

UNIVERSITY FOR DEVELOPMENT STUDIES

**IMPACT OF CONTRACT FARMING ON MAIZE FARM HOUSEHOLDS’
WELFARE IN THE NORTHERN REGION OF GHANA**

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FACULTY OF AGRICULTURE, FOOD AND CONSUMER SCIENCES
DEPARTMENT OF AGRICULTURAL AND FOOD ECONOMICS

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BSc. AGRICULTURAL TECHNOLOGY

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DECLARATION

I, Tou Moses Sampanbire, hereby declare, that this work submitted to the University for Development Studies, with the exception of references of other researchers who have been duly acknowledged, is the result of my own research and that this has never been presented anywhere for another degree.

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We hereby declare that the presentation of this thesis was supervised in accordance with the guidelines on the supervision of thesis laid down by the University for Development Studies.

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DEDICATION

I dedicate this work to the Almighty God, who is my steadfast supporter and my source of inspiration. He who has granted me the knowledge, insight and wisdom to carry out this study. Throughout this training, he has been my source of strength and I have only flown on his wings.



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ABSTRACT

Poverty and food insecurity remain great concerns to governments, NGOs, and other major stakeholders in developing countries including Ghana. The goal of the research is to establish how contract farming affects maize farm household welfare, as measured by consumption expenditure and Food Consumption Score (FCS) in the Northern Region of Ghana. Multistage sampling methods were employed to acquire primary information from 316 maize farmers with the aid of semi-structured questionnaire. A regression model with endogenous switching was used to evaluate both the drivers and effect of contract farming on farm household welfare, and Kendall's coefficient of concordance used to estimate the level of agreement of the challenges that farmers rank while participating in contract farming. The endogenous switching regression results revealed contract farming has a positive effect on household welfare (FCS and consumption expenditure) with farmers' participation in off-farm work, market distance, marital status, land size, extension service access established as the main drivers of farmers' contract farming participation decisions in Ghana's Northern Region. The Kendall's ranking found drought, late rainfalls, unsatisfactory price formula used by agents, lack of trust of the unit of measurement as the notable challenges farmers face while participating in contract farming. The study recommends that the Government of Ghana should (MoFA), through its extension agents, sensitize and encourage farmers to part-take in contract farming to help improve their welfare. In addition, NGOs, and relevant stakeholders should encourage the formation and participation in social groups to facilitate contract farming for enhanced farm household welfare. The study further recommends that the Government should speed up its flagship project (1V1D) to help farmers mitigate this challenge and by extension improve their production, income and food security.



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ABBREVIATIONS

2SLS	Two Stages Least Squares
ACDEP	Association of Church Development Projects
ADRA	Adventist Development and Relief Agency
CIDR	Centre International de Développement et de Recherche,
ESOP	Enterprise de Service et Organization de Producteurs
ESRM	Endogenous switching regression model
FAO	Food and Agriculture Organization
FCS	Food Consumption Score
GSS	Ghana Statistical Service
IPWRA	Inverse probability weighted regression adjustment
MoFA	Ministry of Food and Agriculture
NGO	Non-Governmental Organization
PSM	Propensity Score Matching
1V1D	One Village One Dam



CHAPTER ONE

INTRODUCTION

1.1 Background

A producer and a buyer enter into a two-party contract when they practice contract farming. A buyer commits to purchasing output from a producer at a predetermined price, quality and timing (Bellemare & Bloem, 2018). In many nations around the globe, contract farming is used to link smallholders' farmers to profitable markets for higher incomes and better living conditions (Barrett et al., 2012). Early in the nineteenth century, the North American agricultural sector saw the introduction of contract farming, which later expanded to developing nations in the 1960s. Their initial focus was on cash crops but later diversified to cover non-cash crops (Watts, 1994). Contract farming emerged on the African continent as part of the current trend of nationalization of developing countries agriculture sectors. And as a result, international businesses are looking for alternatives to direct ownership of farms in developing nations (Minot, 2011). Contract farming emerged in sub-Saharan Africa to support development of agriculture through technology transfer from developed countries to less developed African agricultural sector (FAO, 2001). Furthermore, contract farming was implemented to aid African nations in achieving food security and eradicating poverty because it has the potential to raise farmers' revenue (Warning & Key, 2002). Contract farming is greatly considered as a fundamental mechanism for growing employment and productiveness, increasing global food security, improving social welfare, improving technology and in improving food quality. It is a strategy to assist farmers to overcome multiple production and marketing constraints like lack of finance, crop insurance, insufficient access to inputs, low market premium for produce, and lack of technical and managerial skills



in handling business. Contract farming also helps in risk management, macroeconomic stability, improve producer livelihood, and overcome market failures. In many developing nations, contract farming has lately gained popularity as a means to support the coordination of the agricultural supply chain (Mishra et al., 2018). Contract farming helps assist smallholder farmers in becoming more integrated into recently emerging value networks, which are thought to be a key factor in rural development and the reduction of poverty (Bellemare & Bloem, 2018; Otsuka et al., 2016). Similarly, a vast body of literatures has explored the effects of contract farming on smallholder incomes (Andersson et al., 2015; Bellemare, 2012; Maertens & Swinnen, 2009; Maertens & Vande Velde, 2017; Rao & Qaim, 2011; Ruml et al., 2020; Wang et al., 2014). When the impact of contract farming on food security were examined, it was discovered that contract farming helps smallholder householder households in Madagascar experience less hunger for shorter periods of time (Bellemare & Novak, 2017). Also, Mishra et al. (2018) found that contract onions farmers in India spend more on food than comparable household without contracts. According to Soullier & Moustier (2018), Senegal's rice deal reduces price seasonality, enhancing food security. However, the recent rise in contract farming has sparked intense discussion about the welfare and financial advantages it offers smallholders, necessitating a number of studies on the topic (Warning & Key 2002). Furthermore, contract farming has been challenged as a method for businesses to abuse unequal power relationships with farmers. Contract farming allow large agricultural businesses to take advantage of less expensive labour in rural communities therefore transferring their risk to farmers. Smallholders may be overlooked because businesses prefer to work with large farmers, aggravating inequality for small and marginal farmers in rural areas. Furthermore, a contract



farming with input provision and fixed price may be view as a bad contract farming because it restricts farmers access to better source of improved certified seed, fertilizer, loan, technical assistance and the liberty to sell in other markets where they will get higher price and revenue. Similarly, other studies contend that the advent of contract farming in sub Saharan Africa was as a result of the profit potential for contracting businesses in the continent. According to Rehber (2007), businesses buy agricultural products at low prices, process them, and sell them at higher prices. However, the purpose of the research is to investigate the factors that determines farmers' participation in contract farming, the effects of contract farming on household welfare and challenges that farmers in Ghana's northern region experience when engaging in contract farming.

1.2 Problem Statement

In Africa, constraints such as low agricultural production make it challenging to achieve food security and poverty reduction in many African countries (Commission, A.U. 2021). Lack of access to essential inputs and other factors that can help boost productivity, such as improved seeds, fertilizers, credit, basic infrastructure facilities, markets, technical advice, and so on, are major reasons for low agricultural productivity (Commission, A.U. 2021). However, contract farming can help farmers gain better access to these inputs (Staatz & Eicher, 1998). Another strategy being advocated to overcome technology limitations is ease technological adoption (Ragasa et al., 2018), connect farmers to business repretatives (Wiggins & Keats, 2013), to reduce the transaction costs of farmers (Bellemare,2012), and open access to finance (Ragasa et al., 2018). Contract farming is based on a contract between a farmer and a company in which there is an agreement to buy the farmer



produce to market or process it. And it has become a key feature for effective income-generating programmes for smallholders' farmers in Africa for many years. Several studies on the influence of contract farming on welfare have been documented in the empirical literature. Most of them found that contract farming has a positive impact on welfare as measured by household income, farm production, and food security. Contract farming for example, has increased the annual income of contract producers of organic honey is higher than of non-contract partners; according to Alemu et al. (2016). Participation in contract farming for export chickpeas and vegetables improved contract farmers' annual income more than their counterparts. Ton et al. (2016) found a 62 percent increase in contract farmers' income above non-contract farmers' income in their extensive meta-analysis. However, few similarly Seba (2016) and Gemechu et al., (2017) indicated that studies point out to the fact that contract farming is a method used by agribusinesses firms to transfer production risks to farmers by using unequal bargaining dynamics. Abdulai & Al-hassan (2016) and Ragasa et al. (2018) found that contract farming is unlikely to increase producer income. This suggests that productivity gains from better inputs combined with the implementation of proposed farm management practices for avocado, soybean and corn farmers in Kenya and Ghana, respectively, are not sufficient to achieve increase. This can cover high input and labor costs. Despite this, many studies on contract farming have been conducted globally. Eaton & Shepherd (2001) acknowledge that the benefits, drawbacks, challenges, and impacts of contract farming can differ depending on the physical, social, and commercial contexts or conditions of each country. As a result, there is a need for research on the relationship between contract farming and household well-being in the Northern Region of Ghana.



1.3 Research Questions

The core research question is; how does participation in contract farming affect household well-being in northern region of Ghana?

1. What factors influence a farmer's decision to participate in contract farming in northern Ghana?
2. How has contract farming participation impacted household welfare in northern Ghana?
3. What restrictions do farmers face when participating in contract farming in northern Ghana?

1.4 Research Objectives

The overall objective of the study is to examine the impact of contract farming participation on household welfare in the northern region of Ghana. The specific objectives of this study are,

1. To identify the factors that influence farmers' decisions to engage in contract farming in the Northern Region of Ghana.
2. Estimating the impact of engaging in contract farming on household well-being in the Northern Ghana.
3. Assess the limitations faced by farmers in participating in contract farming in the Northern Region of Ghana.

1.5 Justification of the Study

Contract farming is mostly utilized in developing countries to improve farmer performance and agricultural quality (Will, 2013). Analysis of the factors that influence farmers' decision-making to contract farming; the challenges they encounter and the effect of contract farming on welfare in the northern region of



Ghana provides pertinent insight into why some farmers engage in contract farming and others do not.

This data will be beneficial to stakeholders who can influence decisions to improve contract farming's efficiency and effectiveness, as well as development partners, local governments, and contracting enterprises on how to improve farmers' access to and involvement in markets to boost household welfare. Even though this study is being conducted in Ghana's Northern Region, the findings will provide insights into measures that would increase farmer productivity and welfare



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Contract farming has increased in popularity as a way for processors, exporters, distributors, and retailers to secure good quantity and quality of raw materials needed by industries (Reardon et al., 2009). Similarly, contract farming assist farmers in overcoming production constraints such as financial problems, limited access to inputs, and as well ensuring that there are available markets for their product (Swinnen & Maertens, 2007; Barrett et al., 2012). Contract farming can be a win-win strategy for both the buyers and farmers, especially in developing countries characterized by market inefficiencies and weak government institutions (Swinnen & Maertens, 2007; Maertens & Vande Velde, 2017). The concept of contract farming in general, as well as the factors that influence farmers' decision to participate in contract farming are discussed in this chapter. The chapter also looks at the constraint's farmers encounter while participating in contract farming and the influence participation has on their households' welfare. Finally, the welfare measures of households are also examined.

2.2 Concept of contract farming

Although different authors define contract farming differently, the implication is fundamentally the same. Contract farming is defined by Eaton & Shepherd (2001) as a forward agreement between farmers and processors or marketing corporations to produce and supply agricultural goods at a pre-determined price. The purchaser must always provide some level of production support in the form of input and technical guidance as part of the contract. According to Minot (2007), contract



farming is agricultural production carried out on the basis of prior agreements in which the farmer commits to produce a particular product in a particular manner and the customer commits to purchase it. Buyers typically provide farmers with technical assistance, seeds, fertilizers, and other inputs on credit in exchange for a guaranteed price for their produce.

Also, a pre-planting contract between a farmer and a buyer is called contract farming. In this contract, the farmer commits to produce a specific product in a specific manner, and the customer commits to purchase that product (Minot & Sawyer, 2016).

Contract farming is being defined as an agreement between two parties, manufacturer and purchaser, the buyer agrees to acquire output from a producer at a pre-determined price, time, quality, and quantity after providing credit and production assistance to the producer.

The basis of a contractual agreement is the producer's commitment to offer a certain commodity. The contractor's duty is to support the production and purchase of commodities by the farmers, with the quantity and quality specified by the contractor. The forms of these contracts vary, but primarily he has two types, marketing and production contract (Swinnen & Maertens, (2007).

A marketing contract is an agreement between a buyer and a farmer that details the price structure, product quantity and quality and also delivery schedule. However, a production contract details specification for the use of inputs, management practices, and quality features. Production contracts frequently include



the provision of important inputs to farmers, such as loans, technical assistance, and so on (Swinnen & Maertens, 2007). Basic contracts allow farmers more control and decision rights, as well as bringing them closer to spot market conditions, whereas restrictive contracts give buyers more control and decision rights, as well as bringing them closer to a vertical integration (Goodhue & Simon, 2016).

