, policies and investments made to ensure food security should focus on the following; availability of food throughout the year, provision of diversified food to meet individual dietary preferences and the stability of food prices (van de Ven et al., 2020).

Prioritizing agriculture and rural development

Agriculture remains an essential sector concerned with the provision of food (Abdelhidi & Zouari, 2020). The attempt towards global food security will be void without considering the

agricultural sector (Abdelhidi & Zouari, 2020). A greater portion of crop production occurs in rural areas on a smallholder basis. There should therefore be measures put in place to cushion smallholder farmers in rural areas to enhance their productivity (Gil et al., 2019). Basic infrastructure and social amenities should also be provided to make life in rural areas comfortable (Ushachev, et al., 2021). This will reduce rural-urban migration and retain labour and markets for food production (Duda et al., 2018).

Promoting sustainable agriculture and food production systems

The growing population and the rapid urbanization of communities demand the production of adequate food to meet the rising demands (Amejo et al., 2018). The systems, mechanics and chemicals used in the production of food should be environmentally friendly while increasing crop yields (Ulian et al., 2020). In this regard, agricultural practices should not pose a challenge to the soil, water bodies, forests and biodiversity. Sustainable agriculture also implies adopting measures that will make the agricultural sector resilient to climate change (Van Wyk, 2019). Countries are therefore encouraged to explore different means to attain food security (Galiè et al., 2019),

The conceptual review of food security revealed that the attainment of food security is almost impossible without the agricultural sector. Again, the conceptual review of food security revealed that women have a crucial role to play in the realization of food security. Furthermore, it is evidenced in the literature that smallholder farmers should not be left out of the discussion of food security issues. A similar observation was made by the United States Agency for International Development which asserted that the development of communities and the drive to attain sustainable development goals demand close collaboration with women (USAID, 2016). Women empowerment and gender equality should be regarded as major

means through which food security would be achieved (Verthart et al., 2015). Weerabahu et al. (2021) opined that, in the quest to improve food security and achieve zero hunger, there should be a close partnership with rural food farmers. The development of close collaboration between rural farmers and policymakers is an effective means through which food security could be achieved.

2.3.8 Agriculture and food security

The attainment of food security as an aspect of sustainable development goal two (SDG 2) is directly or indirectly related to sustainable agriculture (Karthikeyan et al., 2020). The agricultural sector is regarded as the largest economic activity on the African continent (Kamara et al., 2019). The agricultural sector accounts for an approximation of 33% of the Gross Domestic Product (GDP) of Africa (World Bank, 2015).

The agricultural sector can end hunger and poverty on the African continent if the right policies and measures are implemented (Dhahri and Omri, 2020). The sector does not only produce food to end hunger, it also gives individuals income to purchase nutritious and healthy food commodities to satisfy their dietary preferences (Backman et al., 2021). The agricultural sector serves as a source of income for about two-thirds of the total labour force in Africa (Mentsiev et al., 2020). The agricultural sector in most African societies operates on a family and smallholder basis because agricultural lands are mainly in the custody of families (Christiaensen & Demery, 2018). The major decisions about farms and crop production are mainly taken by the family and individuals who acquire land for farming purposes may do so through the family (Christiaensen & Demery, 2018).

2.3.9 Smallholder farming

Smallholder farmers are small-scale farmers, pastoralists, forest keepers, and fishers who manage areas varying from less than two hectares (Herrero et al., 2019). Smallholder farming is usually performed on a family basis. Smallholder farmers cultivate on family land and depend largely on family labour for production using part of the produce for family consumption (Herrero et al., 2019).

There are over five hundred million farmers around the world who operate on smallholder bases (Lowder et al., 2021). Smallholder farmers account for about 75% of the total farms around the world with a majority of them found in third-world countries (Lowder et al., 2021). Camila et al. (2019) observed that smallholder farms employ more than 60% of the total labour employed by the agricultural sector across the globe and provide over 80% of the food consumed in the developing world (Reincke et al., 2018). Smallholder farms account for almost 70% of the total food produced and delivered to consumers in Sub-Saharan Africa (Reincke et al., 2018).

The Ministry of Agriculture (MoFA, 2017) stated that agriculture is predominantly on a smallholder basis in Ghana and identified that about 90 per cent of farm holdings are less than two hectares in size. Smallholder farmers play a very important part in improving food security at all levels within the community (Graeub et al., 2016). Paloma et al. (2020) opined that smallholder farmers play a major role towards the achievement of food security; however, they are always not captured in development policies and programmes. Smallholder farmers are more vulnerable and are regarded among the poor and hungry groups in the world (Paloma et al., 2020).

Gender is a major factor that influences agricultural labour in Africa. Division of labour in most farms is determined by cultural, political, social, economic and religious perceptions of gender (Nyantakyi-Frimpong, 2017). In most African societies, males have access to land and other agricultural inputs which enable them to farm on large scales (Nyantakyi-Frimpong, 2017). Most women in Africa do not have the right to own land. Women usually depend on their male family heads or husbands to access land (Shaver, 2020). Females are usually required to keep their homes and perform basic household chores. The household chores performed by females reduce their productive hours to engage in productive ventures (Pati and Babus, 2018). As a result, most female farmers are smallholders.

2.3.10 Female smallholder farmers

The majority of smallholder farmers across the world are women. Women's participation in smallholder farming in Africa can be categorized into three basic systems, even though this may vary across countries (Shaver, 2020). In the first place, women may participate in smallholder farming by taking responsibility for all the factors and processes that are involved in agricultural production. Thus, under this category, women have access to land, seedlings, and capital among other factors under this system (Shaver, 2020). Females may also participate in farming through collaboration with their male counterparts. Women under this system may not have access to land and other factors but may depend on their husbands or the male family heads (Shaver, 2020). The third system reserves the factors of production to only males. Females do not have access to land nor do they participate in the cultivation of crops or rearing of livestock. The production process is exclusively reserved for males. Females may participate during the food process and preservation stage. The third system is common

in the northern part of Africa and other parts of Africa where females are usually barred from fieldwork (Shaver, 2020).

Smallholder female farmers engage in the production of food crops such as cassava, plantain, and cocoyam while their male counterparts focus on the production of cash crops including cocoa, orange, cashew and palm nut (Petrikova, et al., 2023). Though smallholder female farmers may sell some farm produce for income, they usually produce for household consumption. Female smallholder farmers are not able to release their full economic potential due to the limitations placed on them by gender. The McKinsey Global Institute opined that the GDP of Africa could be increased by over USD 316 billion if women in agriculture were given similar privileges as enjoyed by their male counterparts (McKinsey, 2019).

2.3.11 Challenges faced by smallholder farmers

Female smallholder farmers in most African countries, for instance, are faced with the challenge of accessing farmlands, agricultural inputs, ready markets for farm outputs, technology, and financial services (Muzari, 2016).

Access to farmlands

There is a huge gap between male and female access to agricultural resources in most developing countries. Women in most societies do not have access to farmlands (Kamara et al., 2019). This situation is compounded by recent global developments such as population growth, urbanization and illegal mining. The increase in population growth and urbanization have decreased farmlands. Illegal mining has destroyed a greater portion of farmlands in most rural communities in African countries such as Ghana (van Bockstael, 2019). The increase in the rural population will cause a decline in farmlands in most African countries

(Tang and Di, 2019). The loss of farmlands means women will have to compete from a relatively lower ground with their male counterparts on the limited available farmlands (Knapman et al., 2017).

Access to Financial Services

Female smallholder farmers are unable to access financial assistance such as loans and savings accounts (Tsige et al., 2020). Women are unable to hire additional labour or purchase the required farm inputs that could increase production due to their inability to access credit. More than 36% of female farmers have lower access to credit facilities compared to men (Giuliani, 2021). Most female farmers are unable to access credit facilities as a result of legal and cultural constraints. Most of these female farmers do not have any standing property that could be used as collateral for the loans offered by financial institutions ((Oluwaseun and Olaitan, 2020). Most smallholder female farmers reside in rural areas; however, accessibility to financial assistance is worsened in rural areas where access to formal financial services is much more constrained (Oluwaseun and Olaitan, 2020). This situation always propels female farmers to stick to the usage of outmoded and primitive agricultural tools due to their ability to purchase and patronize modern agricultural inputs which usually limit their production and work output.

Access to the market, price spikes and volatility

Access to a readily available market has the potential to increase the income levels of smallholder farmers. However, the participation of smallholder farmers in the modern market is influenced by factors such as literacy level, membership in corporations and access to roads (Kassa and Getnet, 2022). The unpredictability and instability of food prices affect smallholder farmers. The prices of most goods produced by smallholder farmers are

determined by the forces of demand and supply (Amare et al., 2019). In most instances, female farmers are presented with lower prices from buyers who have no competitors. Most of the goods produced by smallholder farmers are perishable, female smallholder farmers are therefore left with no option but to exchange their produce at lower prices (Ocholi et al., 2020). Inadequate information about the prices of goods, demands and supply forces and quality standards affect the income smallholder farmers derive from their produce (Mambile and Machuve, 2019). However, the prices of farm impute are always rising. Thus, smallholder farmers do not receive many returns on the goods produced from their farms (Migose et al., 2018).

2.4 Empirical Review

This section will focus on the review of empirical studies that are related to this research. The empirical review will focus on the level of food security among farmers, the challenges faced by smallholder farmers and policies and measures initiated to support smallholder farmers.

2.4.1 Level of food security among smallholder farmers

Reincke et al. (2018) employed the mixed method approach to study the factors that influence food security among smallholder farmers in Tanzania. The study sampled 899 households from two regions in Tanzania to participate in this study. The authors adopted the household Food insecurity access scale prepared by Coates et al. (2007) to measure the food security of farmers. The finding indicated that factors such as drought, level of income and infertile land had a significant impact on the availability and accessibility of food among smallholder farmers in Tanzania. The study also found that farmers who engaged in the rearing of livestock were more food secure. The study findings indicated that cassava has great potential to reduce food insecurity among smallholder farmers in Tanzania. The findings further

suggested that women appeared to be less food insecure as compared to men. The study was very insightful however; the authors did not relate their findings with previous findings. Again, the authors did review any theory to support their study.

Also, Coulibaly et al. (2017) conducted a quantitative study on the relations between agroforestry and food security among farmers in Malawi. The authors selected 338 smallholder farmers from whom data was gathered. The authors employed regression statistics to analyze the impacts of agroforestry on the food security of smallholder farmers. The results of the study indicated that farmers who made use of fertilizer trees were more food secure. The authors indicated that the use of fertilizer trees increased the yields of farmers by an estimation of 35% which means there will be more food available to such farmers. The study was very interesting and insightful. However, the authors only measured the availability and accessibility aspects of food security. The study did not consider the utilization aspect of food security among smallholder farmers in Malawi.

Mutea et al. (2020) studied the relationship between the theory of access and food security among smallholder farmers in the North-West Mount of Kenya. The study used both probability and non-probability sampling techniques to sample 380 participants for this study. Data for the study was gathered through semi-structured surveys and interviews with key informants. Data were analyzed through content analysis and spearman's rank correlation was used to test how the mechanisms of access correlate with food security. The findings indicated that most smallholder farmers suffered food insecurity as a result of low productivity due to their incapability to pay for modern technology. The findings further suggested that lack of access to credit facilities influences food security among smallholder

farmers in Kenya. The study was very comprehensive and insightful. The authors adopted several mechanisms to measure the rate of food security among smallholder farmers. However, the authors did not support their findings and compare their findings with previous findings.

Hudson et al. (2017) focused on the use of radio and other interactive information and communication technologies to improve food security among smallholder farmers in Sub-Saharan Africa. The authors purposively selected 26 communities from areas where radio signals were accessible and areas where radio signals were not accessible. The authors interviewed 1931 respondents across four countries in Sub-Saharan Africa from March to May 2015. The authors found that the use of radio and other information and communication technologies could help improve food security among smallholder farmers in sub-Saharan Africa. The study was comprehensive and interesting however, the authors did not review any theory to underpin their study.

Ogunniyi et al. (2021) concentrated on the social and economic factors that influence food security among smallholder maize farmers in Ogun State, Nigeria. The authors used a multi-stage sampling technique to sample 260 respondents for the study. The study used a structured questionnaire to gather data from respondents. Descriptive statistics were employed to analyze the data from the respondents. The results showed that households with female heads were more prone to food insecurity. The study also revealed that farmers who joined farmers' associations were less likely to be food insecure. The authors also discovered that smallholder maize farmers were more likely to be food insecure than large-scale farmers. The study revealed that the incidences of food insecurity were higher among households with

larger members. Also, smallholder farming households with heads who are above 70 years were more food insecure. The authors' study was very detailed and insightful. The use of multi-stage sampling ensured a fair representation of study participants. However, the authors did not review any theory to underpin their study.

Sanyo and Mudhara, (2018) concentrated on the relationship between entrepreneurial abilities and food security among smallholder farmers in KwaZulu Natal, South Africa. The study adopted the random sampling technique to select 513 houses from the rural communities within the study areas. The primary data for the study was collected with the use of a questionnaire. The study used descriptive statistics to analyze the data obtained from the survey. The study discovered a positive relationship between the entrepreneurial competencies of smallholder farmers and food security. The study also found that factors such as farm size, education, access to training and extension services and road networks have a positive relationship with food security. The authors explained that smallholder farmers who have access to these factors appeared to be more food secure than those who lack access. The study was detailed and interesting. The use of a two-stage survey provided a suitable condition under which the topic could be studied. The authors also gave priority to research ethics.

In their study, Asare-Nuamah and Mandaza (2020) conducted a quantitative study on the relationship between adaption to climate change and food security of smallholder farmers in the Adansi North District of Ghana. The authors adopted the simple random sampling technique to select 378 smallholder farmers from whom data was collected with the use of a questionnaire. The authors employed descriptive statistics to analyze the data. The authors

performed an independent t-test and standard multiples regression with the help of SPSS. The findings indicated that the application of climate adaptation mechanisms such as fertilizer application, the use of weedicides, irrigation and the use of improved seeds enhance food security among smallholder farmers. The study was very educative. However, the authors did not review any theory to support their study. Also, the adoption of the quantitative approach may limit the ability of the researchers to gain respondents' in-depth understanding of the phenomenon under study.

It is evidenced through the review that factors such as education, gender, level of income and the use of technology influence food security among smallholder farmers. The authors' studies were very insightful. Most of the studies lack theoretical review to provide a comprehensive understanding of the phenomenon under study. Also, few such studies focused on only female smallholder farmers. Moreover, most of the authors did not conduct a comparative study between the southern and northern parts of Ghana. The current study considers and makes provisions for the shortfalls of these studies.

2.4.2 Challenges faced by female holder farmers

Asafo-Adjei and Buabeng (2016) adopted the quantitative research approach to evaluate the challenges that confront smallholder farmers in the Aowin Suaman District in the Western Region of Ghana. The authors used simple random sampling techniques to select 381 respondents from 7 farming communities within the study area. The study made use of a semi-structured questionnaire to collect data from the respondents. The authors made use of descriptive statistics to analyze the data with the help of SPSS. The study found that smallholder farmers face several challenges such as ranging from technological, managerial,

health, marketing and extension services. The study was very interesting and educative; however, the use of the quantitative approach may hinder the authors' ability to obtain respondents' in-depth knowledge of the phenomenon under study.

In their study, Demi and Sicchia (2021) focused on health challenges that arise from the use of agrochemicals among smallholder farmers in Ghana. The authors made use of the mixed method research approach where quantitative and qualitative data were collected. Both purposive and simple random sampling techniques were employed to select 136 smallholder farmers to participate in the study. Data for the study was gathered from primary and secondary sources. The primary data for the study was gathered through a survey, in-depth interviews, workshops, observation and focus group discussions. The authors used NVivo and SPSS software to analyze the qualitative and quantitative data respectively. The study found that the use of agrochemicals poses a greater threat to the health of smallholder farmers. The study was comprehensive and very educative. However, the authors did not review any theory to support their study.

Also, Agholor and Nkosi (2020) studied the challenges faced by smallholder farmers in sustainable water conservation among smallholder farmers in Enyimba Ermelo Mpumalanga Province, South Africa. The author made use of a questionnaire to gather primary data from 100 smallholder households. Descriptive statistics was adopted to analyze the data with the aid of SPSS. The study found that inadequate governmental policies, insufficient technical guidelines, inadequate knowledge of water conservation practices and financial constraints are the major factors that influence sustainable water conservation among smallholder farmers in South Africa. The study was very interesting and educative. However, the authors did not

review any theory to support their study. Also, the use of the only quantitative approach in the study can limit the findings of the study in the sense that, the author could not probe to further gain an in-depth understanding of the responses from the participants.

Moreover, Odoyo et al. (2019) concentrated on the challenges posed by climate change on peri-urban smallholder farmers in Kenya. The study made use of both primary and secondary data. The primary data was collected from 33 respondents who were selected through simple random sampling. The study made use of a semi-structured questionnaire as a data collection instrument. Descriptive statistics were used to analyse the data with the aid of SPSS version 20. The study found that the phenomenon of climate change impedes female smallholder farmers' productivity. The study found that smallholder farmers respond to climate change through the adoption of irrigational schemes. However, there are few and poor irrigational schemes provided for female smallholder farmers. The study was very educative and interesting. However, the sample size is relatively small to make room for effective generalization of findings. Moreover, the authors did support their study with any theory.

Simonyan et al. (2021) studied the factors that influence smallholder farmers' access to credit in Akwa Ibom State, Nigeria. The authors used a multistage sampling technique to select the study area and 120 respondents who participated in the study. The study collected data from both primary and secondary sources. The primary data was collected with the aid of a semi-structured questionnaire. Descriptive statistics were used to analyze the data with the help of SPSS. The study found that factors such as age, lack of collateral and educational level of farmers influenced the accessibility of credit among smallholder farmers. The study was interesting and educative. However, the authors did not review any theory to support their

study. Also, the use of a quantitative approach may hinder the authors' ability to obtain in-depth knowledge to provide a better understanding of the phenomenon under study.

Harvey et al., (2018) focused on the challenges of climate change and adaptation strategies among smallholder farmers in Central America. The study made use of the simple random sampling technique to sample 860 smallholder farmers from across six Central American landscapes (i.e., Turrialba and Los Santos in Costa Rica, Choluteca and Yoro in Honduras, and Chiquimula and Acatenango in Guatemala). The study made use of both primary and secondary data. The primary data was gathered with the use of a questionnaire. The study employed descriptive statistics to analyze the data. The study found that climate change has a severe impact on the productivity of smallholder farmers. It was also discovered that smallholder farmers do not have access to robust adaptation strategies. The study was interesting and educative. However, the authors did not underpin their study with any theory.

Ceballos et al. (2020) concentrated on the Impacts of a national lockdown on the income and food security of smallholder farmers in India. The study made use of both primary and secondary data. The authors' primary data was collected from 1275 respondents through phone surveys. The study found that the COVID-19 Pandemic negatively affected the income of smallholder farmers. It was revealed that the pandemic caused an increment in the cost of farm labour and a reduction in market opportunities. The study was interesting and educative. However, the gathering of data through phone surveys may hinder the quality of findings because the authors may be denied the opportunity of field observation.

Kanagavalli and Manida (2020) explored the challenges and opportunities to improve the livelihoods of smallholder farmers in Tami land. The study made use of secondary data. the

data was obtained from published articles in Journals, chapters in books, government records, newspapers and magazines. The authors found that smallholder farmers face challenges such as unstable prices of farm produce, poor road networks and transport systems, use of traditional farming tools and approaches, climate change and inadequate labour supply. The study was educative. However, the use of secondary data does not generate new findings, since it depends on the findings of other studies.

2.4.3 Policies and measures to assist smallholder farmers

Herrera et al. (2018) focused on the influence of rural public policies on smallholder farming in Brazil. The study made use of secondary data. The data for the study was obtained from the Ministry of Agrarian Development (MDA) between 2014 and 2018 in Brazil. The study found that short-term rural policies that sort to improve smallholder farming attained some level of success compared to longer-term policies. The study was very interesting and educative. However, the use of secondary data does not promote the generation of new findings since it relies on previous findings. Also, the study was not supported by any theory.

In their study, Ankrah et al. (2021) made use of the mixed method approach to explore agricultural insurance access and acceptability among smallholder farmers in Ghana. A multistage sampling technique was adopted for this study. The authors purposively sampled 200 research participants. The study made use of both primary and secondary data. The authors made use of a questionnaire consisting of both closed and open-ended questions to solicit quantitative data and qualitative data for the study. Qualitative data was analyzed through inductive and deductive approaches while descriptive statistics were used to analyze the quantitative data with the aid of SPSS. The study found that most of the smallholder

farmers who participated in the study had a good perception of an agricultural insurance policy. However, few of them had acquired an insurance policy. The authors indicated that the gap between acceptability and accessibility of insurance among smallholder farmers could be caused by factors such as a lack of knowledge about agricultural insurance, lack of trust in insurance companies and unavailability of insurance companies within the study area. The study was very comprehensive and educative. However, the authors did not relate their findings to other existing works.

Chikuni and Kilima (2019) used the mixed method approach to explore the use of a mobile phone to improve market information services of smallholder farmers in Lilongwe, Malawi. The study used a multistage sampling technique to sample the study area and the research participants. The authors systematically sampled 196 respondents to participate in the study. Quantitative data was obtained with the use of a structured questionnaire, while qualitative data was gathered with the aid of an interview guide through focus group discussion. Descriptive statistics were used to analyze the data with the help of STATA version 14. The study revealed that mobile phone-based information services can help improve the market participation of smallholder farmers. The study was comprehensive and educative. However, the authors did not underpin their study with any theory.

Pabi et al. (2019) explored the adaptive strategies to assist smallholder farmers in adapting to climate conditions in the Kogyae Strict Nature Reserve within the Forest Savanna Transitional Zone of Ghana. The authors used a purposive sampling technique to select 100 respondents to take part in this study. The study made use of both primary and secondary data. The study used a questionnaire as the data collection instrument. The primary data was

collected through a one-on-one interview with respondents, key informants, focus group discussion and field observations. Descriptive statistics were used to analyze quantitative data while qualitative data was analyzed through inductive and deductive approaches. The study found that the agricultural ministry has not contributed much to assist smallholder farmers in adapting to climate change conditions. The study was very educative and interesting. Nevertheless, the authors did not underpin their study with any theory.

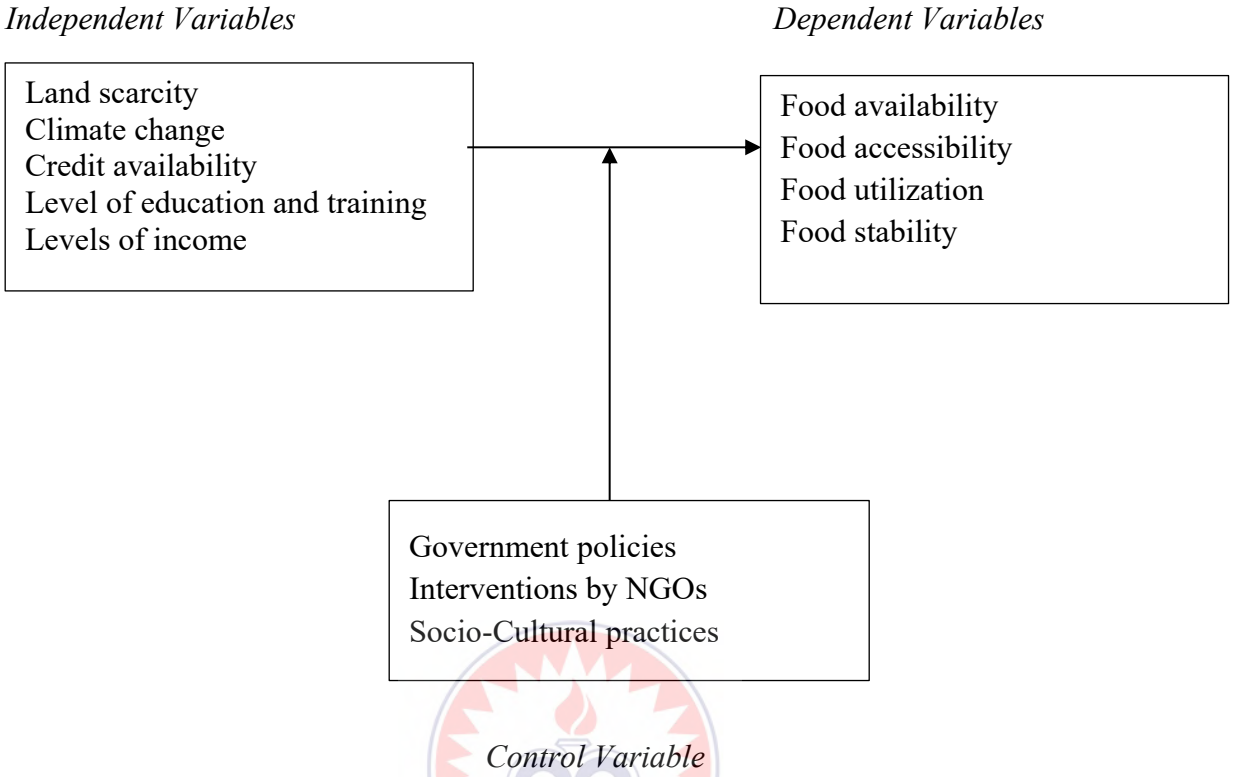
Abokyi et al. (2020) explored how the output price support policy improves the income of smallholder farmers in Ghana. The study used the descriptive design and the quantitative approach. The authors used the stratified random sampling technique to sample 507 smallholder farmers from five districts (i.e., Nkoranza South, Nkoranza North, Ejura Sekyere, Kajebi, and Jasikan) to participate in the study. the authors solicited primary data from respondents with the aid of a questionnaire and field observation. Descriptive statistics were used to analyze the data from respondents with the aid of SPSS. The study found that price support policy such as the Ghana buffer stock operation positively affects the income levels of smallholder farmers. It was also obtained that factors such as age, gender, access to the market and road transport are the main factors that influence the participation of smallholder farmers in the buffer stock operation. The study further revealed that the buffer stock operation policy in Ghana has not given maximum attention to smallholder farmers. The study was very interesting and educative. However, the adoption of the quantitative approach may deny the authors the opportunity to obtain in-depth knowledge of the phenomenon under study.

Andani et al. (2020) assessed the effectiveness of the fertilizer subsidy policy on the productivity of maize smallholder farmers in North-Eastern Ghana. the study made use of a multi-stage sampling technique to select the study area and research participants. A total of 150 respondents participated in the study. The authors made use of primary and secondary data. The primary data was collected with the aid of a structured questionnaire. Descriptive statistics were employed to analyze the data with the aid of SPSS. The study found that the subsidized fertilizer policy has a positive impact on the productivity of maize farmers. It also discovered factors such as education, access to media and the nativity status of farmers influence farmers' access to subsidized. The study was educative and interesting. However, the study made use of the quantitative approach which may hinder the authors' ability to gain in-depth knowledge of the phenomenon under study.

2.5 Conceptual Framework

Based on the review of theories, concepts and empirical studies, the author develops this conceptual framework to guide the study.

Figure 1: Conceptual Framework



***Source**: Author's construct*

From Figure 1, the challenges that impede female smallholder farmers in the production and consumption of food are categorized as independent variables. The study conceptualizes that these challenges may have a direct influence on the components of food security; which are also categorized as dependent variables. Thus, the attainment of the components of food security is dependent on the factors that influence the production of food crops and food consumption. However, the policies and measures developed by the government and non-governmental organizations as well as socio-cultural practices will determine the direction and extent to which the independent variables will influence the dependent variables.

2.6 Conclusion

This chapter focused on the discussion of related literature relevant to this study. The chapter elaborated on the theory that underpins this study. It also considered the various approaches that seek to integrate women into the development process. The chapter further presented issues of global food security and the relevance of the agricultural sector and female smallholder farming in achieving food security. Moreover, the chapter presented the conceptual framework that guides the study. The next chapter focuses on the research methodology of this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

This chapter gives an overview of the research paradigm and methods that guide this study. The chapter gives a brief description of the research sites and the research design. The chapter also considers the research approach, types of data, population, sampling procedure, the instrument of data collection and procedure for data analysis.

3.1 Research Site

The researcher purposively sampled the Bosome Freho and the Saboba districts as the research sites because they offer suitable characteristics and conditions under which the phenomenon in question could be investigated to achieve the objectives of this study.

3.1.1 The Bosome Freho District

The Bosome Freho district is part of the 30 administrative districts in the Ashanti region of Ghana. The land and soil condition in the district is suitable for the cultivation of crops such as food crops, citrus, oil palm and cocoa (GSS, 2012). The major crops produced in the district include cocoa, citrus oil palm and food crops such as plantain, cocoyam, maize, rice and cassava. The district is also noted for the production of vegetable crops such as garden eggs, pepper, cabbage, and tomatoes (GSS, 2012). Some farmers in the district are also engaged in the rearing of livestock such as poultry, goats, sheep, cattle and pigs. The 2010 Population and Housing Census identified that the district has a total population of 60,397 (GSS, 2012). Females represent 50.7 per cent of the entire population in the district. Agriculture remains the main occupation for the population in the district (GSS, 2012). The

agricultural sector employs about 78% of the entire population. There are more females engaged in agricultural production than males in the district (GSS, 2012).

3.1.2 The Saboba District

The Saboba District with an estimated population of 65706 is located in the northern region of Ghana. The population consists of 32,320 males and 33,386 females represented by 49.2% and 50.8% respectively (GSS, 2012). The vegetation cover of the district is dominantly guinea savanna with shrubs and short trees. The soil type in the district is mainly clayey. Livestock such as goats, cattle and sheep are commonly reared in the district. The people are also engaged in the rearing of small scales poultry birds such as fowls, guinea fowls and turkeys (GSS, 2012). According to the Ghana Statistical Service 2010 population and housing census report, 88.9% of the total population is engaged in agriculture, fishing and forestry. The report further indicated that an estimated 12, 043 females and 11, 144 males in the district are engaged in agriculture. This shows that there are more females in agriculture than males. The common crops produced in the district include rice, soya bean, maize and groundnut (GSS, 2012).

The selection of the Bosome Freho and Saboba districts in this study was influenced by two major factors; geographical and socioeconomic diversity and representativeness. The Bosome Freho and Saboba Districts are both located in Ghana, but they have very different geographical and socioeconomic characteristics. Bosome Freho is located in the Ashanti Region and is a relatively wealthy district with good access to infrastructure and markets (GSS, 2021). Saboba, on the other hand, is located in the Northern Region and is one of the poorest districts in Ghana (GSS, 2021). It has limited access to infrastructure and markets and is more vulnerable to climate change (GSS, 2021). Despite their differences, both

districts are important agricultural producers, and female smallholder farmers play a significant role in their economies (MoFA, 2021). In Bosome Freho, female farmers account for over 50% of the agricultural workforce and produce a wide range of crops, including cocoa, cassava, and vegetables (MoFA, 2021). In Saboba, female farmers account for over 60% of the agricultural workforce and produce mainly cereals, such as millet and sorghum (MoFA, 2021). This provides evidence that the Bosome Freho and Saboba Districts are good choices for a study on the role of female smallholder farmers in achieving food security in Ghana.

Studying the role of female smallholder farmers in both districts would provide insights into the challenges faced by female farmers in different types of agricultural districts. This information could be used to develop more effective policies and programs to support female farmers in all types of agricultural districts in Ghana.

3.2 Research Philosophy

A philosophical worldview refers to the system of beliefs and assumptions that guides or explains how knowledge should be developed (Holden and Lynch, 2004). It comprises the processes and procedures that guide the development of knowledge (Creswell, 2009). It defines the process to follow when conducting research in a particular field. Research philosophy comprises the assumptions about human knowledge and the realities the researcher may encounter while conducting research (Holden and Lynch, 2004). Moreover, research philosophy deals with the extent to which the values and beliefs of the researcher can influence the process of developing knowledge (Creswell, 2009). Research philosophy comprises the assumptions that shape how the researcher understands the research questions, the method to use findings solutions to the research questions and how the

researcher will explain the research findings (Ryan, 2018). Philosophical worldviews may include pragmatism, positivism and interpretivism.

This study follows the pragmatic research paradigm. The pragmatics research paradigm mainly deals with the idea of "what works". Pragmatism is concerned with providing solutions to problems in the real world rather than being built on assumptions about the nature of knowledge (Creswell, 2014). This means that pragmatism leads to "action-oriented" research procedures (Cameron, 2011).

The pragmatic philosophical worldview has been criticized for giving too much attention to epistemology and ontology and neglecting ontological issues (Pratt, 2016). However, the ontological position of the pragmatic worldview could be described as intersubjective (Morgan, 2007). Thus, pragmatics views the world subjectively and objectively at the time. Pragmatism accepts that there is the existence of multiple realities and that individuals have multiple or diverse interpretations of reality (Maarouf, 2019). Saunders et al. (2009) mentioned that pragmatism implies that reality is external and multiple at the same time and that a researcher chooses the view best serves his research purposes. The pragmatist needs to understand both the subjective and objective views of reality (Johnson and Christensen, 2012).

Epistemologically, the pragmatic research paradigm is underpinned by the assumption that knowledge is acquired through experience. The perceptions of the individual are influenced by social experiences. Thus, pragmatics argues that each individual has unique knowledge which is created by unique experiences. The pragmatist, therefore, sees all knowledge as social knowledge (Morgan, 2014).

The pragmatic philosophical worldview holds that it is practically unrealistic to choose between one position and another. The pragmatic researcher is of the view that knowledge could be obtained through the use of mixed methods (Johnson and Onwuegbuzie, 2004). Thus, there is no one best way to obtain knowledge. In the view of the pragmatist, the best determinant of which position to adopt in research is the problem or the questions to which the research seeks to find answers (Creswell & Plano Clark, 2011). The pragmatic researcher is free to select the suitable technique that solves the research problem (Rahi, 2017).

Many writers such as Tashakakori and Teddlie (1998), Morgan (2007), and Patton (1990) laud the pragmatist approach to research for its focus on the research problem and the deployment of all methods and strategies possible to help understand the problem in social sciences. Thus, it is an approach that favours mixed-methods employment in information gathering and data collection and analysis to derive knowledge and provide appropriate understanding and explanation about the problem of study. The strength of using the pragmatist paradigm in this thesis was that it enabled the researcher to adopt the needed approach in gathering relevant data as and when necessary to provide answers to the research questions and to meet the objectives of this study.

3.3 Research Approach

The study made use of the concurrent mixed method approach. Mixed methods research is a procedure for collecting, analyzing and mixing or integrating both quantitative and qualitative data at some stage of the research process within a single study (Creswell & Plano Clark, 2011). The concurrent mixed method approach is an approach used in mixed-method research in which data for the study are collected simultaneously. The concurrent

mixed method approach gives priority and considers either the quantitative or qualitative data to be dominant. The dominant approach is assumed to guide the study while the other approach is embedded (Gunasekare, 2018)

In this study, both quantitative and qualitative data were collected concurrently. However, priority was given to the quantitative data whilst the qualitative data was collected in cases where the researcher needed further details to support or further explain the quantitative data.

Qualitative data tends to be open-ended without predetermined responses while quantitative data always includes closed-ended responses such as those found on questionnaire instruments (Creswell, 2014). A mixed methods approach was employed because it helps to resolve the limitation of using a single method approach to understand the research problem.

3.4 Research Design

The cross-sectional descriptive research design and comparative design were adopted for this study. The descriptive is a research method used to study the characteristics of individuals, entities, and groups of people or a particular phenomenon (Devi, 2020). It is used to study and narrates the way things are. The descriptive design is suitable for studying the conditions and relationships that exist such as determining the nature of prevailing conditions, practices, attitudes, opinions that are held and processes that are ongoing or trends that are developed (Yin, 2018). The descriptive design was used in this study to explore the prevailing food security condition of female smallholder farmers and how they are contributing to the attainment of food security by gathering data that provided answers to questions about the entities and phenomena in this study.

A comparative research design is adopted when the researcher seeks to compare the relations or draw a conclusion between two groups (Richardson, 2018). Comparative design helps to gain an understanding of how the differences in culture and societies influence events (Richardson, 2018). The comparative design was used in this study because it helped the researcher to understand the differences that exist between female smallholder farmers in the Bosome Freho district and the Saboba district.

3.5 Research Population

Research population refers to a group, association, organization or any entity about which the researcher wants or seeks to study. The research population classifies the principal group with which the research is concerned (Casteel and Bridier, 2021). The population of research refers to the group of people or entities to whom the findings and outcome of the study will be applied (Shukla, 2020). The population of the study could be determined by the objectives which the research seeks to attain (Shukla, 2020). Asiamah et al. (2017) asserted that it is significant for the researcher to properly define the population of the research. This is because the population is a major factor that determines the credibility of the research findings. This research employed female smallholder farmers as the population for the study. The study also targeted officials from Local government officials, Non-Governmental Agencies and development stakeholders from whom relevant data were needed for the study.

3.6 Sampling Technique

Probability and non-probability sampling techniques were employed in selecting the participants for the study. With the probability sampling technique, the researcher used a simple random sampling procedure to select the required sample size of female smallholder

farmers who participated in this study. To initiate the process, the researcher wrote down the house numbers of all female smallholder farmers on individual pieces of paper. These numbers served as the key identifiers for the selection process. The researcher then folded each piece of paper, ensuring that the house numbers were concealed, and placed them into a hat or other suitable container. The researcher ensured that the folded pieces of paper were thoroughly mixed within the container, guaranteeing that they were well-shuffled to maintain the randomness of the selection. With the container of folded pieces of paper, the researcher blindly drew out several pieces equal to the desired sample size for each community. These selected house numbers represent the female smallholder farmers who participated in the study. This process ensured an unbiased and representative sample for the research. Once the researcher had selected the female smallholder farmers to participate in the study, the researcher then visited their houses and followed the steps outlined in section 3.10 to obtain their consent and administered the survey questionnaire or interviewed the female smallholder farmers.

Similarly, Daudu et al. (2019) used the simple random sampling technique to select respondents in their study on the diversification of food crops among female and male smallholder farmers in Kwara State, Nigeria. The simple random technique was used in this study because it offered each female smallholder farmer an equal opportunity to participate in the study. In the case of non-probability sampling, the researcher relied on the purposive sampling technique. According to Taherdoost (2016), purposive sampling is a technique used to intentionally choose particular entities, individuals or settings from whom or where specific relevant data can be obtained. In this regard, the researcher purposively sampled the Bosome Freho and Sabobo Districts as the sites for this study. These two districts were

selected because they exhibited the qualities within which the phenomenon in question could be studied and the objectives of this study to be achieved. Also, the purposive sampling technique was used to select the heads of the agricultural departments of the two districts, four operations managers of four non-governmental organizations and two assembly men from the two districts. The study selected these individuals to participate in the study because the researcher was of the view that these individuals possess adequate knowledge that would be relevant to the objectives of the study or would provide answers to the questions posed by the study.

3.7 Sample Size

It is useful for researchers to reduce the size of the population to a manageable size that will facilitate field data collection (Chanuan, et al., 2021). The sample size for a particular study can be determined by using criteria, calculation formulas, tables and computer tools (Israel, 2013). To determine a suitable sample for this study, the researcher undertook documentary research to ascertain the criterion needed to determine the correct sample size. The data obtained from the agricultural departments of the Bosome Freho district assembly and the Soboba district assembly indicated that there were 10,437 and 10,995 female smallholder farmers in Bosome Freho and Saboba districts respectively. Based on these findings, the researcher employed the Yamane (1967) sample size determination formulae to determine the sample size for this study.

Using the Yamane (1967) formulae $n = \frac{N}{1+N(e)^2}$,

Where;

n = sample size, =?

N = Total population = 10,437 + 10,995 = 21432

The researcher seeks to attain a confidence level of 95%, assume a level of precision, P=0.05

$$n = \frac{21432}{1+21432(0.05)^2}, \qquad n = 392$$

Following the calculation above, the researcher selected a sample size of 392 female smallholder farmers for the two districts. According to Kumar et al. (2020), the sample size for a study can be determined by referring to the guidelines, methodologies and experiences of past researchers. Israel (1992) also indicated that a researcher can make use of a similar sample size as used by previous studies that are related to the current study. Consequently, an equal number of 196 respondents were selected from the Bosome Freho and Saboba districts for this study. The researcher selected an equal number of respondents to enhance fairness in the comparison of the results between the two districts. In the same way, Huges et al. (2021) selected an equal number of respondents (i.e., 120) from the nine districts that participated in their study on pesticide use and health impacts on farmers in Thailand, Vietnam, and Lao PDR. Similarly, Shaibu et al. (2020) sampled an equal number of respondents (i.e., 100) each from the Nandom and Lawra districts in their comparative study on the vulnerability of smallholder livestock farmers to climate change in North-West Ghana. Moreover, Gurumoorthy (2020) selected an equal number (i.e., 150) of each organic and inorganic farmer in his study on farmers' notion towards the creation of a casteless society in Tamil Nadu, India. Thus following the principles of these studies, it was appropriate for this current study to select an equal number of respondents from the two districts.

The study also selected 8 participants who were key informants from the department of food and agriculture in the districts, district assemblies and Non-Governmental Organizations

based on the judgment of the researcher. A total of 400 sample size was employed for this study.

3.8 Sources of Data

Data for the study were gathered from both primary and secondary sources. The primary data used in this study comprised the first-hand data collected by the researcher in the Bosome Freho and Saboba districts for this study. The primary data was gathered through face-to-face interviews with respondents as well as field observations made by the researcher. The secondary data used in this study refers to the data that existed before the current research was undertaken. Secondary data consist of the finding of previous studies. The secondary data for this study was sourced from journals in articles, books, government and institutional publications and newspapers. The combination of both primary and secondary sources of data helped the researcher to gather comprehensive data to meet the objectives of the study.

3.9 Instrument for Data Collection

The researcher used a questionnaire as an instrument for data collection. A questionnaire refers to a list of questions purposively designed to solicit the responses of the respondents about a particular phenomenon. The use of the questionnaire provided is regarded as the major means for collecting data for the study (Roopa and Rani, 2017) questionnaire serves as the major means through which primary data is obtained. The questionnaire was made up of close-ended and open-ended questions which provided both quantitative and qualitative data as both joined help to produce useful data for social research (Roulston, 2019). Open-ended questions were used to solicit responses where the researcher thought detailed

responses could add deeper knowledge. Likewise, close-ended questions were used where the researcher had little prior knowledge of the conceivable responses (Payne, 2014).

The questionnaire was divided into four sections. Section I gathered data about the demographic characteristics of respondents. Section II comprised question items that sought to explore the situation of food security among female smallholder farmers. The questionnaire items under this section were patterned after a four-point Likert Scale. Moreover, the questionnaire items under section II were adapted from Coates et al. (2007). Section III obtained data on the challenges faced by female smallholder farmers in food production and consumption. Section IV which contained the last set of question items sought to explore the existing policies and measures that sought to empower female smallholder farmers to improve food production and consumption in the two districts. The use of a questionnaire made it relatively easier to deal with a large sample since a large sample was needed for meaningful comparisons and conclusions. With the fieldwork, the researcher observed farming activities and farming tools used by some female smallholder farmers.

3.10 Data Collection Procedure

The researcher obtained a letter of introduction from the department of political science, University of Education, Winneba, before going to the field to gather data for this study. The introductory letter was presented to the participants before the questionnaire was administered. This was done to assure respondents of the trustworthiness and credibility of the researcher.