Specialization, information asymmetries, and transaction costs influence the nature of contract design and the distribution of decision-making power (Bogetoft & Olesen, 2002; Kuijpers & Swinnen, 2016; Goodhue & Simon, 2016). Contract farming can be used in the form of institutional arrangements to overcome risks associated with labor, credit, insurance and market access and improve access to quality and timely inputs, productivity and income (Abebe et al., 2013). Contract farming, on the other hand, may introduce a new set of coordination and enforcement problems that are better explained by the principal agent theory, also known as the moral hazard problem (Key & Runsten, 1999). This helps explain common issues such as breach of contract, redirected input, and side jobs. Contract farming is presented as a win-win practice for both buyers and sellers. However, it has a very high failure rate (Minot & Sawyer, 2016). For traditional staples and non-perishable foods, contract farming will not work as spot markets are the most efficient method (Hellin et al., 2007). With so many buyers and sellers, contract farming has no marketing impact, so the transaction costs associated with market access are very low. In addition, grains are easier to store than perishable staples such as some roots and tubers, offering farmers additional opportunities for opportunistic behavior (Swinnen et al., 2010). As a result, it is difficult to enforce contracts for contract



cultivation of staple crops, especially cereals, and the risk of being sold out is significant.

2.3 Contract farming in Africa

Both farmers and businesses benefit from contract farming. Contract farming has social implications that are not limited to the farmer, but extend beyond the farmer to other families, wage earners and communities (Glover & Kusterer, 1990). Contract farming is a key component of Africa's most successful smallholder income-generating operations. However, there are also examples of failed contracting systems where farmers are exploited by contractors (Grosh, 1992). Contract farming in Africa is primarily practiced by the private sector, but is also used by some state-owned companies to extract high-quality raw materials. Contract farming has been promoted as a development tool by national governments and donor organizations in several countries (Jacobson, 2010). But they recognized that contract farming should be more driven by the private sector. Depending on the contractor's capabilities and their motivations, the number of farmers participating in contracting schemes ranges from a few hundred to over 200,000 (Jacobson, 2010). Cotton, fresh fruits and vegetables, tea, coffee, cashew nuts, sugar and other crops are common contract crops (Jacobson, 2010). Product price, quantity and quality are usually specified in most contracts. Contracts range from 2 months to 1 year, with unlimited contracts available. Small farmers often cultivate a hectare or a few hectares of land (Jacobson, 2010). Farmers are organized into groups in many contract structures. This means that we can work together, whether it's fostering company relationships or dealing with financial issues. Through these farmer groups they also form social bonds and safety nets. Contracts may be written or oral, formal



or informal (Jacobson, 2010). As you can see, there are different contract farming models in Africa. Although there are some differences, the company's terms are the same for most contract systems. Most companies offer the most popular inputs such as seeds, fertilizers and pesticides (Jacobson, 2010). This cost will be deducted from the final payment, which is usually made in cash or check. Farmers receive different prices for their products. Some companies use pre-determined fixed prices, while others adapt them to international markets (Jacobson, 2010). Since 2004, a kind of contract farming model called “Enterprise de service et organization de producteurs” (ESOP) has been implemented in Benin, Ethiopia, Madagascar and Togo (Adabe, 2017). The ESOP was funded by the Center International de Développement et Recherche. The ESOP contract farming model is an innovative way to help smallholders participate in a dynamic staple food chain of value and improve their performance for better quality (Adabe, 2017). The idea behind the ESOP agreement is to build business services and food businesses and connect smallholder farmers to improve farmer performance and facilitate access to quality products in urban markets. (Adabe, 2017). The ESOP contract model had two core tasks. First, it aims to organize smallholder farmers in an economically viable way. Second, it encourages market-oriented private companies to provide viable services to smallholder farmers and to supply competitive products to urban consumer markets (Adabe, 2017). Meanwhile, several studies highlight the problems contract farming poses for farmers. One problem is the ineffective legal framework and slow litigation processes (Jacobson, 2010). If the contract is broken, the farmers cannot immediately sue the company and receive compensation for their losses. In addition, the farming insurance system is generally weak. Several studies have been



conducted on the issue of selecting farmers who can produce a certain amount by a company.

2.4 Contract farming in Ghana

In Ghana, efforts to regularly incorporate smallholder farmers into more structured market arrangements have been few and mostly centered in the horticulture industry, where exporters and processing enterprises rely on smallholder farmers to satisfy the bulk of their output needs (Ragasa et al., 2018). However, there are numerous types of informal contracts in the food crop industry (Poku et al., 2018). Food industry traders provide production credits to farmers in exchange for some or all of the farmer's agricultural produce at market prices at harvest time. There are multiple levels of control over agricultural production. Some traders have full control over all produce, while others can only buy pre-funded goods (Poku et al., 2018). Farmers may also choose to sell additional produce to traders on credit, although payment is expected later, but this is usually based on weekly or bi-weekly regional market cycles (Poku et al. al., 2018). Such contracts are concluded without the aid of a third party and are primarily based on long-term trust between farmers and their authorized dealers. This type of informal contract is used by many smallholder farmers across Ghana, especially maize farmers (Ragasa et al., 2018). For the most part, this type of arrangement puts less emphasis on quality.

A market-oriented or specified contract arrangement, on the other hand, is frequently enabled by a third party, usually an NGO. Farmers receive all production credits and technical assistance from the NGO, which also connects them to agro-processors that give guaranteed markets (Kumah, 2015). The interest of NGOs in this situation is for farmers to sell their produce to recoup the cost of the NGO's production inputs



(Kumah, 2015). The Adventist Development and Relief Agency (ADRA) is a non-governmental organization that connects farmers and processors in several regions of the country (Kumah, 2015). ADRA helps soybean, cashew, citrus, and mango growers with inputs, mostly seeds, as well as technical assistance and linkages to potential buyers (Kumah, 2015). In this instance, the buyers do not offer any resources to the farmers, and there are no minimum quantity constraints (Kumah, 2015). Farmers and processors negotiate and agree at the beginning of each season on fixed, pre-determined prices at harvest or delivery. Farmers are paid when processors confirm that their products meet the required quality standards (Kumah, 2015). The fundamental drawback of this approach is that quality issues are determined solely by the buyer, and most buyers do not directly commit resources to farmers, so they fail to deliver on their promises to farmers, even if they do not buy. They have nothing to lose (Kumah, 2015). Similarly, the Ministry of Food and Agriculture launched a pilot project to connect rice farmers to markets in the north (Kumah, 2015). As part of the project, a rice mill was developed to teach women's groups how to mill locally produced rice (Kumah, 2015).

The Association for Church Development Projects (ACDEP), a non-governmental organization in northern Ghana, has built an integrated farmers market link (Kumah, 2015). Savannah Farmers' Marketing Company was established as part of this project to link smallholder farmers to sorghum, soybean and peanut markets (Kumah, 2015). The company is partly owned by an agricultural cooperative that contracts members to produce quality crops and sells them to end users such as Guinness Ghana Company, Goldenweb, and Agrimart (Kumah, 2015). The NGO ensures that the required quality and quantity of output is achieved by the marketing



company. Marketing companies also act as a link between farmers and customers, allocating farmers into different groups and signing production contracts that specify quality, quantity, delivery time and, most importantly, price. Groups are organized primarily to facilitate mass deliveries, but production is the responsibility of individual farmers (Kumah, 2015). In addition, some export companies employ farmers to secure their produce, mainly to meet the needs of high-volume exports to European markets. For example, Adom Orchards is a fruit processing and export company founded in 1986 and based in the Eastern Region of Ghana (Mensah-Bonsu, 2006). Farmer's ability to acquire land was the most important factor in the selection of contract farmers. The company provides basic inputs such as fertilizer and seeds under the scheme, and farmers are responsible for farm maintenance. Each farmer is bound by a signed legal contract and the crop is purchased at a set price (Mensah-Bonsu, 2006).

Similarly, the Integrated Tamale Fruit Company was established in the northern region of Ghana in 2000 to produce organic mangoes for export (Kumah, 2015). The company chose contract farmers in what was then the Savelugu-Nanton District to meet their high-volume export needs while increasing the incomes of smallholder farmers. Farmers are selected primarily on the basis of their agricultural experience and are bound by a legally valid written contract between them. Seeds, fertilizers, pest control chemicals and tractors are among the company's most important inputs (Kumah, 2015). Given the region's low yields, the company saw mangoes as a long-term investment. According to the contract, the company will receive 30% of the harvest after sale, with the remaining 70% going to the farmers. Thirty percent was set aside for loan repayment until all loans were paid off (Kumah, 2015). The number



of external producers under this contract increased from 175 to 600 between 2004 and 2006 (Kumah, 2015).

In addition to these examples, the Masara N'Arziki Farmers Association organizes the most prominent maize contract farming program in the Upper West Region of Ghana known as Masara. Masara is a non-profit organization founded in 2009 by two large private agribusinesses, Wienco and Yara, whose primary goal is to promote the cultivation of maize as a source of wealth (Guyver & MacCarthy, 2011; Ragasa et al., 2018). Farmers participating in masala contract farming enter into a written contract with the company. They receive a certain quantity of quality inputs and advisory services, but are required to return a certain quantity of bags of maize at the time of harvest (Ragasa et al., 2018). Masara also provides agribusiness start-ups with the opportunity to market their agricultural input brands. Yara's Yara Mila Actyva fertilizer and Wienco's herbicide and corn seed form the input package. Masara contract farming started with just 1,250 farmers in 2009 and grew to approximately 10,000 farmers by 2015 (Ragasa et al., 2018).

Furthermore, Akate Farms began contract farming operations with only 156 farmers in 2011 and quickly expanded to about 695 farmers by 2015 (Lambrecht & Ragasa, 2016). Its principal goal is to ensure a steady supply of high-quality maize to feed its poultry farm. Participants in contract farming sign a written contract and get a fixed input package of fertilizer, seeds, and herbicides. However, if participants do not want the entire service, then their required repayment will be adjusted proportionally. Akate Farms also offers tractor services. Akate works with Ministry of Food and Agriculture extension staff to provide farmer training and extension guidance. The quantity of harvested maize requested to pay for inputs is like the



Masara repayment, with an additional payment required for tractor services. Out grower farmers are not compelled to sell all their output to Akate (Lambrecht & Ragasa, 2016).

2.5 Factors influencing farmer' decision to engage in contract farming

When seen through an economic lens, the main motivation for contracting parties to sign an agreement is to maximize profit. According to Eaton & Shepherd (2001), Contract farming is an excellent strategy for promoting and coordinating agricultural production and commercialization. A farmer's decision to engage in contract farming is influenced by many factors, but one of the main reasons is the benefits they will receive from the firm's technical help and knowledge transfer. Processors provide production-specific technical support to achieve the required yield quality and quantity.

Information regarding product requirements for specific markets, planting and harvest timing to meet market needs, product quality control, and other commercial and technical information can be provided through contract farming. According to Eaton & Shepherd (2001), farmers use contract farming as a means of developing their abilities. This is so because farmers who employ contract farming have the chance to master the fundamentals of running productive processes effectively. Farmers that engage in contract farming learn skills such the effective use of agricultural equipment, improved input application methods, record-keeping, understanding of the value of quality, and the characteristics of various markets, notably export markets. Moreover, contract farming's positive impacts motivate producers to spend money on market infrastructure and labor.



Similar to this, Masakure & Henson (2005) discovered that there are eleven components, which they further divided into four major latent incentive elements. These elements include market instability, indirect benefits such as knowledge acquisition, direct income benefits, and intangible benefits such as status.

Furthermore, contract farming is used by farmers in China's eastern provinces according to a study by Guo et al. (2005) to gain access to markets, enjoy price stability, and receive technical support to help them improve the quality of their products. Excellent yields produced by good agricultural practices in contract farming will result in high profit, (Schipmann & Qaim), which will help to promote farmer participation in contract farming.

In addition to these studies, Arumugam et al. (2011) he argues that there are four key variables that influence farmer participation in contract farming. The availability of market information, market stability, the transfer of production technology to enhance farming practices, and finally indirect benefits are some of these factors. Similar to this, Moyo (2011) reported that variables such as payment delay, understanding of price variations, and trust and confidence in the buyer all had a significant impact on the likelihood of farmers engaging in contract farming. Similar to Moyo (2011), Prowse (2012) shows that the motivation to enter into contracts must include both short-term financial interest and a longer-term image and credibility component.

In addition, Abogados et al. (2012) presented three methods that might be taken into account in future research. The first is to give farmers an economic incentive to produce high quality rice. The second is to provide equipment for threshing and



drying (such as plastic and tarps). The third is to launch an advisory service to teach farmers how to grow quality rice.

Combining all these elements increases the appeal of contract farming to producers. In addition, Senger et al. (2013) argued that the main variables influencing a farmer's decision to engage in contract farming are the availability of inputs, the best price for higher quality, and predetermined pricing. Most important factors influencing contract farming participation is the best price for better grade. Furthermore, da Silva & Rankin (2013) claim that the availability of staple crops in rural regions is constrained by poor seed and fertilizer markets. Contract farming is encouraged by the availability of a dependable input method. Additionally, access to credit from reputable banking organizations is restricted for farmers in developing nations. By directly providing credit to farmers, the processor encourages them to sign up for the contract farming plan.

Additionally, Puspitawati (2013) and Masakure & Henson (2005) found that market volatility is the primary latent factor influencing smallholder farmers to sign a contract with a processor. The farmer's wish to acquire a guaranteed market for crops, minimal prices, a consistent supply of inputs, and someone to buy the harvest produce for consumption at home served as the main impetus behind contract farming (no need to transport produce to market).

Furthermore, Yasutabe (2017) describes "guaranteed market", "opportunity to get higher quality premium price", "gaining knowledge through technical assistance", and "seeing other farmers benefit from it". found to be an important element of his research: Contract rice cultivation and quality improvement; An assessment of the



motivations, performance and limitations of smallholder farmers within Togo's Business Services and Farmers Organization (ESOP)." "Reliable supply of inputs", "Access to quality seeds", " Measure products at scale" and "a have a solid source of income".