The researcher gathered the data primary data for this study by administering questionnaires to respondents. Data from female smallholder farmers were gathered by administering questionnaires to smallholder female farmers in their houses. The researcher also observed the activities of female farmers on their farms. The researcher also administered questionnaires to officials who participated in this study at their respective offices. The questionnaire was administered in twelve communities across the two districts. The communities selected in the Bosome Freho District included Asiwa, Nsuta, Anyenase, Adeito, Nsuem No. 1, and Yapesa. Also, the communities in the Saboba district were Telengbeni, Dicheeni, Dokondo, Kiteek, Boagbaln, and N'nikondo. The researcher sought the permission of community leaders before administering questionnaires

The researcher explained the purpose and significance of the study to participants and sought their consent before the questionnaire was administered. The participants were made aware that participation in the study is voluntary and they could opt out of the study any time they wish to do so. The participants were edged to respond to the questions in the presence of the researcher. This ensured that most of the questionnaires were responded to. Participants were given enough space and privacy to freely respond to the questionnaires. However, the researcher explained the items on the questionnaire to participants who could read and understand the English language. The researcher also employed a research assistant who helped in translating the language for the researcher in instances where there was a language barrier between the participants and the respondents. The research assistant was trained by the researcher on how to interpret the language of respondents.

3.11 Data Analysis

The researcher used the quantitative-dominant mixed analysis to analyze the data collected for the study. Mixed method analysis is said to be quantitative dominant if the researcher places a higher priority on the quantitative component of the study (Gunasekare, 2018). Both quantitative and qualitative data were analyzed concurrently in this study. The researcher gave priority to the quantitative data while the qualitative data were analyzed to provide a better understanding of the quantitative data. The data was analyzed based on the items of the questionnaire developed for this study. Descriptive statistics (i.e., means, frequencies, percentages) were employed in analyzing the data with the help of IBM SPSS. Descriptive crosstabulation was used to compare the data from the two districts. The results were presented in simple statistical illustrations such as frequency, mean, standard deviations and percentages from which inferences were made.

The study used the average score of responses, as prescribed by FANTA (2003) to determine the food security levels of respondents. The study calculated the total HFIAS score by summing the scores for their responses to the HFIAS questions. The total score reflects the overall level of food insecurity experienced by the household over the past month. The study calculated the average HFIAS score for each respondent by finding the mean of the total scores. This involves adding up all the individual total scores and dividing by the total number of questionnaire items (i.e., 9). An average HFIAS score between 1 and 1.49 indicates High Food Security. This category represents households with stable access to an adequate and diverse food supply, experiencing little to no food insecurity. An average HFIAS score between 1.5 and 2.49 corresponds to Moderate Food Security. Households in this category generally have consistent access to food but may occasionally face mild to

moderate food insecurity issues, such as uncertainty in food supply or limited dietary diversity. An average HFIAS score between 2.5 and 3.49 signifies Low Food Security. Households falling into this category experience more pronounced food insecurity, with limited access to an adequate and diverse food supply. They may need interventions to improve their food security. An average HFIAS score between 3.5 and 4.0 represents Very Low Food Security. Households in this category face severe food insecurity, struggling to access and afford enough food. They likely experience irregular meals, and inadequate dietary diversity, and may employ various coping strategies to address food shortage.

3.12 Validity of Research Instrument

Validity refers to the rate at which the collected data epitomizes the actual phenomenon that the research seeks to investigate. Validity measures the accuracy of the collected data against the reality of the phenomenon. Validity is important in the scientific study because it determines the appropriateness of the inferences and conclusions made from the findings of a study.

The researcher ensured the validity of the questionnaire by piloting the research instruments. A pilot study refers to the small-sized version of a larger study that is undertaken to detect possible errors, problems and viability of the research instruments. The pilot study is undertaken in preparation for the main study. The research instrument was piloted on ten female smallholder farmers within the Bosome Freho district. The researcher reflected on the pilot study and made the necessary corrections to the study instrument which helped to meet the objectives of the study. Also, the researcher ensured the validity of the research instrument by presenting the questionnaire to a senior researcher and supervisor who made appropriate suggestions and contributions to the questionnaire.

3.13 Ethical Consideration

According to Arifin (2018), it is significant for the researcher to protect the participants of any study by observing proper ethics that guide scientific research. Because of this, the researcher observed ethical issues by obtaining the informed consent of respondents before administering the questionnaire. The researcher also assured participants of the anonymity and confidentiality of the data they provided. The researcher explained the purpose of the study in the local language for a respondent who could not read and understand the English language before the questionnaire was administered. The respondents were made aware that participation in the study was voluntary, and they were free to withdraw should they so wish. Moreover, all articles, books, and publications consulted in this study have been duly acknowledged.

3.14 Conclusion

This chapter discussed the methodological approach that was used for conducting this research. The chapter looked at the research design and approach, types of data, population, and sampling procedure, research instrument, data collection procedure and a procedure for data analysis. The chapter also discussed the demographic background of the research sites. The next chapter will focus on the data presentation, analysis and discussion.

CHAPTER FOUR

PRESENTATION OF DATA, ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter focuses on the presentation of data, analysis and discussions of study findings. The chapter is divided into four main sections. The first section will focus on the presentation of data on the demographic characteristics of respondents. Section two discusses data on the situation of food security among smallholder female farmers. Section three focuses on the discussion of findings on the challenges faced by smallholder farmers in the production of food while section four presents data on the measures implemented by various entities to empower female smallholder farmers.

4.1 Demographic Characteristics of Respondents

The demographic characteristics of respondents sought to obtain personal information about respondents that would be relevant to this study. The characteristics of respondents that were obtained in this section include age, educational level, marital status, the main purpose of production, income, and membership in a farming association. The data obtained are presented below.

4.1.1 Age of respondents

The age of respondents used in this study refers to the total number of years spent by the respondents on earth at the time of data collection. The age of respondents was relevant to this study because it could influence the accessibility and ownership of land which is the key factor in agricultural production (Gong and Elahi, 2022). The ages were categorized into 18-

25, 26-35, 36-45, 46-60 and above 60 years. The data obtained on the ages of the respondents is presented in Table 1.

Table 1: Age of respondents

	Age category					
	18-25	26-35	36-45	46-60	above 60	Total
Bosome Freho	11 5.6%	37 18.9%	52 26.5%	80 40.8%	16 8.2%	196 100.0%
Saboba	17 8.7%	43 21.9%	65 33.2%	50 25.5%	21 10.7%	196 100.0%
Total	28 7.1%	80 20.4%	117 29.8%	130 33.2%	37 9.4%	392 100.0%

Source: Field data (2022)

From Table 1, it is observed that 7.1% of the total respondents were within the age category of 18-25. The table further shows that 5.6% of the respondents from the Bosome Freho District were between the ages of 18 and 25 whilst 8.7% of the respondents from the Saboba district were within the same age category. Also, 20.4% of the total female smallholder farmers who participated in the study were between the ages of 26-35. The data shows that 18.9% of the respondents within this age category were from the Bosome Freho district while 21.9% were from the Saboba district. The comparison of the percentage of respondents from the two districts who are between the ages of 18-25 and 26-35 shows that younger females are involved in smallholder farming in the Saboba district than in the Bosome Freho district. Moreover, Table 1 shows that 29.8 of the respondents were between the ages of 35-45. The data shows that 26.5% and 33.2% of the respondents in this age category were from the Bosome Freho and Saboba districts respectively. It is shown that 40.8% of female smallholder farmers from the Bosome Freho who participated in this study were between the ages of 46-60. Also, 25.5% of the respondents from the Saboba district

were within this same age category. Table 1 further revealed that 9.4% of the respondents were above 60 years old. 8.2% and 10.7% were from the Bosome Freho and the Saboba districts respectively.

It could be observed that the least of the respondents from the two districts were between the ages of 18 and 25. This phenomenon could be attributed to the observation made by Zheng et al. (2022) who found that individuals within this age category are usually pursuing their education, hence, they do not actively engage in economic activity. However, Muthoni (2017) also noted that most of the people within this age category do not find the agricultural sector attractive as a result they venture into other economic activities aside from farming. For example, a study by Kvartiuk et al. (2020) found that most of the youth who are pursuing agricultural studies in Russian universities do not want to stay in rural areas or be engaged in farming. Moreover, Rao et al. (2019) opined that age is recognized as an important social factor that influences the extent of access and ownership of land in most farming societies. Thus, few younger females are involved in smallholder farming because they may lack ownership and access to land which is the principal factor of agricultural production due to age constraints.

The results presented in Table 1 further show that more older females are engaged in smallholder farming in the Bosome Freho district compared to the Saboba district. Table 1 further shows that the majority of the respondents from both districts, represented by 33.2%, were within the age category of 46-60. This is in consonant with the observation by the Ministry of Food and Agriculture (2013) which indicated that the average age of a Ghanaian farmer is estimated to be 55 years. Maltitz and Bahta (2021) also found that the average age of female smallholder farmers who participated in their study in the Northern Cape

Province, South Africa, was 51 years. A similar observation was made by Appiah and Guodaar (2021) who found that the majority of the smallholder farmers who participated in their study, in the Offinso Municipality were between the ages of 46 and 60. Thus, the population of female smallholder farmers that participated in this study could be classified as an ageing population. Ubisi et al. (2017) also indicated that smallholder farming in rural areas in Limpopo, South Africa is dominated by older women.

4.1.2 Educational level of respondents

The educational level respondents sought to gather data on the highest level of formal education attained by the respondents in this study. The educational level of respondents was included in the study because it could determine the level of food security among female smallholder farmers and farming practices such as the adoption of technology and climate adaptation strategies such as the adoption of female smallholder farmers face in food production (Mwangi et al., 2020). The educational level of respondents was categorized as; No level of formal education, Basic education (i.e., primary, MSLC, JSS, JHS), O/A Level/SHS/Voc./Tec. and Tertiary Education (Diploma, HND, Degree, Master, PhD). The data obtained on the educational level of respondents obtained by the study are presented in Table 2.

Table 2: Educational level of respondents

	Educational Levels				
Districts	No school	Basic Education	O/A Level/SSS/SHS/Voc/Tec.	Tertiary	Total
Bosome Freho	108	71	12	5	196
	55.1%	36.2%	6.1%	2.6%	100.0%
Saboba	142	31	16	7	196
	72.4%	15.8%	8.2%	3.6%	100.0%
Total	250	102	28	13	392
	63.8%	25.8%	7.1%	3.3%	100.0%

Source: Field data (2022)

From Table 2, it could be observed that the majority of the respondents, represented by 63.8% have attained no level of formal education. Table 2 shows that more than half of the respondents from each district (i.e., 55.1% and 72.4% of the respondents from the Bosome Freho and Saboba respectfully), have not attained any level of formal education. Table 1 also reveals that 32.4% of the respondents have attained basic education. The data shows that 36.2% of respondents from the Bosome Freho District have attained basic education while 28.6 of the respondents from the Saboba district have attained basic education. Also, a total of 28 out of the 392 respondents from the two districts have attained O/A Level/SSS/SHS/Voc./Tec. education. Table 2 shows that 2% more respondents from the Saboba district have attained O/A Level/SSS/SHS/Voc./Tec. education than the respondents from the Bosome Freho district. Furthermore, Table 2 shows that 3.8% of the respondents have tertiary education. It could be observed that 2.6% of the respondents from the Bosome Freho had attained tertiary education while 5.1% of the respondents from Saboba had attained tertiary education.

The findings affirm what was observed by Ragsdale et al. (2022) who indicated that the majority of 89.9% of female smallholder farmers who participated in their study were not

educated. However, this finding does not agree with what was discovered by Ankra et al. (2020) who found that the majority of the female smallholder farmers who participated in their study had attained primary education. The researcher observed that the respondents who attained tertiary education were government workers such as teachers and nurses who were engaged in smallholder farming as a complement to their professional careers.

4.1.3 Marital status of respondents

Marital status is a major factor that determines the ownership and accessibility of farmlands by females in most African traditional societies. Marital status can also determine the farming roles and functions performed by females (Lawson et al., 2020). The study, therefore, sought to assess the marital status of female smallholder farmers who participated in this study. The marital status of respondents was categorized into never married, currently married, widowed and separated. This characteristic of the respondents is relevant to this study because it can influence the ownership of resources such as land in the community. The data obtained are presented in Table 3 below.

Table 3: Marital status of respondents

	Marital status				
Districts	Currently married	Never married	Separated	Widowed	Total
Bosome Freho	148	16	20	12	196
	75.5%	8.2%	10.2%	6.1%	100.0%
Saboba	164	14	7	11	196
	83.7%	7.1%	3.6%	5.6%	100.0%
Total	312	30	27	23	392
	79.6%	7.7%	6.9%	5.9%	100.0%

Source: Field data (2022)

From Table 3, a majority of 79.6% of them were currently married. The data shows that 75.5% and 83.7% of the respondents from the Bosome Freho and Saboba districts respectively, were married. Table 3 further shows that 7.7% of the respondents from both districts had never married. It could be observed that 8.2% of the respondents from the Bosome Freho and 7.1% from the Saboba district had never married. Moreover, the Table shows that 6.9% of the total respondents had separated from their husbands. The data further indicate that the occurrence of marital separation among female smallholder farmers in the Bosome Freho district is higher (i.e., 10.2%) compared to the occurrence in the Saboba district (i.e., 3.6%). The differences in the percentage of separation could be attributed to differences in sociocultural values and practices among the people in the two districts. Also, Table 3 shows that 5.9 of the respondents were widowed. The table shows no significant differences between the two districts as 6.1% and 5.6% of the respondents from the Bosome Freho and the Saboba districts respectively, were widows.

The results show that most of the female smallholder farmers who participated in this study were married. This is in consonant with the findings of Lawson et al. (2020) who observed that 66% of smallholder farmers who participated in their study were married. Murage et al. (2019) also found that the majority of female smallholder farmers in Kenya are married. However, the findings do not agree with what was discovered by Kolawole and Michael (2021) who found that most of the female farmers who participated in the study in Nigeria were single. The differences among these findings may be due to the number of older females who participated in the study. In most African societies, marriage is associated with old age. Hence, the greater participation of older female farmers in this study could mean the majority of female farmers should be expected to be married.

4.1.4 Number of years in farming

The number of years in farming sought to obtain data on the years that respondents have been engaged in farming. This data is relevant to the study because it would give a knowledge of the level of experience of female smallholder farmers. According to Anang and Yeboah (2020), the farming experience of smallholder farmers is relevant because it may influence farmers' participation in off-farm work. Also, the level of experience of female smallholder farmers is relevant to the study because it influences the accuracy and depth of information that will be obtained from the respondents. The number of experience of respondents was categorized into less than 12 months, 1-5 years, 6-15 years, 16-25 years and more than 25 years. The data obtained are presented in Table 4 below.

Table 4: Number of years in farming (experience)

	Years in farming					
Districts	Less than 12 years	1-5 years	6-15 years	16-25 years	More than 25	Total
Bosome Freho	13	18	39	57	69	196
	6.6%	9.2%	19.9%	29.1%	35.2%	100.0%
Saboba	17	26	35	46	72	196
	8.7%	13.3%	17.9%	23.5%	36.7%	100.0%
Total	30	44	74	103	141	392
	7.7%	11.2%	18.9%	26.3%	36.0%	100.0%

Source: Field data (2022)

From Table 4, it can be observed that 7.7% of the respondents from the two districts have less than 12 months of farming experience. The table further shows a few more of the respondents from the Saboba district (i.e., 8.7%) than those from the Bosome Freho (i.e., 6.6%) ventured into farming within the last 12 months before the data for this study was collected.

Also, the table shows that 11.2% of the respondents had been engaged in farming for 1-5 years. The data shows that 9.2% of the respondents from the Bosome Freho district have 1-5 years of experience in farming while 13.3% had the same years of experience in the Saboba district. The Table shows that a relatively higher number of females have ventured into smallholder farming in the last 5 years in the Saboba district than in the Bosome Freho district. It could also be revealed that the number of females who have entered into smallholder farming in the last 5 years in the two districts is relatively low. This affirms the assertion that people do not find the agricultural sector attractive.

Table 4 further shows that 18.9% of the respondents from the two districts have been practising smallholder farming for a period of 6-15 years, 23% have 16-25 years of experience in smallholder farming and 36% have more than 25 years of experience in smallholder farming. Thus, it could be inferred from Table 4 that the number of females who venture into smallholder farming has been decreasing over the years. Fewer females have entered into smallholder farming in recent years. Abegunde et al. (2019) also found that few young people are venturing into smallholder farming in King Cetshwayo District Municipality, South Africa which has resulted in the domination of older smallholder farmers. This reaffirms the claim that the agricultural sector is not attractive to people. Abdul-Razak and Kluse (2017) opined that the number of years of farming experience of smallholder farmers may influence their adoption of new farming practices and technologies. The authors asserted that females with greater years of farming experience may be reluctant to change and may not adopt new farming practices (Abdul-Razak and Kluse, 2017). This may explain the observation made by Dibakoane et al. (2022) who indicated that most female smallholder farmers do not use technological tools and modern

farming practices. The researcher also observed that most female smallholder farmers were using traditional farming tools and inputs.

4.1.5 Main purpose of production

The purpose of production is useful to this study because it can explain the level of income and food security among female smallholder farmers (Hlatshwayo et al., 2021). The purpose of production was categorized into "selling" and "feeding of household". The data obtained for production is presented in the table below.

Table 5: Main purpose of production

	Purpose of production		
Districts	Sell	To feed household	Total
Bosome Freho	47	149	196
	24.0%	76.0%	100.0%
Saboba	38	158	196
	19.4%	80.6%	100.0%
Total	85	307	392
	21.7%	78.3%	100.0%

Source: Field data (2022)

Table 5 shows that the majority of the respondents, represented by 78.3% produced to feed their households whilst 21.7% produced for selling. The table further shows that the majority of smallholder farmers in the Bosome Freho (i.e., 24.0%) produced to sell compared to 19.4% of the respondents from the Saboba district who produced for selling. The results suggest that a greater percentage of female smallholder farmers who participated in this study produce to feed their households. This affirms the assertion by Lowder et al. (2016) that most smallholder farmers produce to feed their households. A similar observation was made by Hlatshwayo et al. (2021) who opined that while male smallholder

farmers may produce for selling, most female smallholder farmers produce to feed their families. This may affect the income level of female smallholder farmers and may make them overdependent on their husbands and other relatives for money. The inability of smallholder farmers to produce for income may also increase poverty in rural areas. In their study, Kara and Kithu (2020) found that low-income earners are usually food insecure. Thus, female smallholder farmers may be food insecure due to low income though they are producers of food.

4.1.6 Income of respondents

The income of respondents as used in this study refers to the total income farmers receive from farming activities. The level of income of female smallholders is a major determinant of the adoption of technology and modernized agricultural practices (Tesfaye et al., 2016). Also, the level of income of the respondents can determine the level of food security among female smallholder farmers. This study, therefore, sought to assess the income level of female smallholder farmers (Baiphethi and Jacobs, 2009). The income was categorized into less than 1000, 1100-2000, 2100-3000 and more than 3000. The data obtained are presented in table 6.

Table 6: Income of respondents

	Income in (Ghc)				
	Less than 1000	1100-2000	2100-3000	More than 3000	Total
Bosome Freho	130	35	15	16	196
	66.3%	17.9%	7.7%	8.2%	100.0%
Saboba	149	24	13	10	196
	76.0%	12.2%	6.6%	5.1%	100.0%
Total	279	59	28	26	392
	71.2%	15.1%	7.1%	6.6%	100.0%

Source: Field data (2022)

Table 6 shows that the majority of the respondents representing, 71.2%, earn less than Ghc 1000. The table further shows that 66.3% of the female smallholder farmers in the Bosome Freho district earn less than Ghc 1000 while 76% from the Saboba district earn less than Ghc 1000. The table also shows that 15.1% of the respondents earn Ghc 1100-2000 annually from their farming business. The data shows that 17.9% of the respondents from the Bosome Freho earn Ghc 1100-2000 while 12.2% from the Saboba district earn the same amount. Moreover, 7.1% of the respondents earn an annual income of Ghc 2100-3000 from farming. The data also shows that 7.7% and 6.6% of the respondents from the Bosome Freho and Saboba districts respectively, earn 2100-3000. Furthermore, it can be observed from Table 6 that 6.6% of the respondents earn more than Ghc 3000. While 8.2% of the respondents from the Bosome Freho district earn more than Ghc 3000, 5.1% of the respondents from the Saboba district earn more than Ghc 3000.

The results indicate that the majority of female smallholder farmers earn less than GHC 1000.00 per annum which is equivalent to USD 71.00 at the time of writing. Thus, smallholder farmers who participated in this study earn relatively less than what was observed by Ayisi et al. (2022) who also found that the majority of the smallholder farmers earn less than GHC 5000.00. As indicated in section 4.1.6 of this study, most female smallholder farmers produce mainly to feed their families which may have resulted in the relatively lower income they receive. This observation could affirm the assertion made by Hasselberg (2017) that most smallholder farmers in developing countries live in poverty.

4.1.7 Engagement in other economic activities

Economic activities as used in this study refer to any legitimate activities which respondents undertake to earn a living apart from farming. Most farmers smallholder farmers earn

income from off-farm economic activities to support their farming activities and household food consumption (Anang and Yeboah, 2019). In this study, the researcher sought to explore the extent to which female smallholder farmers in the Bosome Freho and Saboba District earn from off-farm economic activities. The respondents were asked whether they were engaged in any economic activity apart from farming. The responses obtained are presented in Table 7 below.

Table 7: Engagement in other economic activities

	Responses		
	No	Yes	Total
Bosome Freho	135	61	196
	68.9%	31.1%	100.0%
Saboba	99	97	196
	50.5%	49.5%	100.0%
Total	234	158	392
	59.1%	40.9%	100.0%

Source: Field data (2022)

Table 7 shows that the majority of the respondents represented by 59.1% do not engage in any other economic activity apart from farming. The data shows that 40.9% of the total respondents from the districts undertake other economic activities aside from farming. It could further be observed from the table that more respondents from the Saboba district (i.e., 40.9%) were engaged in other economic activities as compared to respondents from the Bosome Freho district (i.e., 31.1%). Most of the respondents who were engaged in other economic activities in the Saboba district were mainly involved in shear butter processing and wood carving. Moreover, respondents in the Bosome Freho district were engaged in other economic activities such as the operating of minor tabletop provision shops while others were food vendors.

The study shows that 40.9% of the female smallholder farmers who participated in the study undertake off-farm economic activities. A similar observation was made by Anang and Yeboah (2020) who found that 43% of smallholder farmers who participated in their study were engaged in off-farm economic activities. The engagement of smallholder farmers in other economic or entrepreneurial activities is an innovative means through which farmers can earn extra income. For example, Benedek, et al. (2021) found that engagement in off-farm economic activities is a major resilience strategy adopted by most European smallholder farmers. Also, Abegunde et al. (2019) found that smallholder farmers who engage in off-farm economic activities earn more income from off-farming activities than they generate from farming activities. Moreover, Sell and Minot (2018) found that the more female smallholder farmers are engaged in off-farm economic activities in Uganda, the more they become empowered. However, the current study reveals that the majority of the female smallholder farmers, especially in the Bosome Freho district, are not engaged in any off-farm activities.

4.1.8 Membership in farmer's association

Farmers' associations are common among most African societies and developing economies and render services that improve the income and productivity of smallholder farmers (Bizikova et al., 2020). In this study, the respondents were asked whether they belonged to any farmer's association. The data obtained are presented in Table 8.

Table 8: Membership of farmers' association

Districts	Responses		Total
	No	Yes	
Bosome Freho	115	81	196
	58.7%	41.3%	100.0%
Saboba	149	47	196
	76.0%	24.0%	100.0%
Total	264	128	392
	67.3%	32.7%	100.0%

Source: Field data (2022)

The data shown in Table 8 shows that the majority of the respondents, representing 67.3% do not belong to any farmer's association, while 32.7% belong to a farmer's association. The table further reveals that there are more female smallholder farmers (i.e., 41.3%) in the Bosome Freho than there are in the Saboba district. Mutura (2016) also found that the majority of the respondents were not members of any farming association. Abdul-Rahman and Abdulai (2019) found that farmers who are members of farmers' associations have greater efficiency and produce higher yields than those with no membership. The current study indicates that most female smallholder farmers may not be benefiting from the advantages associated with being a member of a farmer's association.

4.1.9 Nativity of respondents

The nativity of respondents gathered data on the district of birth of respondents. Thus, the study sought to inquire about the number of female smallholder farmers who were residing in their respective native districts. This characteristic is relevant to this study because it tends to influence the accessibility of agricultural resources (Andani et al., 2020). The data obtained are presented in Table 9.

Table 9: Nativity of respondents

District	Responses		Total
	No	Yes	
Bosome Freho	50	146	196
	25.5%	74.5%	100.0%
Saboba	35	161	196
	17.9%	82.1%	100.0%
Total	85	307	392
	21.7%	78.3%	100.0%

Source: Field data (2022)

Table 9 shows that the majority of the respondents were natives of their districts where they engaged in smallholder farming. It observed that 78.3% of the respondents were natives while 21.7% were non-natives of the district. From the table, it could be observed that there were more non-native female smallholder farmers in the Bosome Freho district (i.e., 25.5%) than there were in the Saboba district.

The results indicate that most of the female smallholder farmers operate within their respective districts of birth. This may be because the land which is the principal factor of agriculture production is an immobile factor. Thus, it cannot be moved from one location to another. Hence, female smallholder farmers may be forced to stay in their communities where they may have access to family land rather than move to other communities where it may be difficult to have access to land for farming. Nevertheless, other factors such as marriage may influence female smallholder farmers to move out of their districts of birth to engage in smallholder farming.

4.2. Situation of Food Security among Female Smallholder Farmers

The study sought to assess the level of food among female smallholder farmers. The respondents were asked to state whether they strongly disagreed, disagreed, agreed or

strongly agreed with sets of statements concerning food security. The average score of responses was used to determine the situation of food security of respondents; 1 – 1.49 = High Food Security, 1.5 – 2.49 = Moderate Food Security, 2.5 – 3.49 = Low Food Security and 3.5 – 4.0 = Very Low Food Security. The data obtained are presented in Table 10 below.

Table 10: Situation of food security among female smallholder farmers

Levels of food security	District of respondents				Total
	Bosome Freho		Saboba		
High food security	8	4.08%	5	2.55%	13
Moderate food security	37	18.88%	41	20.92%	78
Low food security	139	70.92%	121	61.73%	260
Very Low Food Security	12	6.12%	29	14.80%	41
Total	196	100%	196	100%	392

Source: Field data (2022)

Table 10 provides an overview of the food security situation among female smallholder farmers in two different districts: Bosome Freho and Saboba. It presents data on the distribution of food security levels among these farmers, categorizing them into four groups: High food security, Moderate food security, Low food security, and Very Low food security (FANTA, 2003).

The data as presented in Table 10 shows that a mere 4.08% of female smallholder farmers enjoy high food security. This category represents households with stable access to an adequate and diverse food supply, experiencing little to no food insecurity. In stark contrast, a substantial 70.92% of the respondents in the same district grapple with low food security. Respondents in this category generally have consistent access to food but may occasionally

face mild to moderate food insecurity issues, such as uncertainty in food supply or limited dietary diversity. Furthermore, 18.88% of female smallholder farmers exhibit moderate food security. Households falling into this category experience more pronounced food insecurity, with limited access to an adequate and diverse food supply. They may need interventions to improve their food security. Distressingly, 6.12% of additional female smallholder farmers in Bosome Freho confront the harshest conditions. Households in this category face severe food insecurity, struggling to access and afford enough food. They likely experience irregular meals, and inadequate dietary diversity, and may employ various coping strategies to address food shortage. On the other hand, Saboba presents a slightly more optimistic scenario, with 2.55% female smallholder farmers attaining high food security, though a smaller proportion in this district. Nevertheless, 61.73% of female smallholder farmers in Saboba contend with low food security, constituting a significant portion of the sample. Also, 20.92% of female smallholder farmers in Saboba fall within the moderate food security category. Notably, 14.80% of female smallholder farmers in Saboba face severe food insecurity, shedding light on the substantial food security challenges prevalent in this district. These disparities emphasize the need for targeted interventions and policies tailored to the specific challenges faced by female smallholder farmers in each district, with a focus on improving food security for those experiencing low and very low food security.

The findings presented above show that the majority of female smallholder farmers experience low food security. Thus, it could be inferred that a greater percentage of female smallholder farmers are food insecure. This outcome affirms the assumptions of the Access Theory (Ribot and Peluso, 2003). It could be inferred from the findings that though female smallholder farmers are producers of foods; they are unable to make use of or utilize the

food they produce to satisfy their food security needs. The inability of female smallholder farmers to make use of the food they produce to meet their food security needs may be influenced by other factors such as access to land, educational level, access to credit and other financial resources, access to agricultural markets and level of income (Ribot and Peluso, 2003). These findings are in consonant with the findings of other empirical studies such as Aniah et al. (2019) who indicated that the challenges and shocks such as drought and soil infertility affect the quantity of food consumed by smallholder farmers, the authors indicated that most smallholder farmers react to the shocks they face by reducing the quantity of food the consume daily (Aniah et al., 2019). In their study, Agwu and Oteh (2014) found that a majority of 68.7% of the smallholder farmers who took part were food insecure in Abia state, Nigeria. Also, Andriamparany et al. (2021) found that 74% of Vanilla smallholder farmers in Madagascar were food insecure. A study conducted by Twongyirwe et al. (2019) found that 68.8% of smallholder farmers who participated in their study perceived food insecurity as a problem in their households. Moreover, the findings are consonant with the findings of Acheampong et al. (2022) who concluded that food security threat is prevalent among smallholder households in Ghana. In general, the findings resonate with the assertion by Palom et al. (2020) that Smallholder farmers are more vulnerable and are regarded among the poor and hungry groups in the world.

4.3 Challenges Faced by Female Smallholder Farmers

This section focused on the challenges faced by smallholder farmers in the production of food crops. The data obtained are presented below.

4.3.1 Effects of household chores

Household chores refer to the basic or menial duties performed by the individual to keep the home. In most African societies, such as Ghana females are expected to perform household chores such as sweeping, washing, cooking and looking after children in the house. The study, therefore, sought to assess how the performance of these duties serves as a challenge to female smallholder farmers. The data obtained are presented in Table 11.

Table 11: Effects of household chores on female smallholder farmer

	Responses		
Districts	No	Yes	Total
Bosome Freho	69	127	196
	35.2%	64.8%	100.0%
Saboba	52	144	196
	26.5%	73.5%	100.0%
Total	121	271	392
	30.9%	69.1%	100.0%

Source: Field data (2022)

From Table 11, it could be observed that 69.1% of the respondents indicated that the performance of household chores serves as a challenge to their farming activities while 30.9% thought otherwise. It could further be observed that more respondents from the Saboba district (i.e., 73.5%) were of the view that household chores serve as an impediment than the number of respondents from the Bosome Freho district (64.8%).

Most of the respondents asserted that the performance of household chores reduces the number of working hours they may spend working on their farms and also arrive at their farms already tired. For example, one of the respondents from the Saboba district stated;

> *"For me, my children are many, so I spend much time taking care of them and preparing them to go to school. By the time I will be done, time will be far spent. Though I still go to the farm, I spend most of the hours at home*".

Another respondent from the Bosome Freho responded;

> *"Sometimes, I even get tired before I go to the farm because of household chores. Because of this, I am not able to work as I expect."*

However, some of the respondents also indicated that though they perform household chores it does not affect their productivity as farmers. For instance, one respondent from the Bosome Freho district stated;

> "*No, the performance of household chores does not affect my productivity as a farmer, because I wake up early every day. So, I can finish my household chores on time so time I can go to the farm early".*

Another from the Saboba district opined;

> "*My children are grown, so I instruct them to perform the household chores, so I can get to the farm early"*

The results show that the majority of the performance of household chores serves as an impediment to a majority of female smallholder farmers. A similar observation was made by Tsige et al. (2020) who found that the performance of household chores limited the majority of female smallholder farmers in Ethiopia from participating in a training session offered by development agents. Pati and Babus (2018) also indicated that female farmers usually have heavy and unpaid domestic responsibilities which reduce the number of their productive hours.

4.3.2 Access to Farmland

Land serves as the principal factor of production in the agricultural sector. The study sought to explore the extent to which accessibility of farmlands serves as an impediment to female smallholder farmers. The data obtained are presented in Table 12.

Table 12: Access to farming land

	It is easy to access land for farming activities.					Total
	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	
Bosome Freho	11(5.6%)	39(19.9%)	84(42.8%)	48(24.5)	14(7.2%)	196
Saboba	19(9.7%)	82(41.8%)	65(33.2%)	21(10.7)	9(4.6%)	196

Source: Field data (2022)

From Table 12, it can be observed that 5.6% and 19.9% of the respondents in the Bosome Freho Strongly Disagree and Disagree respectively, with the statement that is easy to access farmland. 42.8% of the respondents were to the statement, 24.5% agreed whilst 7.2% of the respondents strongly agreed to the same statement. The table further shows that more respondents in the Saboba district disagreed that it is easy to access farmland (41.8%) as compared to the percentage obtained from the Bosome Freho District. Also, it is shown in Table 12 that 9.7% of the respondents in the Saboba district strongly disagreed with the same statement, 33.2% were neutral, 10.7% agreed and 4.6% of the respondents strongly agreed that it is easy to access farmland in the Saboba district. Thus, it could be inferred that it is moderately easy for female smallholder farmers in the Bosome Freho to acquire land for farming while it is difficult for female smallholder farmers in the Saboba district to get access to farmlands.

The majority of the respondents from the Saboba district revealed that they acquire lands from their husbands for farming, whilst the majority of the female smallholder farmers in the Bosome Freho farmed on family lands. Few of the respondents in the Bosome Freho also indicated that they acquired farmland from the government. Other respondents from both districts acquired farmlands by renting them from other individuals.

A respondent from the Saboba district indicated;

> *"The only means through which I can access farmland is to get it from my husband. I have been using a piece of farmland that my husband gave to me for almost four years now".*

This is in line with what was observed by Nyantakyi-Frimpong (2017) who opined that most farmlands are owned by men and women mostly get access to lands through their fathers, husbands and sons.

Another respondent from the Bosome Freho stated:

> *"I farm on our family land, and though it's difficult I usually get a piece of land to plant crops every year"*

Another from the Bosome Freho also indicated;

> *"I and my husband are not from this community; we are not from this district. So, we do not have any land of our own here. So, I rent from other people, so that when I harvest the crops, I share it with the owner of the land"*

The responses from the respondents indicated that land acquisition serves as a challenge to female smallholder farmers. The findings indicated that most female smallholder farmers do not easily get access to farming lands. The findings are in line with the findings of Ankrah et al. (2020) who found that ownership and accessibility to productive resources such as land is in favour of men more than women in most Ghanaian societies. Also, Po and Hickey (2018)

found that smallholder farmers in semi-arid Kenya find it difficult to access land for farming activities. similarly, Fonjong and Gyapong (2021) discovered that the majority of female smallholder farmers in Cameroon do not have any legal land claims. Thus, smallholder farmers in most African countries do not have easy access to farmlands.

4.3.3 Main source of farm labour

Labour is a major factor that influences productivity. The female smallholder farmers were asked to indicate their main source of labour in their production. The data obtained are presented in Table 13.

Table 13: Main source of farm labour

	The main source of farm labour				
	Personal Labor	Depend on children	Other relatives	Hired labour	Total
Bosome Freho	107	29	27	33	196
	54.6%	14.8%	13.8%	16.8%	100.0%
Saboba	125	46	14	11	196
	63.8%	23.5%	7.1%	5.6%	100.0%
Total	232	75	41	44	392
	59.2%	19.1%	10.5%	11.2%	100.0%

Source: Field data (2022)

From Table 13, it could be observed that 59% of the female smallholder farmers who participated in the study relied on personal labour. It could also be observed that more smallholder farmers in the Saboba district relied on personal labour than in the Bosome Freho district. Also, 19.1% of the respondents depend on their children as a source of labour. It is further observed that whilst 14.8% of the respondents in the Bosome Freho district depend on their children for labour, 23.5% from the Saboba relied on their children as the main source of farm labour. Moreover, 10.5% of the respondents indicated that they depend on other relatives as their main source of farm labour. 13.8% and 7.1% of the

respondents in the Bosome Freho and Saboba districts respectively depend on other relatives as their main source of labour. Furthermore, 11.2% of the respondents depend mainly on hired labour. It is observed that whilst 16.8% of female smallholder farmers in the Bosome Freho depend on hired labour, 5.6% of those from the Saboba district depend on hired labour.

The respondents revealed that the higher cost and their inability to pay for hired labour is a major challenge to their productivity.

One of the respondents from the Saboba states:

> *"I sometimes wish I could get somebody to help clear the bush before I start planting, but can't pay them. I have to do it all by myself. Because of this, sometimes the planting of the seed is delayed"*

Another from the Bosome Freho said'

> *"If I can pay for labourers to help me, I can produce more crops".*

The cost of labour remains a challenge to most female smallholder farmers as a result most rely on personal labour. This is in line with the findings of Neizer et al. (2020) who indicated that the majority of smallholder farmers depend on personal labour. This confirms the assertion by Anuga and Gordon (2016) who indicated that the use of personal and household labour is a common feature in smallholder farming.

4.3.4 Main source of irrigation

Irrigation is considered a panacea for semi-arid regions. It was relevant due to rainfall variability and climate change (Mosello et al., 2017). The study sought to explore the main source of irrigation used by female smallholder farmers. The data obtained are presented below.

Table 14: The main form of irrigation

	Forms of irrigation		
	Rainfall	Artificial irrigation	Total
Bosome Freho	181	15	196
	92.3%	7.7%	100.0%
Saboba	114	82	196
	58.2%	41.8%	100.0%
Total	295	97	392
	75.3%	24.7%	100.0%

Source: Field data (2022)

Table 14 shows that a majority of 75.3% of the respondents mainly depend on rainfall while 24.7% depend on artificial irrigation systems. The table also shows the use of irrigational systems is more common among female smallholder farmers in the Saboba district (i.e., 41.8%) than female smallholder farmers in the Bosome Freho district. The respondents in the Saboba district revealed that the source of water for farming purposes serves as a major challenge to their farming activities. One of the respondents said;

> *"Many times, we plant and we do get water to feed our crops. so, the crops are not able to produce well for us".*

Another respondent in the same district said;

> *"We the females do not often get the lands that are closer to the dams. Our husbands usually cultivate those lands and give the portions that are far away from the dams. So, it is very difficult to even make use of the dam, we try our best because we have no other option".*

Also, one respondent said;

> *"The water in the dam sometimes runs dry, so at certain times we do not have rainwater as well as water from the dam".*

Moreover, one of the respondents from the Bosome Freho stated;

> *"We do not have dams here, so only those who have lands closer to the rivers and streams can make use of artificial irrigation".*

The findings indicate that most female smallholder farmers depend largely on rainfall to feed their farms. It is also revealed that the irrigational systems and the one-village, one-dam policy of the government of Ghana have not yielded any significant results among female smallholder farmers. As indicated by Moyo et al. (2020), the failure of smallholder irrigation schemes is not solely a water challenge. The causes span policy, weak institutions, inadequate agronomic and irrigation expertise and inadequate funds. Thus, the failure of the one-village, one-dam initiative especially in the Saboba district could not be attributed only to the water challenge.

4.3.5 Effect of climate change on female smallholder farmers

The major development around the world such as industrialization, excessive release of carbon dioxide and the depletion of the ozone layer has resulted in a change in climatic conditions. The study sought to investigate how the change in climate affects female smallholder farmers. the results obtained have been presented in the table below.

Table 15: Effects of climate on smallholder farmers

	Responses		
Districts	Yes	No	Total
Bosome Freho	59	137	196
	30.1%	69.9%	100.0%
Saboba	128	68	196
	65.3%	34.7%	100.0%
Total	187	205	392
	47.7%	52.3%	100.0%

Source: Field data (2022)

From Table 15, it can be observed that 47.7% of the respondents are of the view that they are affected by climate change while52.3% expressed that they are not affected by the change in climate the table shows that the majority of the respondents from the Saboba district, represented by 65.3% were of the expressed that they are affected by the changes in climatic conditions, while30.1% of respondents in the Bosome Freho district expressed same. Thus, it could be inferred from Table 15 that the issue of climate change affects more female smallholder farmers in the Saboba district than in the Bosome Freho district.

The study sought to identify how climate affects female smallholder farmers. It was discovered that most of the smallholders expressed that the drought caused by the climate influenced the time for the cultivation of seeds. Most of the respondents expressed that they have to wait for rainfall before they start planting. Others also stated that the increase in temperature often dries the leaves of their which does not favour their crops. One of the respondents stated;

> *"Some time ago, by now I would have planted my seeds already because the rain would have come down. But nowadays, the rains do come early in the year so, I have to wait for a while until it rains before I can cultivate".*

Through, field observation, the researcher found that most of the female smallholder farmers, especially in the Saboba district had prepared their lands; but were, however, waiting for the first rainfall so that they could cultivate their seeds. The researcher also found that some of the female smallholder farmers had already cultivated their seeds and were in anticipation of the rainfall. Thus, climate change serves as a challenge to female smallholder farmers.

Also, some of the respondents opined that sometimes their farms get flooded as a result of heavy rainfall. One of the respondents in the Saboba district said;

> *"Sometimes, we can use artificial irrigation to plant our seeds and will be expecting the rain to fall; however, it rain can very heavy to the extent that all our farms will be flooded".*

One respondent from the Bosome Freho opined;

> *"Climate change affects us because it used to rain in specific months in the time past. But for now, the rainfall follows no regular pattern. We can plant and be expecting rain but it would not rain and our crops will not yield as expected".*

Another said;

> *"I cultivate cabbage, sometimes it can rain continuously for a long time, and all the leaves of the cabbage crops will turn yellowish. We call it bright. When it happens like that, we can lose all the crops we have cultivated and we will run at a loss"*

In their study, Odhiambo et al. (2021) found that smallholder farmers in Kenya have adopted several climate change adaptation strategies such as improved seeds, rain-water harvesting and irrigation schemes. However, it was found that the majority of female smallholder farmers who participated in the study have not adopted any strategy to deal with climate. Few respondents in the Saboba district attempt to make use of artificial irrigation mechanisms which is not very effective

4.3.6 Access to a credit facility

Credit accessibility as used in this study refers to the rate of easiness with which female smallholder farmers get access to financial support. This is relevant because accessibility to credit facilities could influence the productivity of female smallholder farmers. the data obtained are presented in Table 16.