2.6 The constraints farmers face taking part in contract farming

In the existing literature, there are contradictory views to the topic of whether a contract improves the performance of smallholder farmers. Contract farming can cause issues for the parties involved in the food chain, particularly farmers, who are the most vulnerable group in contract farming. According to Eaton & Shepherd (2001), producing a novel variety can be difficult because of production issues or marketing issues like market failure. Increased farmer investment may be necessary for new varieties in order for the farmer to meet the contractor's quality requirements. And because of problems with output, excessive deposit advances can cause farmers to become indebted.

Similar to this, da Silva (2005) claims that the main issues farmers encounter when engaging in a contract agreement with a processor are inconsistent payments, low rates, the company's manipulation of standards, a high rate of product rejection, ignorance of crop potential, and inadequate technical assistance. Additionally, farmers no longer have access to the open market, which may weaken their negotiating position. Many times, complicated pricing selection processes are not understood by farmers, which may have an effect on their benefits. Pricing and farmers' desire for independence could be factors in their withdrawal (Schipmann & Qaim, 2011).



Furthermore, Sopheak (2014) found that input provision and technical assistance can make farmers overly vulnerable to productivity manipulation. The availability of credit through the provision of inputs can increase farmers' indebtedness. In addition to these studies, a study by Adabe (2017) contract farming and rice quality upgrade showed that: An evaluation of the Togo Business Services and Farmers Organization (ESOP) on the motivations, performance and limitations of smallholder farmers found that the pricing formula used by the ESOP was poor. At the beginning of the production season, an ESOP price was set and a premium price was offered on top of the set price if quality standards were met.

The ESOP mitigates price volatility that can occur during the harvest season. These manufacturers see their pricing formulas as constraints and want to modify them to account for volatility in the sales market. Additionally, contract farmers feel that paying the ESOP quality premium does not cover the costs associated with meeting quality standards. Farmers expressed serious concerns about debt. In the ESOP model, when farmers belonging to the same group band together and one of them fails to repay a loan, seed loan, fertilizer loan, or other input loan, the ESOP can immediately withdraw money from the group's paddy fields. From the value gives credit. Some farmers find it difficult to receive automatic contributions, such as repayments, and consider them a violation. Contract farmers also frequently complain about ESOP's payment delays, which are caused by a lack of financial capital during the harvesting season. According to reports, ESOP can cause payout delays of two to four months, which have an adverse effect on farmers' planting season activity.



2.7 The effect of contract farming on household welfare

Contract farming has long had an impact on the well-being of small farmers and their families. Indeed, extensive research was conducted in the 1980s to determine whether contract farming had an impact on farmer welfare. Most studies have found that contract farming affects farmers' incomes. However, other empirical evidence indicates that contract farming has a negligible impact on farmers' incomes (Meemken & Bellemare, 2020; Narayanan, 2014; Ragasa et al., 2018; Wang et al., 2014;). This is due to studies of different contractual relationships in different cultures and geographic regions (Bellemare & Bloem, 2018; Khan et al., 2019; Otsuka et al., 2016; Ton et al., 2018). Goldsmith (1985) and Glover & Kusterer (1990) used a broad socio-economic approach to assess the impact of contract farming and found that these arrangements increased incomes for small farmers and increased access to farmer credit. improved and concluded with better tech support. Increase productivity and productivity. Additionally, CF introduced new technologies, produced jobs, and provided them with an extra source of income for the local economy. The development of farmers' associations, the inclusion of women in the agricultural industry, and the provision of alternatives for households to better their nutritional and health conditions were all facilitated by contract farming (CF). In addition, Minot (1986) studied contract farming in developing countries and concluded that CF improved farmers' overall incomes.

Contrarily, a key finding of the research was how frequently contract farming fails (CF). Similar to this, Porter & Phillips-Howard (1997) come to the conclusion that African farmers who participated in contract farming (CF) generally fared better than their non-participating peers.



Additionally, Warning & Key (2002) used the Heckman selection model to examine how the farm income of 32,000 Senegalese peanut farmers is affected by participation in the NOVASEN program (private enterprise). They found that farmers who participated in contract farming (CF) programs had significantly increased incomes compared with those who did not. (2005) found that the profit margins of contracted Indian dairy farmers are almost double that of non-contracted farmers. Their revenue differences are primarily due to contract growers' lower production and transaction expenses. In addition, Simmons et al. (2005) through a study of the effects of contract farming (CF) on poultry, maize, and rice seed farmers in Indonesia using OLS regression models found that CF has a positive impact on farmer welfare. Seed maize and broiler producers benefited from contract farming (CF), which increased capital gains. The yields to capital for seed rice were unaffected by contract farming (CF). Contract farming (CF) significantly decreased members' poverty levels for all three types of farming: poultry, maize, and rice.

Similarly, Ramaswami et al. (2006) used a two-stage least-squares (2SLS) regression model to find that contract farming (CF) production is more efficient than non-contract production. The study also revealed a pay gap between the two categories. Farmers benefit greatly from CF as it leads to improved yield prediction and reduced risk. Using yields typical of contract and non-contract farms, they concluded that contract farming (CF) allows poor farmers to earn comparable wages.

In addition, Miyata et al. (2009) found that contract farmers of apples and green onions in China made significantly more money than non-contract farmers. They also found variations in farm income depending on the type of crop. While contract



farmers of apples profited from CF through higher yields, contract farmers of green onions sold their produce for more money as a result of higher quality. It shows how providing inputs and technological support can potentially boost farmers' income through two channels: improved crop quality and yields.

Gibbons et al. (2009) examined the financial impact of the Ugandan farmer contract industry for organic cacao. They found that contract farming had a positive impact on earnings. Contract farmers also have access to the latest growing techniques that can increase production. Bellemare (2012) found, from a study in Madagascar, that contract farming (CF) affects gross household income, net household income, income after deducting contract farmers, adult equivalent income, and household income from livestock. In addition, Michelson (2013) observed that Nicaraguan farm households with contracts with supermarkets had a rise in productive household assets. Furthermore, Dedehouanou et al. (2013) who concentrated on psychological wellbeing also came to the conclusion that contract farming may have had a positive effect on wellbeing. Their main hypothesis is that contract farming raises the subjective well-being of Senegalese high-value crop contract farmers who export their crops, even though they found varying revenue effects depending on the type of crop. In their systematic review of the effects of contract farming, Wang et al. (2014) computed that 92 percent of all pertinent studies had found that CF has a positive effect on agricultural productivity. Additionally, contract farmers in Madagascar experience an average of eight days less harvest time per year, according to a study by Bellemare & Novak (2017) on the link between contract farming and food security. This is due to the significantly increased access to local and global markets available to contract farmers.



Furthermore, a study of contract farming (CF) rice in Benin using the propensity score matching method by Maertens & Vande Velde (2017) found that participation in contract farming doubled rice income and increased overall household income by 17%. (PSM) concluded that it increases in his research, contract farming and improving rice quality: Adabe (2017), “Assessment of Smallholder Motives, Performance and Limitations within the Framework of Togo’s Business Services and Farmers Organizations (ESOP)”, found that participation in “ESOP” contract farming (CF) It is said to significantly improve the performance of Rice farmers have improved yields, turnover, net income, and rice purity.

Similarly, Mishra et al. (2018) investigated Indian onion contracts and found food security benefits determine by yield and food cost ratio. Soullier & Moustier (2018) examined rice contracts in Senegal and found that they improve food security through price reductions. In addition, Bellemare (2018) found that contract farmers earn more income from contract crops, but contract crop production requires more labor and reduces farmer involvement in off-farm activities, indicating that income from other sources is small. Given these examples, there is a broad assumption that higher farm incomes and productivity and improved food security in agriculture lead to higher welfare (e.g. Bellemare, 2012; Dedehouanou et al., 2013; Maertens & Swinnen, 2009; Minten et al., 2009; Wang et al., 2014; Warning & Key, 2002).

Additional research has produced conflicting results on the impact of contract farming on farmer welfare. According to Eaton & Shepherd (2001), contract farming can have a negative impact on farmers' incomes due to corporate monopoly tendencies and opportunistic behavior. Lack of transparency in pricing and quality control is one of the factors that negatively impacts sales.



In a similar vein, Singh (2002) and Guo et al. (2005) claimed that while farmers experience debt, unequal revenue distribution, food insecurity, and family issues, contractors benefit more from contracts. Furthermore, Ramaswami et al. (2006) found that higher profitability is not always a result of improved production efficiency.

They add to the discussion by investigating poultry production in Andhra Pradesh, India. Custom manufacturing has been found to be more effective than non-custom manufacturing. In the case of poultry production in Andhra Pradesh, contractors took over most of the surplus production. According to Miyata et al. (2009) Because contract farming diverts labor and other resources from other sources of household income, income from contract crops tends to exaggerate the impact of contract farming on household well-being. Michelson et al. (2012), using eight years of historical data, investigated contract farming contracts between Nicaraguan supermarkets and vegetable and fruit producers and found that the contracts were unhelpful for small farmers. They found that farmers employed in local supermarkets received average wages comparable to those of traditional market producers. Foreign supermarkets provided protection against price volatility, but farmers received disproportionately low average prices. Hoang (2021) found in his study that contract farming has no impact on farmers' earnings. Due to the conflicting results of previous studies on contract farming, the complement to domestic care in northern Ghana needs further evaluation.

2.8 Welfare Measures

Usual substitutes for welfare are measures of consumption or money (Cuttillo et al., 2020). Consumption, on the other hand, is a better predictor of current consumption



than current income, and since it provides information about incomes at other periods, current consumption is also a better predictor of longer-term welfare. Individual welfare is based on consumption of commodities and services at the household level, household composition, access to public services, and leisure time, according to Muellbaure (1980), as quoted by Grootaert (1982).

Welfare and utility are related but distinct concepts (Grootaert, 1982). Regardless of whether it is understood as happiness or fulfillment, Sen's interpretation of "welfare theory" goes beyond individual benefits (Grootaert, 1982). Therefore, since it disregards health, morbidity, and long-term statistics, mainstream welfare economics is questioned. Finding a practical welfare indicator to use is the main challenge in welfare analysis. The notion of living standards, on the other hand, is intrinsically complex, making it more challenging to obtain reliable welfare indicators (Grootaert, 1982). Welfare metrics were categorized by Grootaert (1982) into three categories. These include the actual welfare index, total revenue in its entirety, and total spending.

1. True index of welfare is generated from a household consumption and employment behavioral model with the premise that welfare relates to preferences such as products, leisure, household composition, access to public services, and decision to have children. Even though this approach of assessing wellbeing is widely accepted in its direct measure, it has opponents, including the following: it is not relevant in locations where the labour market is failing or nonexistent, and it fails to capture voluntary nonparticipation. As a result of the identification and measurement issues, welfare measures are unreliable and inconsistent (Grootaert, 1982).



2. In the complete total income approach, wellbeing is assessed by the total income generated by the household from all sources of income plus the monetary worth of leisure activities and non-paid home activities (opportunity wage rate for home activities) (Adeniyi, 2014). However, income-based welfare is prone to measurement error since farm households' income sources are more diverse, income is variable, and income is underreported by the owner due to its very nature and sensitivity (Natali & Moratti, 2012).
3. Measurement of welfare by consumption: Welfare is viewed as a function of consumption of goods and services, with the assumption that preferences are disclosed through the purchase of commodities and services (Deaton, 2001). Furthermore, in the welfare perspective, individuals are the rational judges of their own needs, which are disclosed through consumption, utility, and so wellbeing.

In developing countries, the assumption of the typology of well-being measures favors consumption over other indicators (actual wealth or wealth index, income) because: firstly, material well-being is selected from the consumption of goods and services and not from permanent temporary income (Moratti & Natali, 2012); as a result, consumption is perfectly aligned with the standard of living. Secondly, consumption tends to be more stable and even over time, especially in agricultural societies; therefore, it is a good indicator of actual living standards (Browning & Crossley, 2001).

Thirdly, estimating household income is difficult, especially for self-employed households and the unorganized sector although data on consumption takes time to



collect, it is theoretically simpler than income and wealth. Finally, respondents are more willing to participate or respond to a survey because consumption is likely to be less sensitive to them than income (Moratti, Natali, 2012).

CHAPTER THREE

METHODOLOGY

3.1 Introduction

The chapter presents the detail information on the study area, data source and collection, sample size, and sampling technique. It also presents the method of data analysis, theoretical framework, conceptual framework and analytical framework for the study.

3.2 Study area

The study was conducted in the northern region of Ghana. This region is one of the sixteen administrative regions of Ghana. It is set in the northern part of Ghana and Tamale is the regional capital with 16 administrative districts. The region area blanked was about 31% of the country's whole land area until 2018 when the Northeast and Savannah regions were carved from it. The region shares its borders with North East Region in the north, eastern Ghana-Togo worldwide border to the east, Oti to the south and Savannah to the west. Northern Region falls under the Guinea Savannah grassland, which has two distinct seasons. January-March marks the dry season and July through to December marks the rainy season with average annual precipitation estimated at 750 to 1050mm. The Region has about 75 percent of its economically active population engage in the agricultural sector.