Table 16: Access to credit facilities

	Responses		
	Yes	No	Total
Bosome Freho	48 24.5%	148 75.5%	196 100.0%
Saboba	23 11.7%	173 88.3%	196 100.0%
Total	71 18.1%	321 81.9%	392 100.0%

Source: Field data (2022)

Table 16 shows that the majority of the respondents, represented by 81.9% do not have access to a credit facility, while 18.9% have access to a credit facility. The table further shows that 24.5% of the respondents from the Bosome Freho district have access to credit facilities while 11.7% of the respondents from the Saboba district have access to the credit facility. Thus, a few more female smallholder farmers in the Bosome Freho district could access credit than female smallholder farmers in the Saboba district. One of the respondents indicated;

> *"When I inquired about the loan, they told me I would need a guarantor and collateral. But since I don't have any guarantor and collateral I did not go for the loan"*

The majority of the respondents who could access credit facilities indicated that they acquired the credit through the farmers' association they joined. For example, a respondent from the Bosome Freho said,

> "*I get loans from our association. Usually, some banks come to see the leaders of our association and take our names. So, through that we get loans. But if I go to the bank as an individual, they usually do not give me the loan".*

Another respondent from the Bosome Freho also stated;

> *"I join an association and each of us contributes a specific amount weekly to the association. So, if I need a loan for my farm and I go to the leaders of the association they give me some so that I can pay it later".*

This affirms what was discovered by Djoumessi et al. (2018) who indicated that membership in a farmers' association has a positive influence on the accessibility of credit by vegetable farmers in the Southwest region of Cameroon.

Also, the respondents who were not able to access financial support indicated that they obtained money from their husbands to support their farming business and repay it after they harvested their crops. Others, also indicated that they sometimes work as a labourer on the farms of other males, so that they can earn income to support their farming business. Moreover, it was also found that some of the respondents engage in non-farming economic and entrepreneurial activities to earn some money which part is used to support their farming. Others also indicated they get money from the farm products they sell; part of the money is mostly ploughed back into their farming business.

The findings of this study affirm the assertion by Tsige et al. (2020) who stated that women have limited access to institutional services in rural areas. The findings indicate that the majority of female smallholder farmers do not have access to credit facilities. In the view of Fletschner and Kenney (2014) financial institutions do not recognize female farmers as active economic agents and deny them credit.

4.3.7 Easy access to market

Farmers may earn income if they can access the market for the products they produce. This study sought to assess the availability of a market for female smallholder farmers in the Bosome Freho and the Saboba districts. The data obtained are presented in Table 17

Table 17: Easy access to the market

	Responses		
Districts	Yes	No	Total
Bosome Freho	43	153	196
	21.9%	78.1%	100.0%
Saboba	27	169	196
	13.8%	86.2%	100.0%
Total	70	322	392
	17.9%	82.1%	100.0%

Source: Field data (2022)

From Table 17, it could be observed that 82.1% of the respondents indicated that they do not easily access the market for the goods they produce whilst 17.9% were of the view that it is easy for them to access the market for the goods they produce. The table also shows that more female smallholder farmers in the Bosome Freho District (i.e., 21.9%) easily access the market for their goods than female smallholder farmers in the Saboba district (i.e., 17.9%). The findings agree with what was found by the International Labour Organisation (2017) which asserted that female smallholder farmers do not have easy access to the profitable and value-added market. Also, the Committee on World Food Security (n.d.) noted that several factors constrain female smallholder farmers from accessing markets for their products which impedes the effort to alleviate rural poverty.

4.3.8 Source of the market to female smallholder farmers

The government of Ghana has established agencies such as the National Buffer Stock Company Limited. The study sought to obtain how this government initiative provides a market for the goods produced by female smallholder farmers. the data obtained are presented in Table 18

Table 18: Source of the market to smallholder farmers

Districts	Agency		Total
	Government	Private	
Bosome Freho	29	167	196
	14.8%	85.2%	100.0%
Saboba	63	133	196
	32.1%	67.9%	100.0%
Total	92	300	392
	23.5%	76.5%	100.0%

Source: Field data (2022)

Table 18 shows that government agencies provide a market to 23.5% of respondents while 76.5% obtain a market from private entities. Moreover, the table shows that the government agencies provide a market for more female smallholder farmers in the Saboba district (i.e., 32.1%) than the female smallholder farmers in the Bosome Freho district (i.e., 14.8%).

4.3.9 Satisfaction with the price of goods

The price of the goods produced serves as a motivating factor to the producer. Because of this, the study assesses the extent to which female smallholder farmers are satisfied with the prices they receive for the products. The results are presented in Table 19.

Table 19: Satisfaction with the price of goods

	Responses		
	Yes	No	Total
Bosome Freho	23	173	196
	11.7%	88.3%	100.0%
Saboba	33	163	196
	16.8%	83.2%	100.0%
Total	56	336	392
	14.3%	85.7%	100.0%

Source: Field data (2022)

From Table 19, it could be observed that a majority of 85.7% of the respondents were not satisfied with the amount they received for the goods they produce while 14.3% of the respondents indicated that they were satisfied with the price they received for their products. The data shows that more respondents in the Saboba district (i.e., 16.8%) were satisfied with the price they received than respondents from the Bosome Freho district (i.e., 11.7%).

The majority of the respondents who were not satisfied expressed that they have no control over the pricing of the products they produce. One of the respondents stated;

> *"Even though we produce the products, the prices are determined by the buyers but we cannot contend with them. Because if they do not buy, the goods will rot, so we accept every price they give us".*

Moreover, most of the respondents from the Bosome Freho district indicated that poor roads in the district are a major factor that limits their market access. One of the respondents said;

> *"We find it very difficult to get vehicles to transport our goods to the market centre. Most of the drivers no longer ply our roads because they are in poor states. Most often, during the rainy season, our goods get rotten in the bush because we are not able to get vehicles to transport them to the market centres".*

Also, the respondents from the Saboba district expressed that the sparse nature of their communities limits them from accessing the market for their products. For example, one respondent said;

> *"Because we are far away from the district capital most of the buyers do not come here to buy from us".*

The study found that factors poor roads, lack of market proximity and transportation costs limit female smallholder farmers' access to the market. These findings are in consonant with the findings of Aku et al. (2018) who found that most female smallholders in Tanzania are unable to access the market for their products due to poor roads and transportation costs. Moreover, the study found that the majority of female smallholder farmers were not satisfied with the price they receive for the goods they produce. Similarly, most female smallholder farmers in Cameroon were dissatisfied and felt cheated by middlemen who bought their farm products (Piabuo et al., 2020).

4.3.10 Types of farm inputs and farming practices

The study found that most of the respondents were using traditional farming tools and practices. The majority of the respondents indicated that they use agricultural tools such as cutlasses and hoes. However, the researcher observed that other modern tools such as fertilizer, knapsacks, weedicides and pesticides were used by some female smallholder farmers, especially in the Bosome Freho district. Also, it was discovered that most of the respondents in the Saboba district used "hired services of tractors" on their farms. However, none of the respondents owned a tractor. Moreover, the use of improved seeds was common among respondents who cultivated grains and cereals.

4.3.11 Methods of preservation of the harvest

The study explored the methods employed by female smallholder farmers to ensure that their goods are preserved and kept safe. It was found that the majority of the smallholder farmers who produced cereals and grains adopted traditional preservation mechanisms such as drying. Others who produce non-grain products did not have any means of preservation. One respondent from the Bosome Freho district stated;

> *"We don't have any means of preservation. Our goods begin to rot any three after harvesting if we do not get buyers"*

The majority of the respondents indicated that the lack of proper preservation strategies creates post-harvest losses. A similar observation was made by Mobolade et al. (2019) who found that most smallholder farmers in Nigeria and India employed basic and traditional mechanisms for the preservation and storage of crops. Similarly, the majority of smallholder farmers in developing counties make use of conventional storage mechanisms (Manandhar, et al., 2018).

4.4 Measures to Help Female Smallholder Farmers

This section focused on assessing the policies and measures initiated by the government, non-governmental agencies and other development stakeholders towards the empowerment of female smallholder farmers. The results obtained are presented below.

4.4.1 Provision of extension services to female smallholder farmers

The study explored the extent to which female smallholder farmers are assisted with the services of extension officers. The data obtained from the agricultural department within the two districts indicated that female smallholder farmers are assisted by the services of extension officers. For example, the district agricultural officer of the Saboba district said;

"We provide them (female smallholder farmers) with extension services. We normally conduct field demonstrations where educate the female smallholder farmers on how to effectively apply fertilizer and plant their crops. But the challenge we have now is inadequate numbers of officers".

A similar assertion was made by the officer in charge of Women in Agricultural Development within the Bosome Freho district, who stated;

"We organize demonstrations for the female smallholder farmers. We also go to the various communities to educate them on the best farming practices"

The study further interviewed female smallholder farmers to ascertain the efficiency and effectiveness of the extension services provided by the agricultural departments within the districts. The data obtained are presented in the Table below.

Table 20: Access to extension services

Districts	Responses		Total
	Yes	No	
Bosome Freho	32	164	196
	16.3%	83.7%	100.0%
Saboba	66	130	196
	33.7%	66.3%	100.0%
Total	98	294	392
	25.0%	75.0%	100.0%

Source: Field data (2022)

From Table 20, it could be observed that a total of 25.0% of the respondents had access to the extension services while 75% had no access to extension services. it could also be observed that 16.3% of the respondents from the Bosome Freho district benefited from extension services while 33.7% of the respondents from the Saboba district have access to extension services.

The data in Table 20 indicates that few female smallholder farmers benefit from the extension services provided by the agricultural department at the district assembly.

The respondents who benefited from the extension services indicated that the services were beneficial to them. One of the respondents from the Saboba district stated;

> *"The services we received helped me. It helped my crops to yield more"*

Another from the Bosome Freho also said;

> *"The extension services helped. That year the pest did not destroy my crops as they used to"*

It was also found that most of the respondents who had never accessed extension services had little knowledge of it. For example, one respondent from the Saboba district stated;

> *"I have not accessed extension services before because I do not know where I can find them"*

Another from the Bosome Freho district also said;

> *"I do not seek extension services because I will not be able to pay for it".*

The findings are similar to what was observed by Wongnaa and Awunyo-Vitor (2018) who also found the majority of the respondents who participated in their study did not have access to extension services. The authors also stated that a few of the respondents who accessed extension services did so only thrice. The finding also reveals that inadequate education and knowledge about extension services is a major factor that limits female smallholder farmers from accessing such services.

4.4.2 Effectiveness of the government subsidized fertilizer policy

The government of Ghana through the Ministry of Agriculture has introduced the subsidized fertilizer policy. The study sought to assess the effectiveness of this policy on female smallholder farmers. the results obtained are presented in the table below.

Table 21: Beneficiaries of subsidized fertilizer

Districts	Responses		Total
	Yes	No	
Bosome Freho	95	101	196
	48.5%	51.5%	100.0%
Saboba	79	117	196
	40.3%	59.7%	100.0%
Total	174	218	392
	44.4%	55.6%	100.0%

Source: Field data (2022)

From Table 21, it can be observed that 44.4% of female smallholder farmers who participated in the study have benefited from the subsidized fertilizer policy. the table further shows that 48.5% of respondents in the Bosome Freho district have benefited while 40.3% of those in the Saboba district have benefitted from the government-subsidized fertilizer policy. Generally, it could be asserted that less than half of the female smallholder farmers who participated in the study have benefited from this policy.

The study found that government-subsidized fertilizer is very helpful to the respondents who have benefited. For example, one of the respondents in the Bosome Freho District said;

> *"Yes, the subsidized fertilizer program is very good for me. Because they reduce the price for me and I can buy and use on my farm and helps my crops to grow well"*

Another from the Saboba district stated;

> *"The fertilizer, they give us is helpful. Because without fertilizer, the only crop we can plant on our land is soya beans. But because they give us the subsidized fertilizer, I can grow other crops and apply the fertilizer".*

Other respondents who have not benefited from the program also revealed that they are not aware of the subsidized fertilizer policy. Others also expressed that the leaders in the communities who are supposed to share the fertilizer with the farmers share the fertilizer

with only their friends and relatives. It was also found that often the fertilizer is released to farmers based on political party affiliation. For instance, a respondent from the Bosome Freho district opined;

> *"Many times, they share the fertilizer with party members. So, if the party you join is not in power you will not give you the subsidized fertilizer".*

Another from the Saboba district also said;

> *"I have heard about the subsidized fertilizer but I have never benefited from it. They only give it to their friends and relatives"*

4.4.3 Measures and programmes introduced by non-governmental organizations (NGOs)

The study sought to explore other measures initiated by non-governmental organizations to help female smallholder farmers. The study found that some non-governmental organizations have introduced programmes to empower female smallholder farmers.

Programmes by NGOs in the Saboba district

It was discovered that NGOs such as the Evangelical Presbyterian Development and Relief Agency (EPDRA) have introduced a policy through which they provide training and other agricultural tools to female smallholder farmers. The officer in charge of operations in the Saboba district stated;

> *"We do the best we can to assist these women because if they get the needed help, they can produce more food".*

It was also discovered that OCP Africa, a fertilizer manufacturing company provides training to female smallholder farmers on the relevance and best practices of fertilizer application.

Moreover, other non-governmental organizations such as World Vision and the International Institute of Tropical Agriculture collaborate with the district agricultural department to assist

female smallholder farmers. The study found that these organizations provide training for female smallholder farmers on effective ways of rearing animals for food and income. the agricultural officer of the Saboba district stated;

> *"Through this programme, we can train the female smallholder farmers on how to rear animals like guinea fowls. The aim is to help them get meat and also sell some for income. This initiative will promote food security among female smallholder farmers".*

Furthermore, it was discovered that the district agricultural department through the Ghana Agricultural Investment Project provides training on conservation agriculture, irrigation farming and improved soya bean seeds to female smallholder farmers in the Saboba district.

Programmes by NGOs in the Bosome Freho district

The study also found that non-governmental organizations have introduced programmes to empower female smallholder farmers to improve food security. The study found that programmes such as the West African Food Programme (WAP), Modernizing Agriculture in Ghana sponsored by the Canadian government and Bright-Diamond sponsored by the Ghana Crop Research Institutes are introduced in collaboration with the agricultural department at the district level to empower female smallholder farmers to improve food security. The officer in charge of Women in Agricultural Development in the Bosome Freho district said;

> "*All these programmes are helpful to the farmers. Through these programmes, educate female smallholder farmers on the best agricultural practices, how to conserve their food crops and the need for nutritious foods"*

It was found that the Centre for Women in Agricultural Development in the Bosome Freho district trains female smallholder farmers to acquire some entrepreneurial competencies

which will help them gain income aside from their farming businesses. The officer in charge of Women in Agricultural Development in the Bosome Freho district stated;

> *"We also provide training for female smallholder farmers on entrepreneurship. We train them to gain skills in areas such as gari processing, bread baking, and preparation of palm oil".*

The study further sought to investigate the effect of the programmes and measures introduced by these non-governmental organizations. The data is presented in the table below.

Table 22: Beneficiaries of programmes introduced by NGOs

	Responses		
Districts	Yes	No	Total
Bosome Freho	57	139	196
	29.1%	70.9%	100.0%
Saboba	91	105	196
	46.4%	53.6%	100.0%
Total	148	244	392
	37.8%	62.2%	100.0%

Source: Field data (2022)

From Table 22, it could be observed that 37.8% of the respondents have ever benefited from the programmes introduced by non-governmental organizations while the majority of 62.2% have not. The table further shows more respondents in the Saboba district (46.4%) have benefited from these programmes compared to the respondents from the Bosome Freho district.

Most of the respondents who have benefited from the programme indicated that the programmes are very helpful to them. One of the respondents from the Bosome Freho stated;

> *"Through, this programme I have learnt how to bake bread which gives me income"*

Another also said;

> *"The programmes are helpful, now I know when and how to effectively apply fertilizer to my crops".*

One respondent from the Saboba district also said;

> *Sometimes, I will have food at home but will not meat. But since I have plenty of guinea fowls, I can kill some and use them to prepare food for my household.*

4.4.4 Other supports expected by female smallholder farmers

Most of the respondents from the two districts expressed their need for financial support. Others in the Bosome Freho also stated that most of the extension officers do not pay regular visits and demanded that authorities ensure that extension officers visit them in various communities. Also, the agriculture department within the two districts indicated that inadequate staff and funds limit their ability to reach out to more smallholder farmers.

4.5 Conclusion

The chapter focused on the data analysis, presentation and discussion of findings. The data were presented with simple statistical illustrations such as tables, mean and percentages. The discussion was made simple and clear for the better understanding of readers. The next chapter focuses on the summary, conclusion and recommendation.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.0 Introduction

This chapter presents the summary of the research findings, conclusion and recommendations. Chapter one of this study presented the background of the study and the statement of the problem. It also discussed the objectives of the study and the research questions. Moreover, the chapter elaborated on the significance of the study and its organization of the study. the chapter was dedicated to the review of related literature that was relevant to this study. The chapter reviewed the theories, concepts, and empirical studies and presented the conceptual framework that guided this study. Chapter three focused on the research methodology. The chapter also presented a brief profile of the study areas. Chapter four focused on the data analysis, presentation and discussion and chapter five was dedicated to the summary, conclusion and recommendations.

5.1 Summary of Findings

The study sought to attain three specific objectives. These include assessing the situation of food security among female smallholder farmers, assessing the challenges faced by female smallholder farmers in Ghana that impact their capacity to contribute to food security and exploring the strategies and resources initiated to empower female smallholders in Ghana to contribute to food security. The findings have been summarized, following the research objectives.

5.1.1 Current level of food security among female smallholder farmers

The study found that female smallholder farmers are food insecure. It also revealed that there exists some level of food security among female smallholder farmers. However, the level of food security among female smallholder farmers could be described as marginal food security. Moreover, the study found that the majority of the female smallholder farmers could access food, but, not in the quantity and diversity, they desire. The study also found that the situation of food security among smallholder farmers in the Bosome Freho district is relatively better than female smallholder farmers in the Saboba district. Thus, the findings are in line with the theory of access (Ribot and Peluso, 2003); though female smallholder farmers produce food, they are unable to derive full benefits from the production of food to enhance food security.

5.1.2 Barriers faced by female smallholder farmers in Ghana that impact their capacity to contribute to food security

The study discovered that various factors impede the efforts of female smallholder farmers in the production of food. The study found that the majority of female smallholder farmers spent much of their productive hours at home due to the performance of household chores. It was also found that factors such as lack of market access, low prices of products and lack of storage facilities negatively affect female smallholder farmers. Moreover, lack of access to farmland and climate change serve as major impediments to female smallholder farmers, especially in the Saboba district. the study also found that inadequate funds and lack of access to credit facilities impede the efforts of female smallholder farmers to expand their farm size. Moreover, the study found that the majority of female smallholder farmers were used to traditional farming tools and practices. The findings affirm the argument by liberal

feminist theorists that women are deprived in terms of access to basic human rights, resource allocation, and employment opportunities in society.

5.1.3 Strategies and resources initiated to empower female smallholders in Ghana to contribute to food security

The study discovered that measures and policies have been initiated to empower female smallholder farmers. The study found that some female smallholder farmers benefit from the subsidized fertilizer policy. However, it was discovered that the subsidized fertilizer is mostly shared among male farmers to the detriment of female smallholder farmers. Also, it was discovered that several non-governmental organizations and international development agencies have introduced policies to help boost female smallholder farming. However, these policies have not had the desired impact on female smallholder farmers.

5.2 Conclusion

The issues of food insecurity continue to inflict on individuals and societies around the world. According to FAO (2019), the majority of the African population is food insecure. The major developments around the world such as the increase in population, rapid urbanization, industrialization, outbreak of pandemics and climate change pose a greater threat to the efforts to eradicate hunger, promote food security, improve nutrition and promote sustainable agriculture (Prosekov and Ivanova, 2018; Ambros and Granvik, 2020). This phenomenon highlights the need to adopt practical and effective measures to boost food production and promote nutrition.

According to Neel (2018), female smallholder farmers could be overlooked in the discussion of food security. This is because female smallholder farmers are food producers, processors and consumers. Thus, they are involved at all levels of the food supply chain. As indicated

by Tsige et al. (2020) female smallholder farmers could increase food production by 30 per cent and increase food security by 17 per cent if they should gain equal access to farming resources as men. However, the findings of this study show that female smallholder farmers face the threat of food insecurity. Female smallholder farmers in the Bosome Freho and Saboba districts do not have physical and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life and to contribute towards achieving food security in Ghana.

The study concludes by stating that much attention has been focused on inculcating female smallholder farmers in the drive towards food security. The measures and policies initiated by the government and other development agencies have not been effective in improving food production and income among smallholder farmers. There is therefore, the need for the adoption and implementation of more innovative, efficient and effective measures and strategies to empower smallholder female farmers to improve food production, food processing and food consumption.

5.3 Recommendations

Based on the gaps in the existing literature and the findings of this study, generally, there is a need for public policymakers and development stakeholders to formulate policies that will empower female smallholder farmers to improve food security. The study makes the following specific recommendations.

5.3.1 Effective training and education for female smallholder farmers

The government and non-governmental organizations should provide education and training to female smallholder farmers. The education and training should focus on equipping female smallholder farmers with modern farming practices on the use of modern equipment for

farming. Moreover, female smallholder farmers should be educated on climate adaptation strategies to minimize the effects of climate change on female smallholder farmers.

5.3.2 Equipping female smallholder farmers with entrepreneurial skills

Smallholder farmers should be equipped with entrepreneurial skills. This will empower them to engage in off-farm economic activities to earn some income, especially during planting time season and dry season when female smallholder farmers have no source of income. The income earned from these off-farm economic activities could be used to purchase basic agricultural products to boost crop yield. Also, such income could be used to purchase other foodstuffs which are not produced by female smallholder farmers. This will ensure diversification of food intake and improve nutrition.

5.3.3 Creation of food security awareness among female smallholder farmers

The government and international development organizations such as the United Nations and the World Bank should create food security awareness among female smallholder farmers. The awareness should focus on the importance of consuming nutritious food and best food conservation practices. This will ensure that female smallholder farmers make judicious use of the limited resources at their disposal to enhance food security.

5.3.4 Provision of modern agricultural tools and extension services to female smallholder farmers

Female smallholder farmers should be provided with periodic and regular extension services. The government should therefore ensure that more extension officers are trained, equipped and motivated to deliver services to female smallholder farmers. Also, female smallholder farmers should be provided with modern agricultural tools which will reduce the excessive use of human strength and increase productivity. The provision of these may motivate female smallholder farmers to produce more food.