Figure 1 showing map the Northern Region Source GSS, 2020

Kunbumbu District which has Kumbungu as its district capital was singled out from the Tolon-Kumbungu district. The district borders North Gonja in the west, Tolon in the south, West Mamprusis in the north and Tamale Metropolitan, Sagnarigu municipality and Savelugu municipality in the east (Kumbungu district Composite Budget, 2021)



The district falls within the guinea savannah with short drought resistant trees and grassland. Crops grown in the district include maize, soyabean, cowpea, groundnut, rice etc. Sagnarigu Municipal which was created out of the Tamale Metropolitan in 2012 has a total land area of 114.29sqkm. It shares boundary with Savelugu Municipal to the north, Tamale Metropolitan to the south and east, Tolon to the west and Kumbungu to the North-West. The vegetative cover in the area is guinea savannah (Sagnarigu Municipal composite Budget, 2021)

3.3 Research design and sampling procedures

In attempt to achieve the research objectives, the research's selection of the study region, district, community and farmers involved a multistage sampling method. First, northern region was selected as the study zone because of its higher number of households committed to farming, and higher incidence of poverty and food insecurity. Second, two districts were randomly selected where farming activities are intense. The third step randomly selected 5 communities from each district. The last phase selected 45 farmers each community out of which 20 are non-contract and 25 are contract farmers.

3.4 Data collection and sample size

A semi-structured questionnaire consisting of open and closed questions completed questions were used for data collection. The questionnaire captured all relevant questions that are vital to contract farming involvement and knowledge, challenges of participation, socioeconomic characteristics, inputs access, extension and market access and indicators to measure farm household welfare. The choice of farm households for the research was based on the Yamme's (1967) formula. The formula is specified below as.



$$n = \frac{N}{1 + Ne^2} \quad (1)$$

Whereas n denotes the sample size, N is the number of farming households in the community, and e is the error term. A total of 316 were used for the study.

3.5 Conceptual framework

As presented in the framework below, farmers' decision to participate in contract farming and family welfare are influenced by a number of institutional and specific factors. Farmer specific factors that influence contract farming participation and household welfare include age, gender, educational status, marital status, farm size, land ownership, off-farm engagement, income, farm experience, labour, quantity of inputs etc. Similarly, institutional factors like credit access, good farm roads, extension access, distance to district capital, FBO membership etc. also affects farmers participation in contract farming and household welfare.

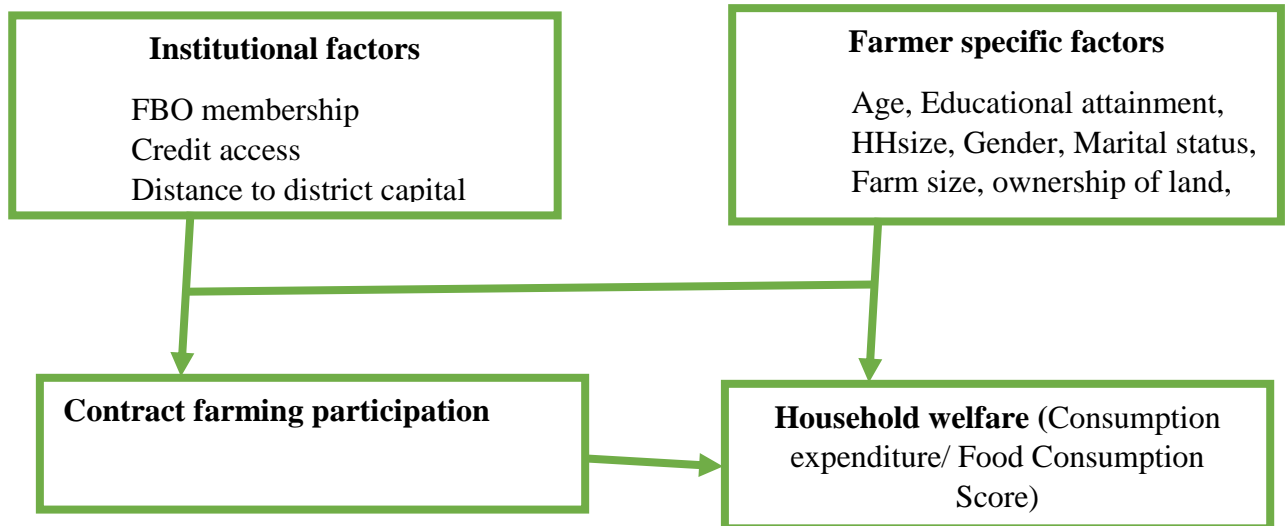


Figure 2 conceptual framework

Source: Authors conceptualization



Notwithstanding the effects of specific and institutional factors that affects both household welfare and contract farming involvement, farmer participation in contract farming also affect household welfare. A farmer who participates in contract farming is more apt to have access to ready market and easy access to farm inputs including extension services and capacity building and trainings, which will better equip the farmer to increase his farm production. This will in turn translate into higher productivity, income, food consumption expenditure. Thus, better wellbeing as a result when compared to those who might not engage in contract farming. The linkages are shown in the figure 2 above.

3.6 Method of data analysis

3.6.1 Summary statistics

To describe the socioeconomic and demographic traits of respondent, descriptive and inferential statistics were used. To determine whether there is statistically meaningful difference in socioeconomic characteristics, the independent t-test and Kwallis test was used to test between farmers who is participating in contract farming and those who did not. This was done for both discrete and continuous variables used in the endogenous switching regression model estimation. Charts, frequency tables were also used to present results on the frequency distribution of respondents by districts.

3.7 Theoretical Framework

A farmer's choice to adopt a new system of farming (contract farming) in this study was specified based on random utility theory given references to the works of Becerril et. al. (2010), Abdulai (2010) and Crost et al. (2007). Granted that P^* is the variation between contract farming participants' benefits (U_{iA}) and (U_{iN}), represent



the usefulness from the participation in contract farming and contract farming will be chosen by non-participant like households if $P^* = U_{iA} - U_{iN} > 0$. The utility difference are unobservable, however it can be expressed as follows in the latent variable model as a function of the observed factors:

$$P_i^* = \alpha K_i + \varepsilon_i \text{ with } P_i = \begin{cases} 1 & \text{if } P_i^* > 0 \\ 0 & \text{if otherwise} \end{cases} \quad (2)$$

where P is a binary 0 or 1 false variable for the involvement in contract farming ($P = 1$ when a farmer engages in contract farming and $P = 0$ otherwise), α is a trajectory of parameters to be estimated, K is a vector that stands for institutional and farmer specific factors and ε is the random error term.

Farmers' participation in contract farming can help increase farm income, consumption expenditure and food security and by implication improvement in household welfare. If the welfare outcome variable, measured by FCS/ consumption expenditure is a linear function of a dummy variable contract farming participation, this will result in an equation as specified below with a vector of certain explanatory variables (X):

$$Y_h = \vartheta X_h + \delta P_h + \mu_h \quad (3)$$

Where Y_h denotes the results variables, ϑ and δ are parameters to be determined, μ is the error term. The coefficient δ are an estimate to assess the effect of the participation in contract farming on the outcome variable. Thus, accurate measure of contracting and non-contracting farmer groups by δ should be assigned randomly to farmers (Faltermeier & Abdulai, 2009)



3.8 Factors affecting contract farming participation and its effect on the welfare of farm household

3.8.1 Analytical framework

Participating in contract farming where a farmer or farm household participates, and other do not participate is not independently determined because it is caused by self-selection. The selection is more likely to be based on the anticipated benefits or utility of involvement, which is advantageous for participants and disadvantageous for non-participants. Thus, analytical technique which control for self-selection is required to cater for same. There are numerous econometric techniques to controlling for self-selection, notably among them are propensity score matching, endogenous switching regression model, Heckman model, and inverse probability weighted regression adjustment. This study favoured endogenous switching regression because its benefits: (1) it accounts for selection bias informed by observed and unobserved variation between control and treatment groups; (2) it provides more information by estimating both selection equation and two outcome equations for the treatment and control groups, respectively; (3) it estimates average treatment effects on the treated (ATT) of contract farming participation on farm household welfare (Li *et al.*, 2020).

The ESRM use a two-step approach. The first stage is estimated using a probit model with a binary dependent variable, which shows whether a farmer/farm household participates or not in contract farming with factors influencing participation as the independent variables.

$$I_i^* = \alpha K_i + \varepsilon_i \text{ with } I_i^* = \begin{cases} 1 & \text{if } I_i^* > 0 \\ 0 & \text{if otherwise} \end{cases} \quad (1)$$



Where I_i is 1 for all farm households who anticipate reaping benefits from engaging in contract farming (CF), α is the parameter to be estimated, ε_i is the error term whereas K_i is a vector that includes variables that affect the participation decisions of farm households (Di Falco *et al.*, 2011). According to Khonje *et al* (2015), the selection equation also includes an instrument(s) that influences the choice of land owner to engage in contract farming (CF) but not welfare as measure by consumption expenditure, FCS productivity or income. The instrument could be validated by a falsification test. In the selection equation, they must both be statistically significant, but not in the outcome equation.

The second phase is the result equation. Farm household participation in contract farming also influences farm household welfare (W). In this phase, two linear regressions must be specified-one for participants and the other for non-participants. (Khonje *et al* 2015; Khanal *et al* 2018). Thus, the two regimes of the result equations can be specified as.

$$W_1 = \gamma_1 X_1 + u_1 \text{ if } I_i = 1 \quad (2a)$$

$$W_0 = \gamma_0 X_0 + u_0 \text{ if } I_i = 0 \quad (2b)$$

The expected welfare measure for contract farming participants and non-participants are W_1 and W_0 respectively; X_1 and X_0 are the $n \times k$ matrices of covariates, γ_1 and γ_0 are the parameters to be estimated and u_1 and u_0 are the $n \times 1$ vectors of normally distributed error terms with a zero mean and non-zero covariance matrix.

$$\Omega = \begin{bmatrix} \sigma_\varepsilon^2 & \sigma_1 & \sigma_0 \\ \sigma_1 & \sigma_1^2 & . \\ \sigma_0 & . & \sigma_0^2 \end{bmatrix}$$



Where σ_ε^2 is the error term in the selection equation, σ_1^2 and σ_0^2 are the error variances of the outcome equations (2a and 2b), σ_{ε_1} is a covariance u_1 and ε and σ_{ε_0} is the covariance of u_0 and ε . The covariance between u_1 and u_0 is undefined, as W_1 and W_0 are never observed simultaneously. We assume that $\sigma_\varepsilon^2 = 1$ (α is estimated only up to a scalar factor).

3.8.2 Conditional expectation and average treatment effects (heterogeneity effects)

The ESRM can be applied to compare the food consumption score (FCS)/consumption expenditure (household welfare) of farm households that participate in contract farming as against those that did not participate in contract farming. It can also be used to compare the expected consumption expenditure/FCS that is household welfare in the counterfactual hypothetical cases that the participated farm households did not participate, and the non-participated households participated. The conditional expectation of the outcome variables in the four mentioned scenarios are specified below.

Observed for participation in contract farming

$$E(W_1|I_i = 1) = \gamma_1 X_i + \sigma u_{1\varepsilon} \lambda_{1i} \quad (3)$$

Observed for non-participation in contract farming

$$E(W_0|I_i = 0) = \gamma_0 X_i + \sigma u_{0\varepsilon} \lambda_{0i} \quad (4)$$

Counterfactual for participation in contract farming

$$E(W_0|I_i = 1) = \gamma_0 X_i + \sigma u_{0\varepsilon} \lambda_{1i} \quad (5)$$



Counterfactual for non-participation in contract farming

$$E(W_1|I_i = 0) = \gamma_0 X_i + \sigma u_{1\varepsilon} \lambda_{2i} \quad (6)$$

To obtain the average treatment effect on the treated that is those who participate in contract farming, we would have to examine the actual observation of participation against the situation if the same group had not participated in the contract farming. Actual observation of participation against the counterfactual. The average treatment effects on the treated (ATT) assess the impact of contract farming (CF) participation on a farmer's household welfare (FCS/consumption expenditure). It is the gains a household make if a farmer in the household participate in contract farming. This can be specified as;

$$\begin{aligned} ATT &= E(W_1|I_i = 1) - E(W_1 = 0) \\ &= X_i(\gamma_1 - \gamma_0) + \sigma u_{1\varepsilon}(\lambda_{1i} - \lambda_{0i}) \end{aligned} \quad (7)$$

In a similar manner, by comparing the observed non-participation in contract farming (CF) as against the counterfactual, it is possible to determine the average treatment effects on the untreated. And that is if the farmer who did not participate had decided to participate in contract farming.

$$\begin{aligned} ATU &= E(W_0|I_i = 1) - E(W_0 = 0) \\ &= X_i(\gamma_1 - \gamma_0) + \sigma u_{0\varepsilon}(\lambda_{1i} - \lambda_{0i}) \end{aligned} \quad (8)$$

It is worth noting to show that a comparison can be made between the unbiased average treatments on the treated of the household farmers who participate against the average treatment effect of the untreated. Not participating in contract farming is more effective and tangible which gives better and clear effect of participation in contract farming. Table 3.1 shows the independent variables used in the regression model, the measurements, and their expected signs



Table 3.1: Regression variables, measurements, and their expected signs

<i>Variables</i>	<i>Measurement</i>	<i>A prior expectation</i>
1. <i>Age</i>	Number of years	+/-
2. <i>Gender</i>	1-male, 0-female	+/-
3. <i>Education</i>	Number of years in school	+
4. <i>Farm experience</i>	Number of years in farming	+
5. <i>Access to credit</i>	1-yes, 0-no	+
6. <i>Access to extension services</i>	1-yes, 0-no	+
7. <i>Off-farm engagement</i>	1-yes, 0-no	+/-
8. <i>Remittance</i>	1-yes, 0-no	+
9. <i>FBO membership</i>	1-yes, 0-no	+
10. <i>Income</i>	Ghana cedis	+
11. <i>Land ownership</i>	1-yes, 0-no	+
12. <i>Farm size</i>	hectares	+
13. <i>Location</i>	District (1-kunbungu, 0-Sagnarigu)	+/-
14. <i>Household size</i>	Number of individuals using the same pot to cook their meals	-
15. <i>MoFA fertilizer</i>	1-yes, 0-no	-
16. <i>Contract farming</i>	1-yes, 0-no	
17. <i>Consumption expenditure</i>	Ghana cedis	
18. <i>Distance to district capital</i>	kilometers	+/-

3.9 Constraints farmers face in participating contract farming

There are a number of methods recognized in literature for evaluating an item, including Friedman, Kendall's coefficient of concordance, and Garret's score techniques. Friedman's test and Kendall's concordance coefficient are closely related (Legendre, 2005). These three approaches address the same data hypotheses and use Chi square testing. However, their individual hypothesis is formulated in different ways. While the test by Friedman stresses the items rated, the hypothesis of the test by Kendall emphasizes the raters. On the other hand, the Garrett scoring technique uses an average scoring of rater and organize them either ascending or descending order. The constraint of this technique is that there are several steps involved and the



level of agreement between rankers is not tested. This study applied Kendall's (W) because it runs the test of agreements of raters among their ratings which the Friedman's and Garrett's tests lack. The Kendall's (W) is given as:

$$W = \frac{12s}{P(n^2-n)-PT}; \quad 0 \leq W \leq 1$$

$$S = \sum_i^n (R_i - \bar{R})$$

Where R_i is the overall rank for the i^{th} strategy, \bar{R} is the average score for each overall rank strategy, P is number of rankers, n is the number of items to be rated and T is the correction element for stalemates



CHAPTER FOUR

4.0 RESULTS AND DISCUSSIONS

4.1 Introduction

Results and discussions under the following categories are presented in this chapter: The socioeconomic and demographic details of the interviewees are shown in Table 4.2. The choice of farmers to engage in contract farming is illustrated in Section 4.3. Factors affecting farm household food security are shown in 4.4; the impact of contract farming on family welfare (food security) is shown in 4.5; factors affecting household consumption expenditure are shown in 4.6; the impact of contract farming on consumption expenditure is shown in 4.7; and limitations on contract farming are shown in 4.8.

4.2 Demographic and socio-economic characteristics of the respondents

4.2.1 Description of categorical variables in the model

As presented in Table 4.1, the results revealed that the average food consumption of a farm household was 38.729 units. This implies high level of food security among respondents. The average farm size was 2.445 hectare which implies that on average farm holding in the study area is low. Additionally, the family head's average number of years in education was 6.794. This implies high level of illiteracy in the Northern Region as compared to other regions. Again, the average family dimension in the study region was 6.852 people which is far higher than the national average of 4 people per household (GSS, 2014). This could mean more and cheaper labour for farming activities. Additionally, households may be under strain as a result of the limited resources available, which may affect their welfare, food security, and choice to engage in contract farming. The research also found that farmers have an average



of 10.680 years of farming experience. Implying that the respondents were more of less experienced farmers and would be likely to seek contract farming ventures which will give them access to full time extension service, inputs, and market for their produce.

Table 4.1a: Summary of continuous variables used

Variables	Mean	Std. Dev.
Continuous variables		
FCS	38.729	12.941
farm size	2.445	.621
Years of formal school	6.794	2.926
Household size	6.852	3.299
Years of farm experience	10.680	8.063

Source: Author's analysis, 2022.

4.2.1 Description of categorical variables in the model

The result in **Table 4.2b** revealed that 22 percent of the sampled farmers received remittance. This indicates that, on average, 1 in 5 of the households chosen for the study received remittances, which could be ascribed to the general economic hardship that almost everyone in the nation experienced, including household migrants, and which led to low remittance levels. The data revealed that 46.7 percent of the respondents interviewed are contract farmers as against 53.3 percent non-participants. More so, 90.5 percent of the respondents had received extension advice with 7 percent been social group members from the data analysis. In addition, about 88 percent are males with 91.8 percent of them been married. Furtherance to this, about 37 percent of the respondents sampled were into off-farm work which is below



expectation because off-farm work participation has been championed and promoted across board by major stakeholders given its contribution to farm household livelihood diversification.

Table 4.1b: Summary of the categorical variables used

Variable	Percentage (%)	Std. Dev.
Categorical variable		
Remittance	22	.147
Contract farming	46.7	.5
extension advice	90.5	.293
Male or female?	87.7	.329
social group	7	.255
married	91.8	.275
Off-farm work	36.91	.483
Access to good farm road	76.66	.424

Source: Author's analysis, 2022.

Furthermore, about 77 percent of farmers had access to good roads to their farms, implying that farm inputs and output could easily be transported from the farm without limitations. This has the potential of increasing household food security and welfare because there could be reduction in postharvest losses.

4.2.2 Summary statistics based on contract farming participation

As presented in **Table 4.2**, the study also assessed the difference in socioeconomic and institutional related characteristics. The results revealed that the average household size of a farming household was 6.852 people with contract and non-contract farming households reporting 6.615 and 7.059 people, respectively. The results imply that household size is a decreasing function of contract farming participation, and this is reflected in the bigger household size for non-contract farm



households compared to contract farming households but the difference in household size among contract and non-contract farming households was not significant. Also, the average food consumption score was 41.159units and 36.601units for contract and non-contract participating households respectively with a pooled average consumption score of 38.727units. The difference in consumption score among contract and non-contract farmer households was statistically significant at 1 percent which represent higher consumption score for contract faming households. This means by participating in contract farming has gone a long way to increases household food consumption score and it is understandable because farm households who participate in contract farming are more likely to have higher output/productivity which will translated to higher income, food availability, accessibility, and stability. Thus, higher food consumption. Again, in totality 92 percent of the farmers/ household heads were married, with 86 and 97 percent of contract and non-contract farmers being married respectively, and the difference was significant at 1 percent. These results imply that contract farming is more patronized by unmarried farmers as compared to married farmers. This can be anticipated because farmers who are married are likely to rely on their wives to sell their produces when its ready for market and may not need contract agents to get their produce to the market. Also, married farmers are likely to have supporting family labour on the farm which may reduce their farm expenditure and by extension would be able to meet their other input needs without contract agents.

Furthermore, farm size and the number of years spent in school were found to be high on average for non-contract farming households as compared to contract farming households. This implies farmers with bigger farm size are less likely to



participate in contract farming and this is contrary to literature and a prior expectation because bigger farm size could mean more input and market need and thus, farmers may participate in contract farming to meet this need. But it is understandable because bigger farm size owners are likely to be financial stable and may be salary earners who could rely on their own earnings to meet their farm expenditure and may not need contract benefits given the terms and conditions contract farming brings to the table. This result is contrary to those of Bezabeh et al. (2020) who could not find any significant relationship between contract farming and farm size. But conforms to Okezie et al., (2012) study. Similarly, spending more years in school is likely to translated to greater income earning opportunities which farmers could use to support their farming. More so well-educated farmers are likely to have good knowledge on farm management and may not need to go into contract for extension services and other gains that it brings to bear. Another finding worth noting was farm experience. The results show that the average years in farming by the sampled respondent was 28 years with 24 and 31 years, respectively, for contract and non-contract farmers and difference in farm experience among the two categories was significant at 1 percent. This means that farmers who have more years in farming are less likely to participate on contract farming given the revelation of the results.



Table 4.2: Summary statistics based on contract farming participation

<i>Variable</i>	<i>Pooled</i>	<i>Contract</i>	<i>Non-contract</i>	<i>t-value</i>	<i>p-value</i>
Household size	6.852	6.615	7.059	1.1970	0.232
FCS	38.727	41.159	36.601	-3.1734** *	0.001
Married	0.918	0.858	0.970	3.7021** *	0.000
Farm size	12.617	10.373	14.536	5.4343** *	0.000
Years in schooling	5.633	4.352	6.753	4.3758** *	0.000
Farm experience	27.902	23.837	31.458	4.762***	0.000
Remittance	0.022	0.027	0.018	-0.5592	0.576
Extension access	0.905	0.817	0.982	5.1903** *	0.000
<i>Gender</i>	0.877	0.777	0.964	5.2504** *	0.000
Social group	0.070	0.088	0.053	-1.1932	0.233
Off-farm work	0.369	0.520	0.237	-5.4428** *	0.000
Good roads to farms	0.767	0.655	0.864	4.5026** *	0.000

From the above table, about 91 percent of the sampled respondents had access to extension services. Those who had access to extension service and participated in contract farming was 82% and 98 percent of farmers had access to extension but are non-contract farmers respectively. This implies that farmers who have access to extension service are less likely to participate in contract farming and this means that extension access is a decreasing function of contract farming participation. This makes sense because at time farmers participate in contract farming for extension service access thus, may not participate if they already have it. Additionally, about



88 percent of contract farming participants were males per the results with 78% of male farmers being contract and 96 percent of male farmers being non-contract farmers respectively. This means males are less likely to engage in contract farming and for that matter being a male reduces your chance of participating in contract farming. This makes logical sense because males are usually exposed and better placed in terms of resource access and income generating avenues. Thus, they would have the capacity to meet their farming needs as compared to females who are always disadvantageous. Similarly, 37 percent of off-farm participants were into contract farming with 52 percent of contract farmers being off-farm participants as against 24 percent for non-contract farming. This implies that off-farm participation or work has a positive relation to contract farming participation. Thus, farmers who are into off-farm work are more likely to participate in contract farming than their counterparts who do not. Finally, 77 percent of farmers who had access to good farm roads were into contract farming with about 66 and 86 percent of the farmers into contract farming and non-contract farming, respectively, having access to good farm roads. This implies that farmers who have access to good farm roads are less motivated to participate in contract farming and this make sense because farmers who have access to good farm roads are more likely to cart both their farm inputs and output easily to and from farm and may not have challenges in that regard. Thus, may not actively participate in contract farming.



4.3 Determinants of contract farming participation

Table 4.3 shows the determinants of farmers' decision to participate in contract farming in the Northern Region of Ghana. The results presented include both coefficients and marginal effects, and interpretation and discussion are based on marginal effects. Analysis shows that the main determinants of farmer involvement in contract farming in the Northern Region of Ghana are farmer involvement in off-farm work, market distance, marital status, land size, and access to extension services. The marginal effect of off-farm work means that there is a negative relationship between farmers' involvement in contract farming and off-farm work, which is statistically significant at his 1% level. This is in line with previous expectations, mainly as farmers are switching to contract farming due to certain marketing, input and financing constraints. Farmers working outside agriculture may earn additional income that allows them to meet or overcome these constraints without entering into contracts with other parties. Again, there is a negative relationship as farmers who participate in contract farming are typically commercial farmers who pursue agriculture as their primary occupation and may be unable to combine with work outside of agriculture. Consistent with the results, Bezabe et al. (2020) failed to find a significant relationship between external participation and firm size. Furthermore, market distance was found to be positively correlated with participation in contract farming, which was significant at the 1% level, and holding all factors constant, an increase in market distance of 1 km increased the It means that you are more likely to participate. 0.671 for contract cultivation. This is fully consistent with a priori expectations that farmers who are far from markets have difficulty accessing agricultural inputs and markets and are more likely to engage in contract farming to access mature markets. are expected to be high, so get their farms



to provide products and inputs. This result differs from that of Gemechu et al., who reported market distance as a negative function of contract farming participation in their study (Ejigu et al., 2012 and Bezabeh et al., 2020). is consistent with (2017) found that market distance was positively associated with participation in contract farming in northern Ghana. Marital status, which is denoted 1 if married and 0 otherwise, also had a negative marginal effect, significant at the 10% level. This means that married farmers are less likely to engage in contract farming than unmarried farmers. This is understandable given the study area, where men primarily utilize women to sell their produce, and married men hire wives to sell their produce. Also, since women are primarily engaged in trading and other non-agricultural activities, the income generated can be used to help her husband buy supplies and cover the costs of other farmers without relying on contracting agents.

Farm size was found to be a negative function of participation in contract farming in northern region. This goes against a priori expectations. Because farmers with large farms need more inputs, have higher yields, and need a reliable market source, these farmers contract because they are more likely to work in agriculture. Inputs and markets for their production or products. This result contradicts previous studies (e.g. Bellemare, 2012; Goshu et al., 2012, Okezie et al., 2012). Bezabe et al. (2020) and Azumah et al. (2016) found that farm size had a significant negative impact on farmers' decisions to engage in contract farming. Minot and Ronchi (2015) also found that farm size did not significantly influence farmers' decisions to participate in contract farming. Finally, farmers who have access to, or receive advisory advice are less likely to participate in contract farming than farmers who do not have access to, or do not receive advisory advice, which is significant at 1%. This means that



farmers who are advised are less likely to participate in contract farming than farmers who are not. Farmers receiving complementary advice, which is an integral part of contract farming, should know more about the benefits of participating in contract farming and be more informed about the terms of contract farming. This deviates from a priori expectations because. They were more likely to participate in contract farming. This is understandable, as farmers with access to advisory services may not want to continue contract farming if access to advisory services is their motivation for participation. Social group affiliation was found to have a positive and significant impact on the food security status of contract farmers. However, the impact on non-farm food security status was negative and significant, suggesting that social group membership is a negative function of non-farm food security. Marital status has a negative coefficient on food security for contract and non-contract farmers. This means that marriage reduces the food security status of contract and non-contract farmers.



Table 4.3: Determinants of contract farming participation in Northern Region.