5.3.5 Encouraging the formation of farmer's associations among female smallholder farmers

Female smallholder farmers should be encouraged to form or join farmers' associations. Farmers' associations are important because they help to mobilize farmers for easy implementation of policies and measures. For, example farmers' associations can be a useful mechanism or point of contact through which government and development stakeholders can educate and provide training for farmers. It is therefore important for assembly members, unit committee chairmen and chief farmers to mobilize female smallholder farmers into an association.

5.3.6 Provision of ready markets for the products of female smallholder farmers

The provision of a ready market for goods produced by female smallholder farmers will encourage them to produce more. The government of Ghana through the National Buffer Stock Company Limited should give special attention to the goods produced by female smallholder farmers. also, the government should intervene to set fixed prices for unperishable farm products such as maize, millet, beans and cowpeas. This can ensure that female smallholder farmers get relatively fair prices for the goods they produce.

5.3.7 Ensuring the effectiveness of the 30% subsidized fertilizer policy for female smallholder farmers

The government of Ghana through the ministry of agriculture has introduced the subsidized fertilizer policy. The policy indicates that 30% of the subsidized fertilizers should be reserved for female smallholder farmers. However, the findings of this study indicate that the implementation of the subsidized fertilizer policy has not given special attention to female smallholder farmers. the study recommends that the government should ensure that 30% of subsidized fertilizer is given to the required female smallholder farmers.

5.3.8 Assisting female smallholder farmers to get access to land

Female smallholder farmers should be assisted to get access to farmlands. In areas where the government has reserved forest, portions of these forest reserves could be given to female smallholder farmers to cultivate their crops while ensuring afforestation and re-afforestation. Also, chiefs, traditional leaders and family heads should make provisions to make portions of fertile lands available and accessible to female smallholder farmers.

REFERENCES

Abdelhidi, I.T., Zouari, S. Z. (2020). Agriculture and food security in North Africa: A theoretical and empirical approach. *J. Know. Econ, 11*, 193–210. https://doi.org/10.1007/s13132-018-0528-y

Abdul-Rahman, M., Donkoh, S. A., Ansah, I. G., & Yahaya, I. (2019). Contract farming and adoption of improved maize production technologies in Northern region, Ghana. *Sustainable Development in Africa: Case Studies*, *121*, 2121-2158.

Abdul-Razak, M. & Kruse, S. The adaptive capacity of smallholder farmers to climate change in the Northern Region of Ghana. *Climate Risk Management, 17*, 104-122.

Abebe, G. & Debebe, S. (2019). Factors affecting the use of organic fertilizer among smallholder farmers in Sekela district of Amhara region, Northwestern Ethiopia. *Cogent Food & Agriculture, 5*(1), 1-11.

Abegunde, V. O., Sibanda, M., & Obi, A. (2019). Determinants of the adoption of climate-smart agricultural practices by small-scale farming households in King Cetshwayo District Municipality, South Africa. *Sustainability*, *12*(1), 195.

Abiodun, S. (2021). Food security in Nigeria: Effect on small-scale agribusiness. Aquaculture challenges. *International Journal of Research Publication and Reviews, 2*(9), 1159-1165.

Abokyi, E., Strijker, D., Asiedu, F. K. & Daams, N. M. (2020). The impact of output price support on smallholder farmers' income: evidence from maize farmers in Ghana. *Helion, 6,* 1-13.

Aborisade, B., & Bach, C. (2016). Assessing the pillars of sustainable food security. *European International Journal of Science and Technology, 3*, 117-125.

Acheampong, P. P., Obeng, E.A., Opoku, M., Brobbey, L. & Sakyiamah, B. (2022). Does food security exist among farm households? Evidence from Ghana. *Agriculture & Food Security, 11*(24), 1-13. https://doi.org/10.1186/s40066-022-00362-9

Acuto, M., Parnell, S., & Seto, K. C. (2018). Building a global urban science. *Nature Sustainability*, *1*(1), 2-4.

Adaku, A. A., & Amanor-Boadu, V. (2022). Typology and performance of inter-organizational relationships among Ghanaian farmers. *International Food and Agribusiness Management Review*, *25*(3), 379-391.

Agarwal, B. (2018). Gender equality, food security and sustainable development goals. *Current opinion in environmental sustainability*, *34*, 26-32.

Agholor, A. I., & Nkosi, M. (2020). Sustainable water conservation practices and challenges among smallholder farmers in Enyibe Ermelo Mpumalanga province, South Africa. *Journal of Agricultural Extension*, *24*(2), 112-123.

Agwu, N. M., & Oteh, O. U. (2014). Analysis of income inequalities and food security among farmers in Abia State, South Eastern Nigeria. *Scientific Papers Series Management. Economic Engineering in Agriculture and Rural Development*, *14*(3), 7-23.

Akinyetun, T. S., Odeyemi, D. D., & Alausa, J. A. (2021). Social media and electoral violence in Nigeria: Sustainable Development Goal 16, a panacea. *KIU Interdisciplinary Journal of Humanities and Social Sciences*, *2*(2), 189-215.

Aku, A., Mshenga, P., Afari-Sefa, V., & Ochieng, J. (2018). Effect of market access provided by farmer organizations on smallholder vegetable farmer's income in Tanzania. *Cogent Food & Agriculture*, *4*(1), 1-14.

Alipio, M. M. (2020). A path analysis examining the relationship between access barriers to health services and healthcare utilization among the publicly insured: insights from a multiprovince survey in the Philippines. *Public Health,* 18(1), 49-74.

Alonso, E. B., Cockx, L., & Swinnen, J. (2018). Culture and food security. *Global food security*, *17*, 113-127.

Amare, M., Mariara, J., Oostendorp, R., & Pradhan, M. (2019). The impact of smallholder farmers' participation in avocado export markets on the labour market, farm yields, sales prices, and incomes in Kenya. *Land Use Policy*, *88*, 104168.

Ambros, P. & Granvik, M. (2020). Trends in agricultural land in EU countries of the Baltic Sea region from the perspective of resilience and food security. *Sustainability, 12,* 1-24.

Amejo, A. G., Gebere, Y. M., & Kassa, H. (2018). Integrating crop and livestock in smallholder production systems for food security and poverty reduction in sub-Saharan Africa. *African Journal of Agricultural Research*, *13*(25), 1272-1282.

Ampim, P. A., Ogbe, M., Obeng, E., Akley, E. K., & MacCarthy, D. S. (2021). Land cover changes in Ghana over the past 24 years. *Sustainability*, *13*(9), 1-21.

Amusan, L., Akokuwebe, M. E. & Odularu, G. (2021). Women Development in Agriculture is an agency for fostering innovative agricultural financing in Nigeria. *Afr. J. Food Agric. Nutr. Dev., 21*(7), 18279-18299. https://doi.org/10.18697/ajfand.102.19345

Anang, B. T. & Yeboah, R. W. N. (2019). Determinants of off-farm income among smallholder rice farmers in Northern Ghana: Application of a double-hurdle model. *Advances in Agriculture, 2019,* 1-9.

Andani, A., Moro, A. H. B., & Issahaku, G. (2020). Fertilizer subsidy policy and smallholder farmers crop productivity: The case of maize production in North-Eastern Ghana. *Journal of Agricultural Extension and Rural Development*, *12*(2), 18-25.

Andriamparany, J. N., Hänke, H., & Schlecht, E. (2021). Food security and food quality among vanilla farmers in Madagascar: The role of contract farming and livestock keeping. *Food Security*, *13*(4), 981-1012.

Aniah, P., Kaunza-Nu-Dem, M. K., & Ayembilla, J. A. (2019). Smallholder farmers' livelihood adaptation to climate variability and ecological changes in the savanna agroecological zone of Ghana. *Heliyon*, *5*(4), 1-25.

Ankrah, A. D., Freeman, C. Y. & Afful, A. (2020). Gendered access to productive resources -evidence from smallholder farmers in Awutu Senya West District of Ghana. *Scientific African 10*(2), 1-12.

Ankrah, D. A., Kwapong, N. A., Eghan, D., Adarkwah, F., & Boateng-Gyambiby, D. (2021). Agricultural insurance access and acceptability: Examining the case of smallholder farmers in Ghana. *Agriculture & Food Security*, *10*(1), 1-14.

Ansah, I. G. K., Gardebroek, C., & Ihle, R. (2019). Resilience and household food security: A review of concepts, methodological approaches and empirical evidence. *Food Security*, *11*(6), 1187-1203.

Anuga, S. W., & Gordon, C. (2016). Adoption of climate-smart weather practices among smallholder food crop farmers in the Techiman municipal: Implication for crop yield. *Research Journal of Agriculture and Environmental Management, 5*(9), 279-286.

Anyidoho, N.A. (2021). *Women, Gender, and Development in Africa*. In: Yacob-Haliso, O., Falola, T. (eds) *The Palgrave Handbook of African Women's Studies*. Palgrave Macmillan.

Appiah, D. O., & Guodaar, L. (2022). Smallholder farmers' perceptions and knowledge on climate variability and perceived effects in vulnerable rural communities in the Offinso Municipality, Ghana. *Environmental Development*, *42*, 100691.

Asafo-Adjei, E. & Buabeng, E. (2016). An evaluation of challenges facing smallholders in Ghana: A case study for the Aowin Suaman District. *Journal of Biology, Agriculture and Healthcare, 6*(3), 22-29.

Asare-Nuamah, P., & Mandaza, M. S. (2020). Climate change adaptation strategies and food security of smallholder farmers in the rural Adansi North District of Ghana. *Handbook of Climate Change Management: Research, Leadership, Transformation*, 1-20.

Asiamah, N., Mensah, H. K., & Oteng-Abayie, E. F. (2017). General, target, and accessible population: Demystifying the concepts for effective sampling. *The Qualitative Report*, *22*(6), 1607-1621.

Asitik, A. J. & Abu, B. M. (2020). Women empowerment in agriculture and food security in Savannah Accelerated Development Authority zone of Ghana. *African Journal of Economic Management Studies.* 11(2), 253-270.

Assefa, Y., Damme, V. W., Williams, D. O., Hill, P. S. (2017). Successes and challenges of the millennium development goals in Ethiopia: lessons for the sustainable development goals. *BMJ Glob Health, 2,* 1-7.

Ayinde, I. A., Otekunrin, O. A., Akinbode, S. O. & Otekunrin, O. A. (2020). Food security in Nigeria: Impetus for Growth and Development. *Journal of Agricultural Economics and Rural Development, 6*(2), 808-820.

Ayisi, D. N., Kozári, J., & Krisztina, T. (2022). Do smallholder farmers belong to the same adopter category? An assessment of smallholder farmers innovation adopter categories in Ghana. *Heliyon*, *8*(8), 1-10.

Azadi, H., Ghazali, S., Ghorbani, M., Tan, R. & Witlox, F. (2019). Contribution of small-scale farmers to global food security: a meta-analysis. *Agriculture, Ecosystems & Environment*, 144 (1), 92-94.

Aziz, N., Nisar, A. Q., Koondhar, A. M., Meo, M. S. &Rong, K. (2020). Analyzing the women's empowerment and food security nexus in rural areas of Azad Jammu & Kashmir, Pakistan: By considering the sense of land entitlement and infrastructural facilities. *Land Use Policy, 94,* 1-14.

Baiphethi, M. N. & Jacobs, P. T. (2009). The contribution of subsistence farming to food security in South Africa, *Agrekon,* 48(4), 459-482.

Barkume, C., Date, K., Saha, K. S., Qamar, F. N., Sur, D., Andrews, J. R., … & Garrett, D. (2018). Phase I of the Surveillance for Enteric Fever in Asia Project (SEAP): An overview and lessons learned. *The Journal of Infectious Diseases, 218*(4), 188-194.

Beckman, J., Baquedano, F., & Countryman, A. (2021). The impacts of COVID-19 on GDP, food prices, and food security. *Q Open*, *1*(1), qoab005.

Benedek, Z., Fertő, I., Galamba, M. C., Aguiar, P. M. D., Pocol, C. B., Čechura, L., ... & Bakucs, Z. (2021). Farm diversification is a potential success factor for small-scale farmers constrained by COVID-related lockdown. Contributions from a survey conducted in four European countries during the first wave of COVID-19. *PloS one*, *16*(5), e0251715.

Beneria, L. (2011). *Globalization, labour and women's work: Critical challenges for the post-neoliberal world*. Routledge.

Bijen, A. (2020). The Future of Peace in the Middle East: Russia's Approach to Israeli-Palestinian Conflict. *Journal of Iran and Central Eurasia Studies, Summer, 3*(1): 51-73.

Bizikova, L., Nkonya, E., Minah, M., Hanisch, M., Turaga, R. M. R., Speranza, C. I., ... & Timmers, B. (2020). A scoping review of the contributions of farmers' organizations to smallholder agriculture. *Nature Food*, *1*(10), 620-630.

Bocksteal, V. S. (2019). Land grabbing "from below"? Illicit artisanal gold mining and access to land in post-conflict Cote d'Ivoire. *Land Use Policy, 81,* 904-914.

Bonuedi, I., Kamasa, K. & Opoku, E. E. O. (2020). Enabling trade across borders and food security in Africa. *Food Security*, *12*(5), 1121-1140.

Bryson, V. (1999). Patriarchy: A concept too useful to lose. *Contemporary Politics, 5*(4), 311-324, DOI: 10.1080/13569779908450014

Bungu, O. (2019). The role played by Zimbabwean women in reviving the agricultural sector after the dilapidation of Zimbabwe-British relations. *Journal of African Foreign Affairs, 6*(2), 1-16.

Calicioglu, O., Flammini, A., Bracco, S., Bellù, L., & Sims, R. (2019). The future challenges of food and agriculture: An integrated analysis of trends and solutions. *Sustainability*, *11*(1), 1-21.

Cameron, R. (2011). Mixed methods research: The five Ps framework. *Electronic journal of business research methods*, *9*(2), 96-108.

Camilla, G., Chiarelli, D. D., Luciano, A., Pinotti, L., & Rulli, M. C. (2022). Global assessment of land and water resource demand for pork supply. *Environmental Research Letters*, *17*(7), 1-15.

Carranza, M. & Niles, M. T. (2019). Smallholder farmers spend credit primarily on food: Gender differences and food security implications in a changing climate. *Frontiers in Sustainability Food Systems, 3*(56), 1-14.

Casteel, A., & Bridier, N. L. (2021). Describing populations and samples in doctoral student research. *International Journal of Doctoral Studies*, *16*(1), 1-8.

Ceballos, F., Samyuktha, K. & Berber, K. (2020). "Impacts of a national lockdown on smallholder farmers' income and food security: Empirical evidence from two states in India." *World Development* 136, 1-5.

Chauhan, V., Villeneuve, D., & Cool, D. (2021). Collaborative efforts are needed among the scientific community to advance the adverse outcome pathway concept in areas of radiation risk assessment. *International journal of radiation biology*, *97*(6), 815-823.

Chege, F. & Sifuna, N. D. (2006*). Girls' and women's education in Kenya: Gender perspectives and trends.* UNESCO.

Chikuni, T., & Kilima, F. T. (2019). Smallholder farmers' market participation and mobile phone-based market information services in Lilongwe, Malawi. *The Electronic Journal of Information Systems in Developing Countries*, *85*(6), e12097.

Christiansen, L., & Demery, L. (2018). Myths Become Realities—Or Do They? *Agriculture in Africa: Telling Myths from Facts, Directions in Development, Agriculture and Rural Development. The World Bank*, 1-12.

Clapp, J., Moseley, W. G., Burlingame, B. & Termine, P. (2022). The case for a six-dimensional food security framework. *Food Policy*, *106*, 102164.

Clement, F., Buisson, M. C., Leder, S., Balasubramanya, S., Saikia, P., Bastakoti, R. & van Koppen, B. (2019). From women's empowerment to food security: revisiting global discourses through a cross-country analysis. *Global Food Security, 23*, 160–172.

Coates, J., Swindale, A., & Bilinsky, P. (2007). *Household Food Insecurity Access Scale (HFIAS) for measurement of food access: indicator guide*. Version 3.

Commission on Human Security. 2003. *Human Security Now: Final Report*. New York: CHS.

Conner, D. S., & Garnett, B. R. (2016). Economic and environmental drivers of fruit and vegetable intake among socioeconomically diverse adults in Vermont. *Journal of Hunger & Environmental Nutrition*, *11*(2), 263-271.

Coulibaly, J. Y., Chiputwa, B., Nakelse, T., & Kundhlande, G. (2017). Adoption of agroforestry and the impact on household food security among farmers in Malawi. *Agricultural systems*, *155*, 52-69.

Creswell, J. (2009). *Research design: Qualitative, quantitative, and mixed methods approach, (3rd ed.).* Sage.

Creswell, J. W. & Plano Clark, V. L. (2011). *Designing and conducting mixed methods research.* Sage Publications.

Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approach (4th ed.).* Sage publications.

Dam Lam, R., Boafo, Y.A., Degefa, S., Gasparatos, A. & Saito, O. (2017). Assessing the food security outcomes of industrial crop expansion in smallholder settings: insights from cotton production in Northern Ghana and sugarcane production in Central Ethiopia. *Sustain Sci*., *12,* 677–693.

Danso-Abbeam, G., Ehiakpor, D. S. & Aidoo, R. (2017). Agricultural extension and its effects on farm productivity and income: insight from Northern Ghana. *Agriculture & Food Security, 7*(74), 2-10.

Daudu, A. K., Oladipo, F. O., Olatinwo, L. K., Kareem, O. W., & Dolapo, T. A. (2019). Differences in Food Crop Diversification between Males and Female Smallholder Farmers in Kwara State, Nigeria. *Journal of Agricultural Extension*, *23*(4), 1-9.

De-la-Torre, G. E. (2020). Microplastics: an emerging threat to food security and human health. *J Food Sci Technol,* 57, 1601–1608.

Delgado, C., Jang, S. Milante, G. & Smith, D. (2021). *The World Food Programme's contribution to improving the prospects for peace*. Stockholm: Stockholm International Peace Research Institute.

Demi, D. S. & Sicchia, R. S. (2021). Agrochemicals use practices and health challenges of smallholder farmers in Ghana. *Environmental Health Insight, 15*, 1-11.

Devi, A. P. (2020). Depicting pragmatic presuppositions in YouTube advertisements. *Journal of English Pedagogy, Linguistics, Literature, and Teaching*, *8*(2), 1-7.

Dhahri, S. & Omri, A. (2020). Foreign capital towards SDG 1 & 2 – Ending poverty and hunger: The role of agricultural production. *Structural Change and Economic Dynamics, 53*, 208-221.

Dibakoane, S., Siyongwana, P., & Shabalala, A. N. (2022). Vulnerability, impact and adaptation strategies of female farmers to climate variability. *Jàmbá: Journal of Disaster Risk Studies*, *14*(1), 11.

Djoumessi, Y. F., Kamdem, C. B., Afari-sefa, V., & Bidogeza, J. C. (2018). Determinants of smallholder vegetable farmers credit access and demand in Southwest region, Cameroon. *Economics Bulletin*, *38*(2), 1231-1240.

Duda, I., Fasse, A. & Grote, U. (2018). Drivers of rural-urban migration and impact on food security in rural Tanzania. *Food Sec. 10*, 785–798. https://doi.org/10.1007/s12571-018-0788-1

EIU. (2019). *The global food security index 2019: Strengthening food systems and the environment through innovation and investment*. Economist Intelligence Unit. https://foodsecurityindex.eiu.com/

Elliot, A. (2013). *Reinvention.* Routledge.

Ene, C. (2020). Food security and food safety: Meanings and connections. *Econ Insights Trends Challs, 9(1)*, 59-68.

Ezirigwe, J. (2018). Law as a tool for ensuring contributions of small-scale women farmers to food security in Nigeria. *Law and Development Review, 11*(2), 709-737.

Fahey, C. A., Njau, P. F., Kelly, N. K., Mfaume, R. S., Bradshaw, P. T., Dow, W. H., & McCoy, S. I. (2021). The durability of effects from short-term economic incentives for clinic attendance among HIV positive adults in Tanzania: Long-term follow-up of a randomized controlled trial. *BMJ Global Health*, *6*(12), 1-9.

FAO, IFAD, WFP. (2021). *The state of food insecurity in the world. The multiple dimensions of food security*. Rome, FOA. http://www.fao.org/docrep/018/i3434e/i3434e.pdf accessed, 24 April 2022.

FAO, WFP & UNICEF (2019). *The state of food security and nutrition in the world 2019: Safeguarding against economic slowdowns and downturns.* Rome. Food and Agri Org.

FAO. (2019). *The state of food security and nutrition in the world 2019. Safeguarding against economic slowdowns and downturns*. FAO. http://www.fao.org/3/ca5162en/ca5162en.pdf

Fletschner, D., & Kenney, L. (2014). *Rural women's access to financial services: credit, savings, and insurance*. Springer Netherlands.

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*, 1-11.

Galiè, A., Teufel, N., Girard, A. W., Baltenweck, I., Dominguez-Salas, P., Price, M. J., ... & Yount, K. M. (2019). Women's empowerment, food security and nutrition of pastoral communities in Tanzania. *Global Food Security*, *23*, 125-134.

Gasper, D. (2020). *Human Development Thinking About Climate Change Requires a Human Rights Agenda and an Ontology of Shared Human Security.* In: Crabtree, A. (eds) *Sustainability, Capabilities and Human Security.* Palgrave Macmillan, Cham.

Ghana Statistical Service. (2012). *2010 Population and housing census: summary report of final results*. Ghana Statistical Service: Accra.