Contract farming	Coef.	St. Err.	dy/dx	std.
FBO membership	-0.324	0.255	-0.094	0.073
Off-farm work	-	0.167	-	0.042
	0.884***		0.256***	
Access to good farm roads	-0.0498	0.275	-0.014	0.080
Market distance	0.671***	0.209	0.195***	0.058
Household size	0.316	0.565	0.092	0.164
Gender	0.133	0.368	0.039	0.107
Remittance	0.135	0.593	0.039	0.172
Married	-0.688*	0.382	-0.200*	0.109
logfarmsize	-	0.218	-0.221***	0.060
	0.760***			
Labour size	0.000	0.000	-0.000	0.000
Years of formal school	-0.282	0.566	-0.082	0.164
Extension advice	-	0.370	-0.302***	0.104
	1.042***			
Social group	-0.053	0.319	-0.015	0.093
Constant	1.88**	0.769		

Source: Author's analysis, 2022.



4.4 Factors affecting farm household food security

Table 4.4 presents estimates of the impact of contract farming on food security for farmers in northern Ghana. The likelihood ratio test results for joint independence were significant at the 10% level. Therefore, the null hypothesis that the three equations are collectively independent and can be estimated individually is rejected. Also, " ρ_2 " is negative and significant at 1% each for both participants and non-participants, indicating that the null hypothesis of no selectivity bias was rejected. Participants and non-participants parameters showed positive coefficients, indicating that both participants and non-participants had significantly higher feed consumption than random farms in the study area. Overall, the results suggest that observed and unobserved factors combine to influence farmers' decisions to participate in contract farming. The analysis shows that off-farm work is positive and significant in determining the food security situation for both participants and non-participants of contract farming in the northern region. A positive coefficient for both contract and non-contract farms means that farms working off-farm are more likely to be food secure than non-farm farms, and this is true for both contract and non-contract farms. However, it rose sharply to the 1% level. This makes sense. Because farmers engaged in off-farm work earn additional income from off-farm activities, purchase food to supplement the food produced by the households themselves, and diversify food consumption, thereby increasing food security. Because it helps improve security. This contradicts the findings of Olounlade et al. (2020) who observed that non-agricultural activities/income were positively and significantly associated with the household food security of rice farmers.

Again, farmers access to good farm roads was positive for both contract and non-



contract farming households' food security but only significant for non-contract farming households. The implication of the positive coefficients is that farmers who have access to good roads to farm have better food security as against those who do not, irrespective of whether they are contract or non-contract farming households. This conforms to a priori expectation, because we expect farmers who have access to good farm roads to easily convey farm inputs and produce respectively without hindrances. This will increase farm productivity and reduce postharvest losses and thus translates into higher income, food availability and accessibility within farm households.

The results also reveal that household size has a negative effect on the food security status of both contract and non-contract farming households, implying that an increase in a farm household size will decrease their food security status all else equal. This effect was significant and resonates with the a priori expectations, because bigger farm households size implies pressure on household food, income, and other available resources, which can have negative implications on their income, food availability and access both at the household and individual level and their overall food security status. This finding deviates from Olounlade et al. (2020) who reported a positive relationship between household size and farm household food security measured by FCS but in conformity with the findings of Aidoo et al. (2013).

In addition, being a male head of household had a significant negative impact on the food security status of contract farmers. This means that male contract farmers are less likely to secure food than female contract farmers in the study area. This deviates from a priori expectations, as it is expected that males who have the advantage in terms of resource access and use will do so. They are more able than



women to meet their household food needs. However, these results make sense because, in addition to agriculture, women also trade in agricultural commodities and other foods, contributing to some extent to food access and availability compared to men. This result is consistent with her Sekhampu (2013) who found that female-headed households were more food secure than male-headed households. However, although positive, gender did not significantly affect the food security status of non-contract farmers. Social group affiliation was found to have a positive and significant impact on the food security status of contract farmers. However, the impact on non-farm food security status was negative and significant, suggesting that social group membership is a negative function of non-farm food security. Marital status has a negative coefficient on food security for contract and non-contract farmers. This means that marriage reduces the food security status of contract and non-contract farmers. This meets the a priori expectations because married farmers may have bigger household size or extra responsibilities to cater for which could put pressure on the resources available to them and would have negative consequences on the amount of fund available for farming which will translate to both food availability and income enhancement which can further be used to purchase food to supplement the available one to meet household food needs. In line with this result is Aidoo et al. (2013) in the Sekyere-Afram Plains District of Ghana but contrary to the findings by Haliuet et al. (2007) and Kaloi et al. (2005) in Ethiopia and Uganda, respectively.

Regards to the receipt of remittance by farm households, the results show that farm households who receive remittance decreases their food security for both contract and non-contract farming households and this was significant for only non-contract



farming households. This contradicts the a priori expectations because we expect that farm households who receive remittance would be better positioned to meet their food consumption needs through purchasing of food to supplement the food produced by the farm household. Again, remittance could also be used to support farming activities to increase farm output, income and by implication food security. But the results make sense because if household members who travel out and send remittances do not send enough to offset their contribution to food production through labour supply, the outcome will be decrease in food consumption in the household.



Table 4.4: Endogenous switching regression results of factors affecting food security

VARIABLES	FCs_1	FCs_0	Contract farming
Off-farm work	7.049*** (0.468)	9.026*** (1.051)	-0.821*** (0.157)
Good roads to farm	1.043 (0.864)	2.354*** (0.186)	0.409** (0.182)
household size	-1.255*** (0.0380)	-2.668*** (0.402)	0.0699 (0.137)
Gender	-7.091*** (0.575)	1.671 (1.611)	0.231*** (0.0867)
Social group	10.31** (4.733)	-2.484** (1.012)	0.226** (0.105)
married	-2.191 (1.617)	-5.494*** (0.706)	-0.291 (0.395)
Years of farm experience	-0.342*** (0.0786)	0.242** (0.112)	-0.0515*** (0.0117)
Remittance	-14.87 (11.22)	-11.87*** (0.634)	0.903*** (0.0269)
Logfarm size	11.72*** (0.635)	3.368** (1.592)	-0.750*** (0.0560)
Years of formal education	0.910 (0.558)	2.238*** (0.291)	-0.0489 (0.122)
Extension advice			-1.238** (0.524)
Constant	21.81*** (3.082)	8.343*** (3.078)	4.191*** (0.430)
lns1			2.710*** (0.0158)
lns2			2.387*** (0.0694)
r1			-0.912*** (0.00623)
r2			-1.212*** (0.316)
Observations	316	316	316

Source: Author's analysis, 2022. *** p<0.01, ** p<0.05, * p<0.1

Focusing on farm experience which measures the number of years a farmer spends in farming, the results indicated that an increase in years of farm experience decreases the food security status of contract farming households and increased the food security status of non-contract farming households, and this effect was significant for non-contract farming households but however not for contract



farming households.

Farm size variable was found to have positive and significant effect on the food security status of both contract and non-contract farming households. This means that an increase in farm size corresponds to increase in food security, which is in line with Aidoo et al. (2013) and a priori expectations. Years of formal education is positively related to the food security status of both contract and non-contract farming households but only significant for non-contract farming households. This means an increase in years of formal education will increase the food security status of both contract and non-contract farming households. This finding is in line with intuition, because we expect that farmers who have good education will be exposed to improved farming technologies that would enhance their production and farm income. Again, educated farmers are expected to have good knowledge and understanding of food security and would mostly likely adopt measures that better their food consumption in terms of quality and quantity. This finding resonates well with the findings of AH Fikire (2022) and Mohammed (2021).

4.5 Assessing the effect of contract farming participation on the welfare (FCS) of maize farmers.

As presented in Table 4.5, farmers who participate in contract farming cell “a” have a Food Consumption Score (FCS) of 50.228 units. Similarly, farm households who are not into contract farming and did not participate cell “b” have an FCS of 29.519 units. Again, cell “c” presents the counterfactual for contract farmer given they decided not to participate, their FCS would have been 30.489 units. Also, cell “d” illustrates the counterfactual for non-contract farmers if they had participated, they would have had an FCS of 49.13 units. The results of the treatment effect estimated



show that the expected FCS of contract farming participants is higher than the non-participants by 20.709 (a-b). The treatment effect is that if those who participate in contract farming had decided not to participate, the counterfactual situation of those who participated would have lost a household FCS of 19.739 units (a-c) which is statistically significant at the 1 percent level. This implies that had the contract farming participant decided not to participate in contract farming he/she would have lost a FCS of 64.74 percent. Similarly, if the non-contract farmers had decided to participate in contract farming, thus the counterfactual situation, the non-contract farmer would have gained a higher FCS by 19.611 units, and this was significant at the 1 percent level. This suggests that had a non-contract farmer decided to participate in contract farming he/she would have gained a higher FCS of 66.44 percent.

Table 4.5: Expected welfare (FCS), Treatment, and Heterogeneity effects of contract farming participation on welfare (FCS)

Variable	To participate in contract farming	Not to participate in contract farming	Treatment	% Change of treatment	Heterogeneity effect
Contract	50.228 (a)	30.489 (c)	19.739***	64.74	
Non-contract	49.13 (d)	29.519 (b)	19.611***	66.44	0.128
Ha	1.098	0.970	0.128		

Source: Author's analysis, 2022



The heterogeneity effect showed that FCS increased by 66.44% when non-contract farmers chose to participate in contract farming. In contrast to the latter, if a farmer participating in contract farming chose not to participate in contract farming, his FCS would have fallen by 64.74%. Overall, a positive transition heterogeneity of 0.128 indicates that farmers who participated in contract farming had a significantly higher impact of participating in contract farming on welfare (FCS) than those who did not participate in contract farming. This means that contract farming is a positive feature of food security for farmers in northern Ghana. This study is consistent with the findings of Soullier and Moustier (2018) and Barthelemy et al. (2016) who reported improvements in farmers' food security through participation in contract farming. Similarly, the findings of Bellemare (2010) that contract farming has a positive impact on farmers' food security were further supported by Bellemare and Navak (2017). However, this finding is inconsistent with the recent findings of Olounlade et al. (2020) and Hussaini Yusuf I, Sakinatu Umar G, Munir Jamiu W (2021). Those two studies found that contract farming has a negative and significant impact on farmers' food security. This may be justified by unfavorable contract design, which can lead to exploitation of farmers participating in contract farming.

4.6 Factors affecting household consumption expenditure

An analysis of the impact of participation in contract farming on farmer welfare, measured by consumer spending, is shown in columns 2 and 3 of Table 4.6. The results of the likelihood ratio test for independence of the three equations were significant at the 1% level, rejecting the null hypothesis that the three equations are collectively independent. In addition, the correlation coefficient "**rho2**" between



participation in contract farming and well-being (consumption expenditure) was negative for both participants and non-participants, and only the correlation for non-participants was significant at 1%. The non-participant parameter was negative and significant at the 1% level. Overall, the results suggest that both observed and unobserved factors determine households' decisions to engage in contract farming and their well-being. The discussion in this section focuses solely on the welfare implications of participation as the determinants of participation in contract farming were discussed above using the probit model. The results show that farmer involvement in off-farm labor is statistically significant to explain the welfare (consumption expenditure) of farmers not participating in contract farming. A positive and significant coefficient for non-participants implied that farmers who participated in off-farm work had better welfare than those who did not. Interestingly, for farmers participating in contract farming, off-farm work did not have a significant impact on welfare. This result is consistent with those of Obasi Igweoscar (2014), which assessed factors affecting farmer welfare as measured by per capita expenditure.

Also, good farm road has a negative and significant effect on the welfare of both participants and non-participants of contract farming. This means that farmers who have access to good roads to their farms are less likely to have higher consumption expenditure than those who do not have access to good farm roads, and this is true for both participants and non-participants. This finding though does not conform to the a priori expectations, but understandable because transportation expenditure is a component of farm household consumption expenditure. Thus, good farm roads have the tendency to reduce the amount farm household spend in totality.



Household size is associated with a negative impact on farmer well-being (consumption expenditure) for both contract farming participants and non-participants. We found an association, but it was only significant at the 1% level for non-participants. This means that an increase in household size by one, all else being equal, decreases a farmer's consumption expenditure, whether or not she participates in contract farming, but this effect is non-trivial. Only significant for participants. This is contrary to the a priori expectations, because we expect that bigger farm household who have many needs to meet will spend more in relation to consumption as compared to smaller household. But it makes sense because if the household size does not correspond to their income, they would be unable to spend more as postulated. Again, household spending is a function of their income thus, bigger households who do not have corresponding bigger income may not spend more. This finding is consistent with the findings of Ademiluy (2014) in Nigeria who also found a negative relationship between household size and consumption expenditure.

The variable gender, measured as dummy, where 1 assigned to male and 0 to female, has been found to have a negative effect on consumption expenditure for both participants and non-participants of contract farming, but significant for only non-participants. The negative and significant coefficient for non-participants implies that being a male decreases the consumption expenditure of both contract and non-contract farming households in northern Ghana. This does not conform to the a priori expectations, because male farmers are usually favored in farming as they are more exposed to resources both in terms of finance and land allocation for farming and therefore should have good incomes which will translate to their household consumption expenditure. This notwithstanding, the results makes logical sense



because women in the study area are more into trading and other businesses in addition to farming as against male who were more into farming alone and this could be their secret of higher income and by extension, higher consumption expenditure than their male counterparts.

The social group membership variable shows a positive and negative effects on consumption expenditure for participant and non-participants, respectively. This means that being a social group member increases household consumption of contract farming participants but decreases the consumption expenditure of non-participants of contract farming, but this effect was only significant for non-participants.

Additionally, farming experience is a positive function of the consumption expenditure of both participants and non-participants of contract farming. The positive coefficient for both cases implies that an increase in years of farming experience will increase the consumption expenditure of both participants and non-participant of contract farming. This conforms to the a priori expectations, because farmers who have many years in farming are likely to have good knowledge of farm management practices and for that matter higher productivity, income, and consumption expenditure. Again, farmers who are more experienced are more likely to have adequate contract arrangement knowledge supported by real farm facts that will allow them to have an arrangement that will boost their farm productivity, income, food security and thus, household welfare.

Remittances showed negative and positive coefficients associated with consumption expenditure for contract and non-contract farming households., respectively. This



means that receiving remittance by a fam household reduces and increases the consumption expenditure of contract and non-contract farming households, respectively. This deviates from the a priori expectations for contract farming households because we expect that farmers who receive remittance will have extra income apart from farm income to lay their hands on in meeting their consumption expenditure needs as against non-recipients of remittances. However, the negative impact for contract farming households could be attributed to unfavorable contract arrangement which requires farmers to pay immediately after harvest resulting in selling at cheaper prices to settle their contractual obligations. Again, higher cost of inputs coupled with manipulation of prices also reduces farmers' returns and remittances could be diverted to the payment of farm inputs instead of consumption.



Table 4.6: Endogenous regression results for determinants of welfare (consumption expenditure) and contract farming in the Northern Region

Variables	Welfare		Contract Farming
	<i>logexpenditure</i> <i>_1</i>	<i>logexpenditure</i> <i>_0</i>	<i>Selection 1/0</i>
Off-farm work	0.353 (0.461)	0.114*** (0.0288)	-0.782*** (0.158)
Good roads to farm	-0.169** (0.0751)	-0.342*** (0.00997)	0.626*** (0.223)
Household size	-0.00183 (0.0144)	-0.0735*** (0.00926)	0.000316 (0.221)
Gender	-0.209 (0.265)	-0.183*** (0.0415)	0.309 (1.425)
Social group	0.0969 (0.146)	-0.165** (0.0652)	0.324*** (0.123)
married	0.123 (0.379)	0.200 (0.322)	-0.0571 (1.713)
Years of farm experience	0.0131*** (0.00271)	0.00997*** (0.000537)	-0.0565** (0.0288)
Remittance	-0.262 (0.816)	0.114*** (0.00496)	0.0243 (0.422)
Logfarm size	0.422 (0.422)	0.226*** (0.0295)	-0.785** (0.336)
Years of formal education	-0.00471 (0.0142)	0.0769*** (0.00680)	0.0261 (0.205)
Extension advice			-1.166*** (0.146)
Livestock income	0.00102** (0.000499)	0.000289*** (3.77e-05)	8.02e-05 (0.000255)
Constant	8.470*** (1.505)	8.862*** (0.360)	3.621*** (1.098)
lns1			-0.464 (0.727)
lns2			-0.962*** (0.0333)
r1			-2.061 (5.756)
r2			-0.0781*** (0.0272)
316	316	316	316

Source: Author's analysis, 2022. *** p<0.01, ** p<0.05, * p<0.1 Wald test of

indep. eqns.: chi2(1) =2.0e+06 Prob> chi2=0.0000



The results also revealed that farm size has a positive effect on consumption expenditure of both contract and non-contract farming participants, implying that a unit increase in farm size will increase the consumption expenditure of both participants and non-participant of contract farming and the effect is significant for only non-participants of contract farming. This resonates well with the a priori expectations, because we expect that larger farm size will have more output which will translate to higher income and consumption expenditure. In line with this finding is Ademiluy (2014) and Ukoha et al. (2007).

Years of formal education has been found to have negative effect on the consumption expenditure of contract farming households but positive for non-contract farming households' consumption expenditure. This contradicts the a priori expectations, because we expect that more educated farmers would have good understanding of contract terms and conditions and would be able to negotiate for better deals that will inure to their benefits and boost their income. Again, we expect that more educated farmers would have better understanding of their farm management activities and resource utilization which will enhance their productivity and by extension income and consumption expenditure (welfare) and this was significant for non-contract farming household welfare but not for contract farming households. The result is inconsistent with those of Ademiluy (2014) who found households with educated heads to have higher welfare as compared to non-educated heads.

Similarly, livestock income increased significantly by 1%, positive for both household consumption expenditure and contract farming. This is consistent with a priori expectations. This is because livestock income helps farmers to diversify their



income and not only crops, in other words it can be called additional income, which can contribute positively to the consumption expenditure of farmers.

4.7 Determining the effect of contract farming on the welfare (consumption expenditure) of farm households

As presented in Table 4.5, farmers who participate in contract farming cell ‘a’ has a consumption expenditure of 11.059 units. Similarly, farm households who are not into contract farming and did not participate cell ‘b’ has a consumption expenditure of 9.354 units. Again, cell ‘c’ presents the counterfactual for contract farmers given they decided not to participate in contract farming, their consumption expenditure would have been 10.268 units. Also, cell ‘d’ illustrates the counterfactual for non-contract farmers if they had participated, they would have had a consumption expenditure of 10.097 units. The results of the treatment effect estimation showed that the expected consumption expenditure of contracted farmers was 1.705(a-b) higher than that of non-contracted farmers. The treatment effect was that the participant's counterfactual was that if contract farm participants chose not to participate, they would have lost 0.792 units (a-c) of household consumption expenditure, which is 1% and is statistically significant. This means that if the contract grower chose not to join the contract grower, she lost 7.7% of her consumption expenditure. In a counterfactual situation, if the non-contract farmer chose to participate in contract farming, the non-contract farmer achieved 0.744 units more consumption expenditure than he did. This was significant at the 1% level. This suggests that non-contract farmers would have achieved an 8% higher consumption effort if they had chosen to engage in contract farming.



Table 4.7: Expected consumption expenditure, Treatment, and the heterogeneity effect of contract farming on household welfare (consumption expenditure)

Variable	To participate in contract farming	Not to participate in contract farming	Treatment	% Change of treatment	Heterogeneity effect
Contract	11.059 (a)	10.268 ©	0.792***	7.7	
Non-contract	10.097 (d)	9.354 (b)	0.744***	8.0	0.048
Ha	0.962	0.914	0.048		

Source: Author's analysis, 2022.

Heterogeneity effects showed an 8.0% increase in consumption expenditure of non-contract farmers when they decided to participate in contract farming. In contrast to the latter, when farmers participating in contract farming chose not to participate in contract farming, their consumption expenditure decreased by 7.7%. This means that the welfare impact (consumption expenditure) of participation in contract farming is significantly higher for contract farmers than for non-contract farmers. This means that contract farming is a positive function of household consumption expenditure of farmers in northern Ghana. Simmons et al. (2005) in their study of the impact of contract farming on poultry, maize and rice crops in Indonesia, found using an OLS regression model, that contract had a positive impact on farmer well-being. Mishra et al. (2018) analyzed Indian onion contracts and found positive impacts on food security as measured by share of yield and food expenditure. Similarly, other previous studies have found that participation in contract farming is a feature that increases farmer well-being (eg, 2014; Warning & Key, 2002).



4.8 Challenges farmers face in contract farming

Table 4.8 presents the challenges farmers face in participating in contract farming in the Northern Region of Ghana. From the Kendall's ranking of the challenges identified on a scale of 1-15. 1 being the most pressing and 15 being the least pressing, the Kendall's coefficient (W) of concordance was 0.430 with a Chi-square of 1016.221 at 14 degrees of freedom (df) and significant at the 1 percent level. The 0.430 value for the W implies that the level of agreement between the rankers is 43 percent. From the ranking, drought, late rainfalls, price formula used by agents is not good, lack of trust of the unit of measurement, unsatisfactory technical assistance of contract agents, flood and too many restrictions on how to cultivate produce were the top 7 pressing challenges identified and ranked by respondents from 1-7 respectively. Drought as identified by respondents in the study as in recent times pose a serious threat to agriculture production most especially within the catchment area of the study. Every year reports on loss of farm produces like rice or maize due to drought and this limits farmers ability to rip the full benefits of contract farming participation. Thus, farmers who want to or who are into contract farming are likely to be challenged by its occurrence. Again, erratic/late rains also featured prominently as a challenge during the study. Farmers reported poor yield because of late rains which sometimes pushed planting dates to coincide with disease and pest prone period which could lead to total farm losses due to disease and pest attack. Again, late rains also limit farmers' ability to plant certain crops that may be more profitable and beneficial under contract. In the words of one respondent, *"this time, if you join contract farming you cannot pay when it rains late. We are unable to plant quickly and therefore the time we are supposed to harvest the crop will not be ready and beyond that we risk losing everything to bush fires so it is a big challenge"*.



Unfavorable price formula was also identified as a challenge to farmers participating in contract farming. According to one farmer, “*contract farming does not help. The price formula they use is a cheat. How can I spend my time to produce and they would come and decide the amount to pay not considering if it covers my cost or not*”. In line with this finding is Silva (2005) who identified low contract price, poor technical assistance, manipulation of standards, among others, as major challenges facing processors in contract engagement. Again, Adabe (2017) noted that the price formula used by ESOP is not good because farmers feel cheated when there are price hikes. Similarly, buyers’ determination of produce quality and manipulation to drive price down, companies not having enough capital, cash and carry, delay in product collection by companies and not benefiting by selling produce to contract agent were the least pressing challenges identified and ranked 15th, 14th, 13th, and 12th, respectively, by farmers as presented in Table 4.8. Furthermore, loss of freedom to sell own produce, no price negotiation, delay in payment and paying for defaulters were ranked as 8th, 9th, 10th, and 11th, respectively, by sampled respondents in the study.



Table 4.8: Challenges farmers face in participating contract farming

Challenges	Mean rank	Rank
1. Drought	13.64	1 st
2. Rain comes late	13.41	2 nd
3. The price formula the agents uses is poor (I feel cheated when the price goes up)	11.83	3 rd
4. I don't believe in the consistency of measurement (scale)	7.9	4 th
5. Technical assistance of contract agents is not satisfactory	7.59	5 th
6. Flood	7.12	6 th
7. Too many limitations in growing the produce crop	7.08	7 th
8. My right to market my own produce is taken away from me.	6.95	8 th
9. Sponsoring businesses abuse their monopoly position to set price and are unreliable (no price negotiation)	6.95	9 th
10. Receiving payment for sold product takes too long	6.93	10 th
11. We are required to pay back any debts that others neglect to pay	6.57	11 th
12. I have not benefited by selling my produce to contracting agent	6.55	12 th
13. Delay products collect by companies	6.13	13 th
14. Companies do not have enough capital cash carry	5.88	14 th
15. The quality of the produce is determined by the buyer, and they manipulate this to drive down prices	5.5	15 th
N	316	
Kendall's W ^a	0.430	
Chi-Square	1016.221	
df	14	
Asymp. Sig.	0.000	

Source: Author's analysis, 2022



CHAPTER FIVE

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary

According to the survey, the average farmer's food consumption was 38.729 units and the average farm size of the respondents was 2.445 hectares. The average number of years of schooling for the head of household was 6.794. Also, her average household size is 6.852, well above the national average of 4 per household (GSS, 2014). Finally, the study observed that the average years in farming experience among farmers in the study area was 10.680 years. About 22 percent of the sampled farmers for the study received remittance. Notably, 46.7 percent of the respondents interviewed for the study were contract farmers as against 53.3 percent who were non-participants. More so, 90.5 percent of the respondents had received extension advice with 7 percent been social group members. In addition, 88 percent of the respondents interviewed from the study area were males with 91.8 percent of them been married. Furtherance to this, about 37 percent of the respondents sampled were into off-farm work. Furthermore, about 77 percent of the sampled respondents had access to good roads to their farms. From the analysis, it was established that farmers participation in off-farm work, market distance, marital status, land size, and extension service access were the main determinants of farmers' decision to participate in contract farming in the Northern Region of Ghana. We applied an endogenous switching regression model to assess the impact of engaging in contract farming on farmer welfare (FCS and consumer spending). Results showed that participation in contract farming had a positive impact on farmers' household welfare (FCS and consumer spending). Ranked within the top seven constraints that limit participation in contract farming were: drought, late rain, poor agency pricing



formula, lack of trust in units of measure, poor technical support from contract agencies, and flooding. Identified as less urgent constraints included manipulation by buyers to undermine product quality and price, firms lacking sufficient cash-and-carry capital, delays in receiving products, and lack of benefit from selling products to contracted agents.

5.2 Conclusion

Regarding the results of this study, the main factors influencing farmers' participation in contract farming in the Northern Region of Ghana are off-farm labor, market distance, marital status, land size and access to extension services. Except for market distance, which was found to be positive for participation in contract farming in this study, all other important variables were negatively associated with farmers' decisions to engage in contract farming. This study used an endogenous switching regression model to find that participation in contract farming positively impacts household well-being (measured by FCS and consumer spending). The Kendall Ranking lists the seven most pressing challenges facing northern farmers as drought, late rains, poor agency pricing formulas, lack of confidence in units of measurement, and poor technical support from contracting agencies.