Gil, J. D., Daioglou, V., van Ittersum, M., Reidsma, P., Doelman, J. C., van Middelaar, C. E., & van Vuuren, D. P. (2019). Reconciling global sustainability targets and local action for food production and climate change mitigation. *Global Environmental Change*, *59*, 101983.

Gil, J.D.B., Reidsma, P. & Giller, K. (2019). Sustainable development goal 2: Improved targets and indicators for agriculture and food security. *Ambi, 48,* 685-698. https://doi.org/10.1007/s13280-018-1101-4

Giller, K. E. (2020). The food security conundrum of sub-Saharan Africa. *Global Food Security*, *26*, 100431.

Giuliani, G. A. (2021). The distributive implications of welfare reform packages. The Italian case during and after the great crisis. *European Politics and Society*, *22*(5), 589-603.

Gong, M., & Elahi, E. (2022). A nexus between farmland rights, access, demand, and amount of agricultural loan under the socialist system of China. *Land Use Policy*, *120*, 106279.

Grabińska, T. (2019). Anthropological foundations of aggression and personal safety on the example of Thomas Hobbes's Leviathan. *Security Dimensions, 31*, 118-138.

Graeub, B. E., Chappell, M. J., Wittman, H., Ledermann, S., Kerr, R. B., & Gemmill-Herren, B. (2016). The state of family farms in the world. *World Development*, *87*, 1-15.

Graham, R., Jackson, K. Masters-Awatere, B., & Stolte, O. (2022). Hidden hunger in a land of plenty: Food insecurity in Aotearoa New Zealand. *Global Journal of Community Psychology Practice, 13*(2), 1-20.

Gubarkov, S. V., Zhupley, I. V. & Tretyak, N. A. (2021). Food Independence as Key Component of Food Security of the Far Eastern Federal District. *IOP Conf. Series: Earth and Environmental Science 666*, 1-18.

Gunasekare, U. L. T. P. (2018). *A Study of Charismatic Leadership in Virtual Teams with special reference to the Business Process Outsourcing Sector in Sri Lanka* (Doctoral dissertation, Faculty of Graduate Studies, University of Kelaniya).

Gurumoorthy, V. (2021). Farmers' Notion Towards Creation of Casteless Society–A Comparative Analysis among Organic and Inorganic Farmers. *International Journal of Latest Research in Humanities and Social Science (IJLRHSS), 4*(10), 68-79.

Harvey, A. C., Saborio-Rodríguez, M., Martinez-Rodríguez, R., Viguera, B., Chain-Guadarrama, A., Vignola, R. & Alpizar, F. (2018). Climate change impacts and adaptation among smallholder farmers in Central America. *Agriculture & Food Security, 7*(57), 2-20.

Hasselberg, A. E., Aakre, I., Scholtens, J., Overå, R., Kolding, J., Bank, M. S., ... & Kjellevold, M. (2020). Fish for food and nutrition security in Ghana: Challenges and opportunities. *Global Food Security*, *26*, 1-10.

He, S., Su, Y., Wang, K., Shahtahmassebi, A. R., Zhang, L., Zhang, J., ... & Gan, M. (2020). Quantifying the sustainability of three types of agricultural production in China: An energy analysis with the integration of environmental pollution. *Journal of Cleaner Production*, *252*, 1-11.

Headey, D., Heidkamp, R., Osendarp, S., Ruel, M., Scott, N., Black, R., ... & Walker, N. (2020). Impacts of COVID-19 on childhood malnutrition and nutrition-related mortality. *The Lancet*, *396*(10250), 519-521.

Herrera, G. P., Bernardes, F. S., da Costa, R. B., da Silva, B. A., Mendes, D. R. F., & Constantino, M. (2018). Rural public policies and the state of smallholders: Recent evidence from Brazil. *African Journal of Agricultural Research*, *13*(35), 1857-1864.

Herrero, M., Thornton, P. K., Bernués, A., Baltenweck, I., Vervoort, J., van de Steeg, J., ... & Staal, S. J. (2019). Exploring future changes in smallholder farming systems by linking socio-economic scenarios with regional and household models. *Global Environmental Change*, *24*, 165-182.

Heywood, L. (2018). *Third-Wave Feminism and Representation.* In: Mansfield, L., Caudwell, J., Wheaton, B., Watson, B. (eds) *The Palgrave Handbook of Feminism and Sport, Leisure and Physical Education.* Palgrave Macmillan, London. https://doi.org/10.1057/978-1-137-53318-0_29

Hlatshwayo, S. I., Ngidi, M., Ojo, T., Modi, A. T., Mabhaudhi, T., & Slotow, R. (2021). A typology of the level of market participation among smallholder farmers in South Africa: Limpopo and Mpumalanga Provinces. *Sustainability*, *13*(14), 1-19.

Holden, M. T., & Lynch, P. (2004). Choosing the appropriate methodology: Understanding research philosophy. *Marketing Review, 4*(4), 397-409.

Hudson, H. E., Leclair, M., Pelletier, B., & Sullivan, B. (2017). Using radio and interactive ICTs to improve food security among smallholder farmers in Sub-Saharan Africa. *Telecommunications Policy*, *41*(7-8), 670-684.

Hughes, D., Thongkum, W., Tudpor, K., Turnbull, N. & Sychareum, V. (2021). Pesticides use and health impact on farmers in Thailand, Vietnam and Lao PDR: Protocol for a survey of knowledge, behaviours and blood acetylcholinesterase concentrations. *Plos One, 16*(9), 1-17.

Inegbedion, H. E. (2021). COVID-19 lockdown: Implication for food security. *Journal of Agribusiness in Developing and Emerging Economies*, *11*(5), 437-451.

International Labor Organization (2017). *The future of work in African agriculture: Trends and drivers of change.* Research department working paper no. 25

International Labour Organization (2017). *Improving market access for smallholder farmers: What works in out-grower schemes – evidence from Timor-Leste.* Issue Brief No 1, March 2017

Islam, A., Islam, A., Jantan, A. H., Hashim, H., Chong, C. W. & Abdullah, M. M. (2018). Factors Influencing Female Progression in Leadership Positions in the Ready-Made Garment (RMG) Industry in Bangladesh. *Journal of International Business and Management (JIBM), 1*(1), 1-13.

Israel, G. D. (1992): *Sampling the Evidence of Extension Program Impact. Program Evaluation and Organizational Development, IFAS*. The University of Florida.

Israel, G.D. (2013) Determining Sample Size. Institute of Food and Agricultural Sciences (IFAS). *University of Florida, PEOD, 6,* 1-5.

Jackson, S. and Scott, S. (2002). *Gender: A Sociological Reader*. Routledge

Jacobs, G., Ramanathan, J., Wolff, R., Pricopie, R., Dominici, P. & Zucconi, A. (2021). A New Paradigm in Global Higher Education for Sustainable Development and Human Security. *Cadmus*, *4*(5), 1-10.

Johnson, B. & Christensen, L. (2012*). Educational Research: Quantitative, Qualitative, and Mixed Approaches, 4th ed*. Sage.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational researcher*, *33*(7), 14-26.

Johnson-Odim, C. (1991). *Common Themes, Different Contexts: Third World Women and Feminism*. In Chandra T. M., Russo, A. & Torres, L. (eds.) Third World Women and the Politics of Feminism. Bloomington/Indianapolis: *Indiana University Press*, 3(4), 314-327.

Juliana, P., Poland, J., Huerta-Espino, J. *et al* (2019). Improving grain yield, stress resilience and quality of bread wheat using large-scale genomics. *Nat Genet* **51**, 1530–1539 (2019). https://doi.org/10.1038/s41588-019-0496-6

Kamara, A., Conteh, A., Rhodes, E. R., & Cooke, R. A. (2019). The relevance of smallholder farming to African agricultural growth and development. *African Journal of Food, Agriculture, Nutrition and Development*, *19*(1), 14043-14065.

Kanagavalli, G., & Manida, M. (2020). Challenges and opportunities to improve the livelihoods of Smallholder Farmers in Tamilnadu. *Journal of Shanghai Jiaotong University*, *16*(07), 312-321.

Kara, M. A. & Kithu, M. L. (2020). Education Attainment of Head of Household and Household Food Security: A Case for Yatta Sub-County, Kenya. *American Journal of Educational Research, 8*(8), 558-566.

Karthikeyan, L., Chawla, I., & Mishra, A. K. (2020). A review of remote sensing applications in agriculture for food security: Crop growth and yield, irrigation, and crop losses. *Journal of Hydrology*, *586*, 124905.

Kassa, E. T., & Getnet, M. T. (2022). Exploring factors that determine the innovation of micro and small enterprises: the role of entrepreneurial attitude towards innovation in Woldia, Ethiopia. *Journal of Innovation and Entrepreneurship*, *11*(1), 1-16.

Knapman, C., Silici, L., Cotula, L., & Mayers, J. (2017). Africa's farmland is in changing hands. *International Institute for Environment and Development. https://pubs.iied.org/17598IIEDi (Accessed, 4 April 2022).*

Kolawole, A. A. & Michael, A. (2021). Economic analysis of rice production by small-holder women farmers in Adamawa State, Nigeria. *Croatian Review of Economic, Business and Social Statistics (CREBSS), 7*(1), 1-12.

Kolawole, A. A., & Michael, A. (2021). Economic analysis of rice production by small-holder women farmers in Adamawa State, Nigeria. *Croatian Review of Economic, Business and Social Statistics*, *7*(1), 1-12.

Kononov, V. S. & Zhukov, A. V. (2020). The philosophy of security in the globalizing culture structure. *Journal of History Culture and Art Research, 9*(3), 415-422.

Kumar, S., Garg, N., & Upadhyay, R. (2021). Taking a Look at the Effects of Climate Change on Different Modes of Transportation. *Webology*, *18*(5), 3385-3395.

Kumari, S. (2013). Various issues of representation of women in Indian cinema. *Asian Journal of Multidimensional Research (AJMR), 2*(9), 81-86.

Kvartiuk, V., Petrick, M., Bavorova, M., Bednaříková, Z. & Ponkina, E. (2020) A Brain Drain in Russian Agriculture? Migration Sentiments among Skilled Russian Rural Youth. *Europe-Asia Studies, 72*(8), 1352-1377. DOI: 10.1080/09668136.2020.1730305.

Kvartiuk, V., Petrick, M., Bavorova, M., Bednaříková, Z., & Ponkina, E. (2020). Does a brain drain in Russian agriculture? Migration sentiments among skilled Russian rural youth. *Europe-Asia Studies*, *72*(8), 1352-1377.

Lawson, E. T., Alare, S. R., Salifu, Z. R. A. & Thomson-Hall, M. (2020). Dealing with climate change in semi-arid Ghana: understanding intersectional perceptions and adaptation strategies of women farmers. *GeoJournal,* 85, 439–452.

Leroy, J. L., Ruel, M., Frongillo, E. A., Harris, J., & Ballard, T. J. (2015). Measuring the food access dimension of food security: a critical review and mapping of indicators. *Food and Nutrition Bulletin*, *36*(2), 167-195.

Levanon, A., Lavee, E., & Strier, R. (2021). Explaining the factors shaping the likelihood of poverty among working families by using a concurrent mixed method design. *Social Indicators Research*, *157*(3), 1089-1109.

Liangliang, H. U., Zhao, L., Tang J, Guo L., Ding, L., Zhang, J. & Chen, X. (2019). Extension potential of the rice-fish co-culture system: A case study of 10 provinces in South China. *Chinese Journal of Eco-Agriculture*, 2019, 27(7), 981-993.

Lowder, S. K., Sánchez, M. V. & Bertini, R. (2021). Which farms feed the world and has farmland become more concentrated? *World Development, 142,* 1-15.

Maarouf, H. (2019). Pragmatism as a supportive paradigm for the mixed research approach: Conceptualizing the ontological, epistemological, and axiological stances of pragmatism. *International Business Research*, *12*(9), 1-12.

Malik SM, Barlow, A. & Johnson, B. (2021). Reconceptualising health security in post-COVID-19 world. *BMJ Global Health, 6,* 1-7.

Maltitz, L. V., & Bahta, Y. T. (2021). Empowerment of smallholder female livestock farmers and its potential impacts on their resilience to agricultural drought. *AIMS Agriculture and Food*, *6*(2), 603-630.

Mambile, C., & Machuve, D. (2019). Web-based Approach to overcome the Market Information Gap between poultry farmers and potential buyers in Tanzania. *Journal of Information Systems Engineering and Management*, *4*(1), em0085.

Manandhar, A., Milindi, P., & Shah, A. (2018). An overview of the post-harvest grain storage practices of smallholder farmers in developing countries. *Agriculture*, *8*(4), 57.

Masson-Delmotte, V., Zhai, P., Pirani, A., Connors, S. L., Péan, C., Berger, S., ... & Zhou, B. (2021). Climate change 2021: the physical science basis. *Contribution of working group I to the sixth assessment report of the intergovernmental panel on climate change*, *2*, 1-8.

Matthew, C., Benjamin, M., Carlo, C., Juan, C., Laso, B. Jesús, C. C. & Homi, K. (2021). Monitoring and projecting global hunger: Are we on track? *Global Food Security,30*(2), 1-15. https://doi.org/10.1016/j.gfs.2021.100568

McCarthy, L., Chang, A. B., & Brimblecombe, J. (2018). Food security experiences of Aboriginal and Torres Strait Islander families with young children in an urban setting: influencing factors and coping strategies. *International journal of environmental research and public health*, *15*(12), 1-22.

Meng, X. (2019). Views on the Security of Nation-States in the Context of Non-Traditional Security Issues under the Globalization. *Advances in Social Science, Education and Humanities Research, 298,* 520-522.

Mentsiev, A. U., Amirova, E. F., Afanasev, N. V. (2020). Digitalization and mechanization in the agriculture industry. *IOP Conf Ser Earth Environ Sci 548.* https://doi.org/10.1088/1755-1315/548/3/032031

Migose, S. A., Bebe, B. O., De Boer, I. J. M., & Oosting, S. J. (2018). Influence of distance to urban markets on smallholder dairy farming systems in Kenya. *Tropical animal health and production*, *50*, 1417-1426.

Mobolade, A. J., Bunindro, N., Sahoo, D., and Rajashekar, Y. (2019). Traditional methods of food grains preservation and storage in Nigeria and India. *Ann. Agric. Sci., 64* (2), 196-205.

MoFA (2021). *Agriculture in Ghana, facts and figures. Ministry of Food and Agriculture, Statistics, Research and Information Directorate (SRID).* Stat. Res. Inf. Dir. October 20, 3137–3146

MoFA, (2017). *Agriculture in Ghana, Facts and figures. Statistics, research and information directorate (SRID)*. Ghana: Accra; 2010.

MoFA, GSS, WFP & FAO (2020). *Comprehensive Food Security and Vulnerability Analysis (CFSVA) Ghana.* 2020 report.

MoFA. 2017. *Agribusiness Unit Production Guide: Mango Production*. Accra: Ministry of Food and Agriculture. Available at: https://mofa.gov.gh/site/?pageid=14124 (last accessed July 17, 2021).

Morgan, D. L. (2007). Paradigms lost and pragmatism regained: Methodological implications of combining qualitative and quantitative methods. *Journal of mixed methods research*, *1*(1), 48-76.

Morgan, D. L. (2014). Pragmatism as a paradigm for social research. *Qualitative Inquiry*, *20*(8), 1045-1053.

Mosello, R., Bruni, P., Rogora, M., Tartari, G., & Dresti, C. (2018). Long-term change in the trophic status and mixing regime of a deep volcanic lake (Lake Bolsena, Central Italy). *Limnologica*, *72*, 1-9.

Moyo, M., Van Rooyen, A., Bjornlund, H., Parry, K., Stirzaker, R., Dube, T., & Maya, M. (2020). The dynamics between irrigation frequency and soil nutrient management: Transitioning smallholder irrigation towards more profitable and sustainable systems in Zimbabwe. *International Journal of Water Resources Development, 36*(1), 102-126.

Mundhe, S. E. (2019). Food security in India: Performance, challenges and policies. *International Journal of Research and Analytical Reviews (IJRAR), 6*(1), 221-224.

Murage, A. W., Pittchar, J. O., Midega, C. A. O., Onyango, C. O., Pickett, J. A., & Khan, Z. R. (2019). Gender appropriateness of field days in knowledge generation and adoption of push-pull technology in eastern Africa. *East African Agricultural and Forestry Journal*, *83*(4), 289-306.

Murage, F. M., Mogae, J. N., Ngetich, K. F., Mucheru-Muna, M. M. & Mugendi, D. N. (2019). Adoption of soybean by smallholder farmers in the Central Highlands of Kenya. African *Journal of Agricultural Economics and Rural Development, 7*(5), 1-12.

Mutea, E., Rist, S., & Jacobi, J. (2020). Applying the theory of access to food security among smallholder family farmers around North-West Mount Kenya. *Sustainability*, *12*(5), 1751.

Muthoni M. G. (2017). The side hustle: diversified livelihoods of Kenyan educated young farmers. *Transforming Development Knowledge, 48*(13), 1-18.

Mutura, K. J., Nyairo, N., Mwangi, M. & Wambugu, K. S. (2016). Analysis of Determinants of Vertical and Horizontal Integration among Smallholder Dairy Farmers in Lower Central Kenya. *International Journal of Agricultural and Food Research [IJAFR), 5*(1), 1-13.

Muzari, W., Nyamushamba, G. B., & Soropa, G. (2016). Climate change adaptation in Zimbabwe's agricultural sector. *International Journal of Science and Research*, *5*(1), 1762-1768.

Mwamakamba, N. S., Sibanda, M. L., Pittock, J., Stirzaker, R., Bjornlund, H. Rooyen, A.… & Japhet J. Kashaigili, J. J. (2017). Irrigating Africa: policy barriers and opportunities for enhanced productivity of smallholder farmers. *International Journal of Water Resources Development, 33*(5), 824-838, DOI: 10.1080/07900627.2017.1321531

Mwangi, T. M., Ndirangu, S. N., & Isaboke, H. N. (2020). Technical efficiency in tomato production among smallholder farmers in Kirinyaga County, Kenya. African Journal of Agricultural Research, 16(5), 667-677.

Nara, B. B., Lengoiboni, M. & Zevenbergen, J. (2021). Assessing customary land rights and tenure security variations of smallholder farmers in northwest Ghana. *Land Use Policy, 104,* 1-17.

Neel, E. H. M. A. F. (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, 5*(25), 2103-2117.

Neizer, E. K., Frimpong-Anin, K., & Mintah, P. (2020). Analyzing the Cost and Returns of Smallholder Farmers: A Case of Asante Akim South in Ghana. *Sustainable Agriculture Research*, *9*(2), 67-73.

Nicol, H. N. (2020). *The evolving North American arctic security context: Can security be traditional?* In: Coates, K.S., Holroyd, C. (eds) *The Palgrave Handbook of Arctic Policy and Politics*. Palgrave Macmillan.

Nihas, P. S. (2021). Non-Traditional Security Threat and National Security. *European Journal of Molecular & Clinical Medicine, 7*(7), 5899-5903.

Nyantakyi-Frimpong, H., & Bezner Kerr, R. (2017). Land grabbing, social differentiation, intensified migration and food security in northern Ghana. *The Journal of Peasant Studies*, *44*(2), 421-444.

Ocholi, A., Nyiatagher, Z. T., & Ayila, V. N. (2020). Effect of marketing intermediaries on the pricing of agricultural perishable products: A case study of onions and tomatoes in Benue State, Nigeria. *Journal of Agricultural and Crop Research*, *8*(7), 132-139.

Odhiambo, K. O., Iro Ong'or, B. T., & Kanda, E. K. (2021). Optimization of rainwater harvesting system design for smallholder irrigation farmers in Kenya: a review. *Journal of Water Supply: Research and Technology-Aqua*, *70*(4), 483-492.

Odoyo, E., Bett, B., & Murenga M. A. S. (2019). Challenges of and responses to climate variability: A Case study of peri-urban female farmers in Kenya. *World*, *7*(2), 61-68.

Ogundare, S. K., Afe, A. I., Kadiri, W. O., & Etukudo, O. O. (2016). Effects of cow dung manure and single superphosphate on soil phosphorus availability, growth and yield of maize in a gleysol of Kabba, Nigeria. *Nigerian Journal of Agriculture, Food and Environment*, *12*(3), 12-5.

Ogunniyi, A. I., Omotoso, S. O., Salman, K. K., Omotayo, A. O., Olagunju, K. O., & Aremu, A. O. (2021). Socio-economic drivers of food security among rural households in Nigeria: Evidence from smallholder maize farmers. *Social Indicators Research*, *155*, 583-599.

Ojakorotu, V. (2019). American protectionism and the new dimensions to human Security in Africa. *African Renaissance, 16*(1), 11-25.

Oluwaseun, A. M., & Olaitan, M. R. (2021). Microfinance banking services and financial inclusion in rural communities of Nigeria. *Trailblazer International Journal of Educational Research*, *1*(1), 1-17.

Onwutuebe, J. C. (2019). Patriarchy and women's vulnerability to adverse climate change in Nigeria. *SAGE Open, 7,* 1-7.

Osabohien, R., Ufua, D., Moses, C. L., & Osabuohien, E. (2020). Accountability in agricultural governance and food security in Nigeria. *Brazilian Journal of Food Technology, 23,* e2019089. https://doi.org/10.1590/1981-6723.08919

Pabi, O., Ayivor, J. S., & Ofori, B. D. (2019). Adaptive strategies of smallholder farming systems to changing climate conditions in the vicinity of Kogyae Strict Nature Reserve within the Forest-Savanna Transitional Zone of Ghana. *West African Journal of Applied Ecology*, *27*(2), 88-105.

Packard, M. (2018). *Report on a review of social and behaviour change methods and approaches within food for peace development food security activities. Food and nutrition technical assistance iii Project (FANTA).*

Paloma, S., Riesgo, L., & Louhichi, K. (2020). *The role of smallholder farms in food and nutrition security*. Springer Nature.

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (2nd ed.). Beverly Hills, CA: Sage.

Pauw, K. (2022). A review of Ghana's planting for food and jobs program: Implementation, impacts, benefits, and costs. *Food Security, 14,* 1321–1335.

Pawlak, K., & Kołodziejczak, M. (2020). The role of agriculture in ensuring food security in developing countries: Considerations in the context of the problem of sustainable food production. *Sustainability*, *12*(13), 1-20.

Payne, J. S. (2014). The influence of secular and theological education on pastors' depression intervention decisions. *Journal of religion and health*, *53*, 1398-1413.

Peng, W. & Berry, E. M. (2019). The Concept of Food Security. *Encyclopedia of Food Security and Sustainability, 2,* 1–7.

Petrikova, I., Bhattacharjee, R., & Fraser, P. D. (2023). The 'Nigerian diet' and its evolution: Review of the existing literature and household survey data. *Foods*, *12*(3), 443.

Piabuo, S. M., & Puatwoe, J. T. (2020). Public health effects of wood fuel in Africa: Bioenergy from tree commodities as a sustainable remedy. In *Public Health in Developing Countries-Challenges and Opportunities*. Intech Open.

Po, Y. T. J. & Hickey, G. M. (2018). Local institutions and smallholder women's access to land resources in semi-arid Kenya. *Land Use Policy, 76,* 252-263.

Pratt, S. F. (2016). Pragmatism as ontology, not (just) epistemology: Exploring the full horizon of pragmatism as an approach to IR theory. *International Studies Review*, *18*(3), 508-527.

Prosekov, A. Y. & Ivanova, S.A. (2018). Food security: The challenge of the present. *Geoforum 91*, 73–77.

Prosekov, A. Y., & Ivanova, S. A. (2016). Providing food security in the existing tendencies of population growth and political and economic instability in the world. *Foods and raw materials*, *4*(2), 201-211.

Ragsdale, K., Read-Wahidi, M. R., Zhou, Q. M., Clark, K., Asigbee, M. A., Tamimie, C., & Goldsmith, P. (2022). Low-cost soybean input bundles impact women farmers' subsistence livelihood traps evidence from Ghana. *Food Security*, *14*(4), 1045-1062.

Ragsdale, K., Read-Wahidi, R. M., Zhou, M. Q., Clark, K., Asigbee, A. K. M., Tamimie, C. & Goldsmith, P. (2022). Low-cost soybean input bundles impact women farmers' subsistence livelihood traps evidence from Ghana. *Food Security, 14,* 1045–1062.

Rahi, S. (2017). Research design and methods: A systematic review of research paradigms, sampling issues and instruments development. *International Journal of Economics & Management Sciences*, *6*(2), 1-5.

Rahmah, S. Z., Wonoadi, G. L., & Zulfikar, A. (2019). The Implementation of MDGs Program on Eradication of Extreme Poverty and Hunger in Indonesia (2009-2014). *Scientific Journal of International Relations*, *15*(1), 75-88.

Rai, A. & Ravi, A. (2011). Do Spouses Make Claims? Empowerment and microfinance in India. *World Development, 39*(6), 913-921.

Rao, N., Gazdar, H., Chanchani, D., & Ibrahim, M. (2019). Women's agricultural work and nutrition in South Asia: From pathways to a cross-disciplinary, grounded analytical framework. *Food Policy*, *82*, 50-62.

Rathgeber, E. M. (1989). *WID, WAD, GAD: Trends in research and practice*. International Development Research Centre Ottawa.

Reinke, W.M., Herman, K.C. & Dong, N. (2018). The Incredible Years Teacher Classroom Management Program: Outcomes from a Group Randomized Trial. *Prev. Sci., 19*, 1043 – 1054.

Reynolds, R. N. (2020). The year of the nurse and midwife 2020: activating the potential and power of nursing. *Rev. Latino-Am. Enfermagem*, 28, 1-3.

Ribot, C. J. & Peluso, N. L. (2003). A theory of access. *Rural Sociology, 68*(2), 153-181.

Ricciardi, V., Ramankutty, N., Mehrabi, Z., Jarvis, L., & Chookolingo, B. (2018). How much of the world's food do smallholders produce? *Global Food Security, 17,* 64-72.

Richardson, J. A. (2018). The discovery of cumulative knowledge: Strategies for designing and communicating qualitative research. *Accounting, Auditing & Accountability Journal*, *31*(2), 563-585.

Roopa, S., & Rani, M. (2012). Questionnaire designing for a Survey. *The Journal of Indian Orthodontic Society, 46*(December), 273–277. https://doi.org/10.5005/jp-journals-10021-1104

Roulston, K. (2019). Preparing researchers to conduct interdisciplinary, multi-method qualitative research. *The Qualitative Report*, *24*(9), 2259-2292.

Ryan, G. (2018). Introduction to positivism, interpretivism and critical theory. *Nurse researcher*, *25*(4), 41-49.

Sahu, B. K., Pati, P., & Panigrahy, R. C. (2018). Impact of climate change on marine plankton with special reference to Indian Seas. *Indian Research of Geo-marine Sciences, 47*(2), 259-268.

Savari, M., Sheykhi, H. & Amghani, M. S. (2020). The role of educational channels in motivating rural women to improve household food security. *One Health, 10,* 1-8.

Sell, M., & Minot, N. (2018). What factors explain women's empowerment? decision-making among small-scale farmers in Uganda. *Women's Studies International Forum, 71*, 46-55.

Shaibu, T. M., Onumah, E. E., Al-Hassan, R. M. & Kuwornu, M. K. J. (2020). Comparative assessment of the vulnerability of smallholder livestock farmers to climate change in North-West Ghana. *Local Environment, 25*(8), 559-575.

Shamadiyah, N. & Nasution, P. P. P. A. (2020). The role of women in food security: A case study of rice farmers in Blang Pala Village, Banda Baro District, Aceh Utara Regency. *Indian Journal of Public Health Research & Development, 9*(12), 203-207.

Sharaunga, S., Mudhara, M. & Bogale, A. (2016). Effects of women empowerment on household food security in rural Kwa-Zulu-Natal Province. *Development Policy Review, 34*(2), 223-252.

Shaver, M. (2020). The gendered political economy of Africa: How the empowerment of women in smallholder farms can spearhead economic growth. *Philosophical Transactions of the Royal Society B*, *375*(1805), 20190428.

Shukla, N., Pradhan, B., Dikshit, A., Chakraborty, S., & Alamri, A. M. (2020). A review of models used for investigating barriers to healthcare access in Australia. *International Journal of Environmental Research and Public Health*, *17*(11), 4087.

Simonyan, J. B., Akpan, A. J. & Amusa, T. A. Factors influencing access to credit among smallholder farmers of selected agricultural commodities in Akwa Ibom State, Nigeria. *Journal of Agriculture and Food Environment, 6*(4), 61-75.

Sinyolo, S. & Mudhara, M. (2018) The impact of entrepreneurial competencies on household food security among smallholder farmers in KwaZulu Natal, South Africa. *Ecology of Food and Nutrition, 57*(2), 71-93.

Sinyolo, S. (2020). Technology adoption and household food security among rural households in South Africa: The role of improved maize varieties. *Technology in Society, 60,*1-17.

Sulser, T., Wiebe, K. D., Dunston, S., Cenacchi, N., Nin-Pratt, A., Mason-D'Croz, D., ... & Rosegrant, M. W. (2021). *Climate change and hunger: Estimating costs of adaptation in the agrifood system*. Intl Food Policy Res Inst.

Taherdoost, H. (2016). Sampling methods in research methodology; how to choose a sampling technique for research. *How to choose a sampling technique for research (April 10, 2016)*.

Tanaka, A. (2019). *Toward a theory of human security*. In: Hernandez, C., Kim, E., Mine, Y., Xiao, R. (eds) *Human security and cross-border cooperation in East Asia. Security, development and human rights in East Asia.* Palgrave Macmillan.

Tang, J., & Di, L. (2019). Past and future trajectories of farmland loss due to rapid urbanization using Landsat imagery and the Markov-CA model: a case study of Delhi, India. *Remote Sensing*, *11*(2), 180.

Tanko, M., Ismaila, S. & Sadiq, A. S. (2019) Planting for Food and Jobs (PFJ): A panacea for productivity and welfare of rice farmers in Northern Ghana. *Cogent Economics & Finance, 7*(1), 1-14. DOI: 10.1080/23322039.2019.1693121

Tashakkori A. & Teddlie C. (1998). *Mixed methodology. Combining qualitative and quantitative approaches.* Thousand Oaks, CA: Sage.

Tesfaye, S., Bedada, B. & Mesay, Y. (2016). Impact of improved wheat technology adoption on productivity and income in Ethiopia. *African Crop Science Journal, 24*(1), 127 – 135.

Tesfaye, W., & Seifu, L. (2016). Climate change perception and choice of adaptation strategies: Empirical evidence from smallholder farmers in eastern Ethiopia. *International Journal of Climate Change Strategies and Management*, *8*(2), 253-270.

Tong, R. (1992). *Feminist thought.* Routledge

Tong, R. (2009). *Feminist thought: A more comprehensive introduction.* Westview Press.

Topić, M., Cunha, M.J., Reigstad, A., Jelen-Sanchez, A. and Moreno, Á. (2020), "Women in public relations (1982–2019)". *Journal of Communication Management, 24*(4), 391-407. https://doi.org/10.1108/JCOM-11-2019-0143

Tsige, M., Synnevåg, G. & Aune, B. G. (2020). Gendered constraints for adopting climate-smart agriculture amongst smallholder Ethiopian women farmers. *Scientific African, 7,* 1-15.

Twongyirwe, R., Mfitumukiza, D., Barasaa, B., Naggayi, B. R., Odongo, H., Nyakato, V., & Mutoni, G. (2019). Perceived effects of drought on household food security in South-western Uganda: Coping responses and determinants. *Weather and Climate Extremes*, *24*, 1-11.

Ubisi, N. R., Mafongoya, P. L., Kolanisi, U., & Jiri, O. (2017). Smallholder farmer's perceived effects of climate change on crop production and household livelihoods in rural Limpopo province, South Africa. *Change and Adaptation in Socio-Ecological Systems*, *3*(1), 27-38.

Ujunwa, A., Okoyeuzu, C. & Kalu, E.U. (2019), "Armed Conflict and Food Security in West Africa: Socioeconomic Perspective", *International Journal of Social Economics*, 46(2), 182-198. https://doi.org/10.1108/IJSE-11-2017-0538

Ulian, T., Diazgranados, M., Pironon, S., Padulosi, S., Liu, U., Davies, L., ... & Mattana, E. (2020). Unlocking plant resources to support food security and promote sustainable agriculture. *Plants, People, Planet*, *2*(5), 421-445.

UN General Assembly (2017). *Work of the Statistical Commission about the 2030 Agenda for Sustainable Development.* Pub. L. No. A/RES/71/313 https://undocs.org/A/RES/71/313

United Nations (2015). *The Millennium Development Goals Report.* United Nations

United Nations, (2015). *Transforming Our World: the 2030 Agenda for Sustainable Development. General Assembly Resolution*, 70/1 of 25 September 2015. A/RES/70/1.

USAID. (2017). *Better health? composite evidence from four literature reviews. HFG project, 2017.* Available: https://www.hfgproject.org/better-health-composite-evidence-from-four-literature-reviews/

Ushachev, I. G., Bondarenko, L. V., & Chekalin, V. S. (2021). Main directions of integrated development of rural areas of Russia. *Herald of the Russian Academy of Sciences*, *91*(2), 87-96.

Van Bockstael, S. (2019). Land grabbing "from below"? Illicit artisanal gold mining and access to land in post-conflict Côte d'Ivoire. *Land Use Policy*, *81*, 904-914.

van de Ven, G., Giller, K. E., Delaune, T., Silva, J. V., Descheemaeker, K., Schut, A. G., ... & van Ittersum, M. K. (2021). The future of farming: Who will produce our food? *Food Security*, *13*(5), 1073-1099.

Van Wyk, B. E. (2019*). Food plants of the world: Identification, culinary uses and nutritional value*. Wallingford, UK: CA

Van Wyk, F., Wang, Y., Khojandi, A., & Masoud, N. (2019). Real-time sensor anomaly detection and identification in automated vehicles. *IEEE Transactions on Intelligent Transportation Systems*, *21*(3), 1264-1276.

Varadan, R. J., Mamidanna, S., Kumar, S., Ahmed, S. Z., & Jaisankar, I. (2022). Technology, infrastructure and enterprise trade-off: Strengthening smallholder farming systems in the Tamil Nadu State of India for sustainable income and food security. *Outlook on Agriculture*, *51*(2), 197–212. https://doi.org/10.1177/0030727022107738.

Vercillo, S. (2020). The complicated gendering of farming and household food responsibilities in northern Ghana. *Journal of Rural Studies, 79*, 235-245.

Vos, R., McDermott, J. & Swinnen, J. (2022). COVID-19 and global poverty and food security. *Annual Review of Resource Economics*, *14*, 151-168.

Wang, S., Adhikari, K., Zhuang, Q., Gu, H., & Jin, X. (2020). Impacts of urbanization on soil organic carbon stocks in the northeast coastal agricultural areas of China. *Science of the Total Environment*, *721*, 1-14.

WFP. (2018) *Comprehensive food security and vulnerability analysis*. Accra, Ghana. 2009. http://www.wfp.org/food-security. Accessed 14 June 2022.

Widiana, A., Wijaya, C. & Atmoko, W. A. (2022). The challenges of food security policy in Indonesia. *Technion Social Sciences Journal, 33*, 1-15.

Wodajoa, D. H., Gemedaa, B. A., Kinatib, W., Mulema, A. A., van Eerdewijkc, A. & Wieland, B. (2020). Contribution of small ruminants to food security for Ethiopian smallholder farmers. *Small Ruminant Research, 184*, 1-10.

Wongnaa, C. A., & Awunyo-Vitor, D. (2018). Achieving sustainable development goals on no poverty and zero hunger: Does technical efficiency of Ghana's maize farmers matter? *Agriculture & Food Security*, *7*(1), 1-13.

World Bank. (2015). *The state of social safety nets 2015*. The World Bank.

World Food Summit, (1996). *Rome Declaration on World Food Security.* Rome.

Yin, R. K. (2018*). Case Study Research and Applications: Design and Methods (6th ed.).* Sage

Zheng S, Wu G, Zhao J and Chen W (2022) Impact of the COVID-19 epidemic anxiety on college students' employment confidence and employment situation perception in China. *Frontiers in Psychology, 13*, 1-2. Doi: 10.3389/fpsyg.2022.980634.

APPENDIX I

UNIVERSITY OF EDUCATION, WINNEBA

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF POLITICAL SCIENCE EDUCATION

MPHIL. POLITICAL SCIENCE EDUCATION

QUESTIONNAIRE

This questionnaire seeks to gather data for an MPhil thesis in Political Science on the topic; "the role of female smallholder farmers in achieving food security in Ghana: A case study in the Bosome Freho and Saboba districts". This data collection and the thesis is a purely academic exercise. Hence, any information provided will be treated as confidential. I, therefore, count on your cooperation in answering the questions.

SECTION I: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

This section seeks to obtain data on your personal information. Please read through and answer each question appropriately

1. District 1 Bosome Freho [ ] 2. Saboba [ ]
2. Which of the following age category do you belong to?

   (1) 18-25 [ ] (2) 26-35 [ ] (3) 36-45 [ ] (4) 46-60 [ ] (5) 60 and above [ ]

3. What is your highest level of schooling?

   (1) No formal education [ ] (2) Basic (Primary/MSLC/JSS/JHS) [ ] (3) O/A Level/SSS/SHS/Voc./Tec. [ ] (4) Tertiary [ ]

4. What is your current marital status?

   1. Never married [ ] 2. Currently married [ ] 3. Widowed [ ] 4. Separated [ ]

5. How many years have you worked as a farmer?

   1. Less than 12 months [ ] 2. 1 – 5 [ ] 3. 6– 15 [ ] 4. 16-25 [ ] 5. More than 25

6. What is the main purpose of your production?

   1. To feed my household [ ] 2. To sell [ ]

7. How much do you earn annually from farming in (Ghc)?

   1. Less than 500 [ ] 2. 600 – 1000 [ ] 3. 1100 – 2000 [ ] 4. 2100-3000 [ ] 5. More than 3000 [ ]

8. Do you engage in other economic activities apart from farming?

   1. Yes [ ] 2. No [ ]

   If yes, what economic activity are you engaged in?

……

9. Are you a member of any farming association?

   1. Yes [ ] 2. No [ ]

10. Are you a native of this district?

    1. Yes [ ] 2. No [ ]

SECTION II: ASSESSING THE CURRENT LEVEL OF FOOD SECURITY AMONG SMALLHOLDER FARMERS

This section seeks to assess the level of food security among female smallholder farmers. Kindly answer the following questions. Strongly disagree = SD =1 disagree = D = 2, agree = A = 4, strongly agree = SA=5

Statement	**SD**	**DA**	**A**	**SA**
11. In the past four weeks, you worried that your household would not have enough food.				

12. In the past four weeks, you or any household member was not able to eat the kinds of foods you preferred because of a lack of resources.				
13. In the past four weeks, you or any household member had to eat a limited variety of foods due to a lack of resources.				
14. In the past four weeks, you or any household member had to eat some foods that you did not want to eat because of a lack of resources to obtain other types of food.				
15. In the past four weeks, you or any household member had to eat a smaller meal than you felt you needed because there was not enough food.				
16. In the past four weeks, you or any household member have had to eat fewer meals in a day because there was not enough food.				
17. In the past four weeks, there was ever no food to eat of any kind in your household because of a lack of resources to get food.				
18. In the past four weeks, you or any household member went to sleep at night hungry because there was not enough food.				
19. In the past four weeks, you or any household member went a whole day and night without eating anything because there was not enough food?				

SECTION III: ASSESSING THE CHALLENGES FACED BY FEMALE HOLDER FARMERS

This section seeks to explore the impediments faced by female smallholder farmers. Please answer the questions as they appropriately apply to you.

20. Does the performance of household chores affect the hours you spend on your farming business?

    1. Yes [ ] 2. No [ ]

21. It is easy to access land for farming activities.

1. Strongly agree [ ] 2. Agree [ ] 3. Disagree [ ] 4. Strongly disagree

22. How do you often access land for farming?

……

23. What factors influence the acquisition of land for farming in this community?

……

24. What is your main source of farm labour?

1. Personal labour [ ] 2. Depend on children [ ] 3. Other family relatives [ ] 4. Hired Labour [ ]

25. What is the main form of irrigation for your farm?

1. Depends on rainfall [ ] 2. have artificial irrigation mechanisms [ ]

26. Climate change negatively affects the farming business.

    1. Yes [ ] 2. No [ ]

27. How does the climate change affect your farming business?

……

28. How do you react to the effects of climate change on your farming business?

……

29. Do you easily get access to credit facilities or any financial support?

a. Yes [ ] b. No [ ]

If yes, how do you access financial support?

……....

If no, what limits you from accessing financial support?

……

If not, how do you finance your farming business?

……

30. Do you easily access the market for farm produce?

a. Yes [ ] b. No [ ]

31. Which agency purchases your farm produce?

1. Government agency [ ] 2. Private agency [ ]

32. Are you satisfied with the price you receive for your farm produce?

1. Yes [ ] 2. No

33. What are some of the factors that limit you from accessing the market for your product?

……

34. How do you preserve your farm produce to last longer without being spoilt?

……

35. What other challenges do you face in your farming business?

……

……..……

SECTION D: STRATEGIES INITIATED TO HELP FEMALE SMALLHOLDER FARMERS

This section seeks to collect data on the measures put in place to assist female smallholder farmers. Kindly respond to the following questions as they appropriately apply to you.

36. Do you have access to the services of extension officers in this District?

1. Yes [ ] 2. No [ ]

If yes, how helpful were the services they provided?

……..……

If no, what limits you from accessing the services of extension officers?

……..……...

37. Do you benefit from the government-subsidized fertilizer programme?

1. Yes [ ] 2. No [ ]

How effective is the government-subsidized fertilizer programme?

…….

38. Do you receive any form of training from any association, organisation or district assembly?

a. Yes [ ] b. No [ ]

39. Has any association, organisation or district assembly introduced any programme to support you?

a. Yes [ ] b. No [ ]

If yes, what supports does /did the association, organization or district assembly offer to you?

……

If yes, how successful is/was the programme?

……

40. If not successful, what do you think was not done well to make it successful?

……

41. What other support do you expect from any association, organisation or the district assembly

……

……

……

Thank you…

APPENDIX II

UNIVERSITY OF EDUCATION, WINNEBA

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF POLITICAL SCIENCE EDUCATION

MPHIL. POLITICAL SCIENCE EDUCATION

QUESTIONNAIRE

This questionnaire seeks to gather data for an MPhil thesis in Political Science on the topic; "the role of female smallholder farmers in achieving food security in Ghana: A case study in the Bosome Freho and Saboba districts". This data collection and the thesis is a purely academic exercise. Hence, any information provided will be treated as confidential. I, therefore, count on your cooperation in answering the questions.

1. Do you assist female smallholder farmers to access with services of extension officers of the Bosome Freho District?

   1. Yes [ ] 2. No [ ]

2. Do you provide any form of training for female smallholder farmers in this district?

   1. Yes [ ] 2. No [ ]

3. Have you introduced any programme to support smallholder female farmers?

   1. Yes [ ] 2. No [ ]

If yes, what programme have you introduced to support female smallholder farmers?

……

If yes, how successful is/was the programme?

1. Very successful [ ] 2. less successful [ ] 3. Not successful [ ]

If not successful, what do you think was not done well to make it successful?

……

4. What other support is expected to be offered for female smallholder farmers in the district?

……
……
……