5.3 Recommendations

Pointing to the primary objectives of this study, the evidence available showed that participation in contract farming helped to enhance the well-being of farmers in northern region of Ghana. The study, therefore, recommends that the Government of Ghana (Ministry of Food and Agriculture), through its agricultural extension agents, raise awareness among farmers on the need to participate in contract farming. Again, government and relevant stakeholders that seeks to enhance farm



households should incorporate contract farming in their livelihood interventions to enhance farm household welfare. Social group engagement according to the study was positive to both contract farming participation and farm household welfare. Thus, we recommend that NGOs, and relevant stakeholders should encourage the formation and participation in social groups to enhance contract farming participation and by extension improve in farm household welfare. Also, drought and late rainfalls were the top two challenges farmers face in contract farming in this study. Hence the study recommends that Government should speed up its flagship project (1V1D) to help farmers mitigate this challenge and by extension improve their production, income, food security and consumption expenditure. Again, major stakeholders in the agricultural sector including the farmers should consider mechanized borehole irrigation systems in areas where the water table is high to supplement the rains. Furtherance to the above, government, NGOs should help develop a standardized measurement system for farm produce and that should be applicable to contracting agents to help reduce cheating of farmers and thereby increase contract farming participation and enhance farm household welfare. Finally, the study was conducted in the northern regions using three districts with only 316 respondents. Notwithstanding the contribution of this finding to welfare policies in the study area, future studies should consider extending to other regions in the north and other parts of the country to gain more representative outcomes that will form the basis for welfare policies in the country.



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APPENDIX ONE

**UNIVERSITY FOR DEVELOPMENT STUDIES
FACULTY OF AGRICULTURE, FOOD AND CONSUMER SCIENCE
DEPARTMENT OF AGRICULTURAL AND RESOURCE ECONOMICS
PROJECT QUESTIONNAIRES**

Good morning/afternoon Sir/Madam. Please my name is

I'm a student at UDS. I'm conducting interviews in the district. You have been randomly/purposively selected to participate in a research study on the *impact of contract farming on household welfare*. The objective of this study is 1. To determine the factor influencing farmers' participation in contract farming in the district 2. To determine the effect of contract farming participation on household welfare. 3. To identify and rank the constraints farmers face in participating contract farming.

It is purely for academic purpose and if you agree to participate, you would be asked a few questions within forty-five (45) minutes. Your views would be confidential and will neither be linked to you in the analysis nor the findings.

CONTACT INFORMATION ON ENUMERATORS AND RESPONDENTS

<i>Enumerator's Information</i>		<i>Respondent's Information</i>			
Name		Phone No.		Region	
Mobile No.		House No.		District	
Code		Date:		Community	
Email					

Part 1: Household A socioeconomic characteristics

Section 1A: socioeconomic characteristics

Section 1A: Size of household (family members or relatives who sleep here every day or at least on the weekends)

Tot al	Ma le	Fem ale	≤ 15 yea rs	16 – 65yea rs	≥ 66yea rs	Attendi ng school	Worki ng on farm	Worki ng off- farm	Studyi ng off- farm
1A1	1A 2	1A3	1A4	1A5	1A6	1A7	1A8	1A9	1A10

Section 1B: Information on the household head or on the person responsible for farming activities in the household



ITEM	Age in years	Gender	Marital status (Married, 2 never married, 3 widowed or divorced)	Years of formal schooling	Years of farming experience
Household head	1B1---- ----	1B2	1B3 -----	1B4 ----- -----	1B5 ----- ----
Farmer*	1B6---- ----	1B7 --- ----	1B8 -----	1B9 ----- -----	1B10 ----- -----

* The person responsible for farm management if not the household head

1 Married, 2 never married, 3 widowed or divorced

1A01. Is at least one of the walls of the house made of bricks? Yes [] No []

1A02. Of what material is the roof of the residential house made? _____

1A03. Does the household own any other houses? Yes [] No []

1A04. What is the distance from this residential house to the nearest paved road in kilometres? _____

1A05. What is the distance from this residential house to the office of the nearest market town? _____

1A06. What means of transportation do you use to transport your produce (contract or not) to the nearest market town or cooperative collection centre?

1A07. How much time does it take to transport this produce to the nearest market town or centre using your usual means of transportation? _____Hours:
_____Minutes

1A08. Is farming the primary occupation of the household head? Yes [] No []

1A09. What was the estimated average monthly non-farm income for the year ended 31 December 2021 in GHC? _____

PART 2: CROP, LIVESTOCK AND INPUT INFORMATION

Section 2A: Crops and livestock produced (Including own consumption), inputs used, and revenue generated in the 2021 season

Crops	Planted Yes [1] No [0]	Reason for planting(a)	Area (Ha)	Quantity produced	Revenue from sales (GHC)	Sold to (b)



a. Maize						
b. Rice						
c. Yam						
d. Groundnut						
e. Soya bean						
f. Cowpea						
g. Millet						
h. Sorghum						
i. Sweet potatoes						
j. Yam						

(a) 1 = only for household consumption, 2 = mainly for household consumption, 3 = equally for household consumption and cash income, 4 = mainly for cash income, 5 = only for cash income.

(b) 1 = neighbours, 2 = traders collecting products in villages, 3 = roadside stalls, 4 = village markets, 5 = companies with contract,

Section 2B: cost of inputs purchased or hired

Cost of inputs purchased or hired						
Seed (GHC)	Fertiliser (GHC)	Chemicals (GHC)	Machine/ox (GHC)	Labour (GHC)	Transport (GHC)	Pesticides (GHC)
2B1	2B2	2B3	2B4	2B5	2B6	2B7

PART 3: AGRICULTURAL & HOUSEHOLD ASSETS

Section 3A: Livestock and Household asset owned and value

3A1 Livestock owned and sold in 2021 season					3A2 Household asset				
Livestock and livestock products	No. of animals	Current value (GHC)	No. of animals sold	Revenue from sales (GHC)	Asset	Present Yes [1] No [0]	Current market value (GHC)	Time acquired	
								Year	Month



Cattle					1. Hoe/cutlasses				
Sheep					2. Mobile phone				
Goat					3. Knapsack sprayer				
Fowls					4. Bicycle				
Guinea fowls					5. Motor bike				
Ducks					6. Radio/Television				
Donkey					7. Bullock plough				
Pig					8. Tricycle (motor king)				
					9. Tractor				
					10. Harrow				
					11. Trailer				
					12. Planter				
					13. Others specify...				
Total					Total				

Section 3B: In all, what is the total size of land owned by your household (acres)?



Are you a member of an FBO Yes [] No []	If yes name of the FBO.....	If yes since when)	If no why?	If yes is the group purposely constituted for contract farming? Yes [] No []	Position in the FBO 1=president 2=secretary 3=treasurer 4=simple member 5=another committee member	Composition of the FBO 2020/2021			Since creation how many exit and how many new members?			
						Male	Female	Total	Male(exit)	Female (exit)	Male (new)	Female (new)
3B1	3B2	3B3	3B4	3B5	3B6	3B7	3B8	3B9	3B10	3B11	3B12	3B13

Section 3C: Credit and extension access

Have you applied for credit in the last five years?	If no, why?	If yes, have you received credit? Yes [] No []	If no, why?	If received how much?	Did you receive the amount on time for your agric	Did someone assist you in the credit application?	Do you receive production advice from extension agents?	If no, why?	If yes, from who? 1=government 2=NGO	If yes how many times do they visit you per season?	How do you appreciate the efficacy of their technology transfer?1=very effective	How many training programs on production did you attend?



Yes [] No []					activities Yes [] No []	Yes [] No []	Yes [] No []				2=effective 3=not effective	
3C1	3C2	3C4	3C5	3C6	3C7	3C8	3C9	3C10	3C11	3C12	3C13	3C14

3C15 Do you engage in any non-agriculture economic activities (off-farm work) Yes [] No []

3C16 What type off-farm are you engage in? a) Petty-trading [] Salaried employee [] Vocational []

3C17 Did you receive any remittance from any relative within Ghana? Yes [] No []

3C18 About how much do you receive per month as remittance?

3C19 Do you have access to market for your produce? Yes [] No [] market distance (Km) -----

3C20 Do you have access to goad roads to farm? Yes [] No [] distance to the road (Km)-----

3C21 do you have access to extension services? Yes [] No [] distance to extension office (Km) -----

PART 4: Contract Farming information

Section 4A contract farming

4A01 Have you participated in contract farming in the last season ending December 2021?

Yes [] No []

4A02 If yes, which crop(s) or product(s) were grown under contract?

Crop	Year	Company
1. Maize		
2. Rice		
3. Soyabeans		
4. Groundnuts		
5.		
6.		
7.		

4A03 If no, are you willing to engage in contract farming? Yes [] No []

4A04 if yes since, when did you engaged in contract farming? (years)_____

4A05 With whom are you engage in contract farming? 1= market women 2= NGO 3= others_____

4A06 What kind of relationship do you have with contractor? 1=no relationship 2=professional/business 3=family relative 4=some village native 5= other



4A07 Are you still in that contract farming? Yes [] No []

Section 4B: Elements in contract arrangement in which you engaged

4B01 What are the elements in the contract farming terms? Tick the elements in the contract farming term

Elements	
a. Input supply	Seed Yes [] No [] Fertilizer Yes [] No [] Herbicides Yes [] No [] Tarpaulin Yes [] No [] Others Yes [] No []
b. Credit access	0=no credit facility Yes [] No [] 1=cash credit Yes [] No [] 2=link to farmers to financial institutions Yes [] No [] 3=other Yes [] No []
c. Price fixation	0=market price Yes [] No [] 1=fixed price Yes [] No [] 2=formula price Yes [] No [] 3=other Yes [] No []
d. Payment mode	0=cash and carry Yes [] No [] 1=pay part and the rest later Yes [] No [] 2=pay the total later Yes [] No []] If yes to 1 and 2 what is the duration? ____ (month)
e. Technical assistance (advice and training for production techniques)	Yes [] No []
f. Extension service	Yes [] No []
g. Guarantee market	0= No market guarantee Yes [] No []



	1= Part of production is purchased Yes [] No [] 2= total production purchased Yes [] No [] 3= production to paid input credit Yes [] No [] 4= part to pay input credit and the rest for sale Yes [] No []
h. Measure	1= bowl Yes [] No [] 2= balance (scale) (Kg) Yes [] No [] 3= other Yes [] No []
i. Be an FBO member	Yes [] No []
j. Specified quantity to be delivered	Yes [] No []
k. Specified quality to be delivered	Yes [] No []

Section C: constraints of contract farmers faced in participating in contract farming

4C01 On a scale of 1-5 rank the following challenges as applied to you in your CF participation. *Note 1 means less pressing and 5 means most pressing*

Challenges	Rank				
	1	2	3	4	5
a. Price formula used by agents is not good (I feel cheated when the price go up)					
b. Technical assistance of contract agents is not satisfactory					
c. Too many restrictions on how to cultivate produce					
d. It takes to long to get payment for produce sold					
e. If others fail to pay their credit, we are asked to pay back					
f. I have not benefited by selling my produce to contracting agent					



g. I loose my freedom to sell my own produce					
h. The quality of the produce is determined by the buyer, and they manipulate this to drive down prices					
i. Sponsoring companies are unreliable and exploit a monopoly position in price fixation (no price negotiation)					
j. I don't trust the unity of measure (scale used)					
k. Drought					
l. Rain comes late					
m. Flood					
n. Companies do not have enough capital cash carry					
o. Delay products collect by companies					

4C02 Have you ever heard about agriculture weather index insurance? 0-no 1-yes

4C03 Are you willing to subscribe? 0-no 1-yes

PART 5: WELFARE INDICATORS/INFORMATION

Section 5A. Household Consumption Score as a measure of welfare

*I would like to ask you about all the different foods that your household members have eaten in the **last 7 days**. Could you please tell me **how many days** in the past week your household has eaten the following foods? (for each food, ask what the primary source of each food item eaten that week was, as well as the second main source of food, if any)*

Food item	DAYS eaten in past week (0-7 days)	Sources of food (enter source code)	
		primary	secondary
a. Maize			
b. Rice			
c. Bread/wheat			
d. Tubers			
e. Groundnuts & Pulses			



f. Fish (eaten as a main food)			
g. Fish powder (used for flavor only)			
h. Red meat (sheep/goat/beef)			
i. White meat (poultry)			
j. Vegetable oil, fats			
k. Eggs			
l. Milk and dairy products (main food)			
m. Milk in tea in small amounts			
n. Vegetables (including leaves)			
o. Fruits			
p. Sweets, sugar			

Food source codes:
 Purchase =1 Own production =2 Traded goods/services, barter =3
 Borrowed = 4 Received as gift= 5 Food aid =6 Other (specify)
 =7

Section 5B. Household consumption and non-food items expenditure as a measure of Welfare

Expenditure item	Amount per week (for food) and Amount per month for non-food items
a. Own-produced food: Estimate cost of own produced food (assuming you are to buy in your local market) per week.	

b. Purchased-Food: Estimate cost of food items (e.g., milk, meat, fish, oil, fruits, vegetables, salt, etc.) that you bought for the household per week.		
c. Food as gift: Estimate cost of food giving to you as gift by relatives and friends (assuming you are to buy them) per week		
d. Accommodation (Assume how much you will pay if you are in your own house/room; maintenance cost should be included)		
e. Clothing		
f. Education		
g. Health or medication		
h. Transportation		
i. Utility;	1. Water	
	2. Electricity	
	3. Kerosene	
j. Communication (telephone, postal etc.)		
k. Sanitation		
l. Ceremonies.	1. Funerals	
	2. Naming and outdoor ceremonies	
	3. Parties/entertainments	
	4. Tithes and offerings	
	5. Gifts	
	6. Others.....	
m. Fuel/ Firewood		
n. Saving		



o. Maintenance of assets (e.g. TV, Motto bikes, Cars etc)	
p. Others.....	



CHAPTER ONE

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