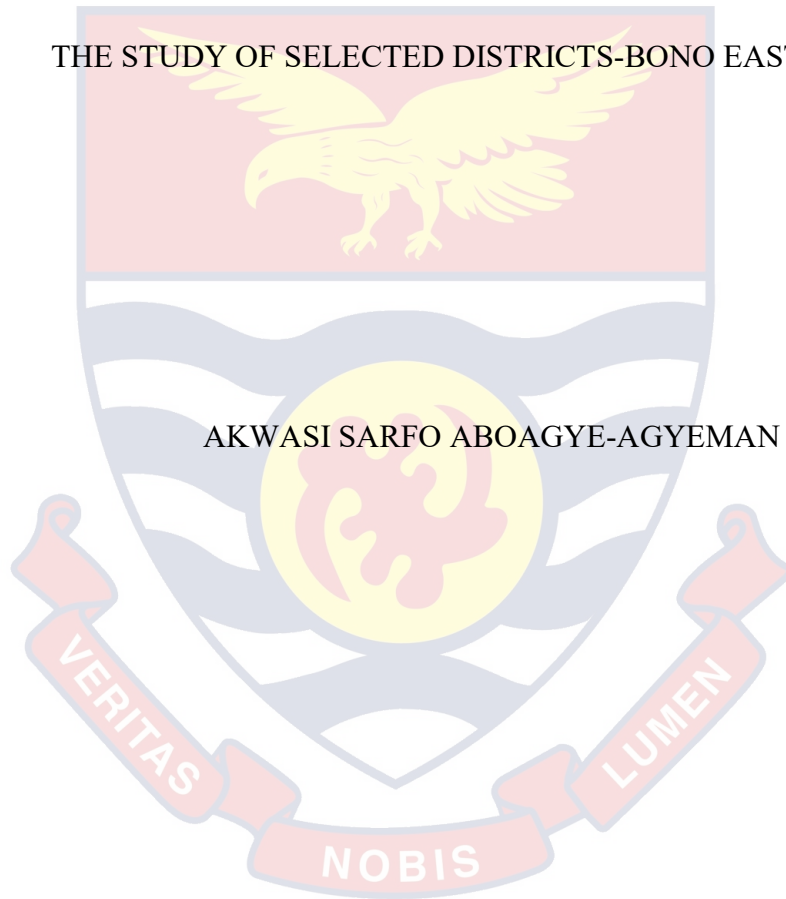


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EFFECT OF CREDIT UTILISATION ON CASHEW FARM PRODUCTIVITY:

THE STUDY OF SELECTED DISTRICTS-BONO EAST REGION

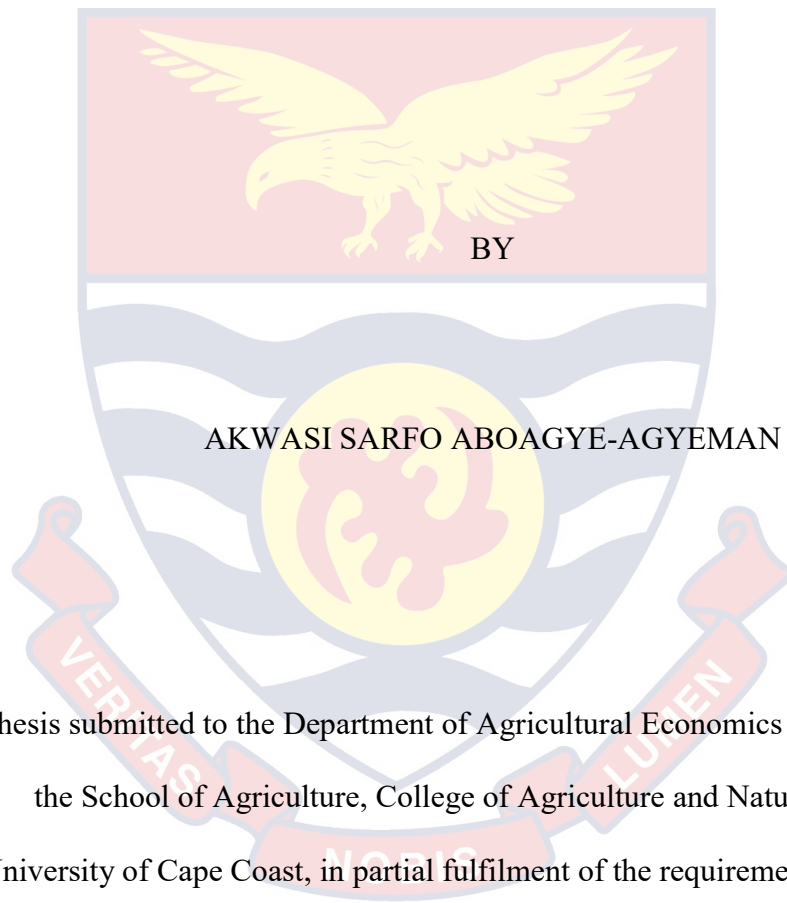


AKWASI SARFO ABOAGYE-AGYEMAN

2020

UNIVERSITY OF CAPE COAST

EFFECT OF CREDIT UTILISATION ON CASHEW FARM PRODUCTIVITY:
THE STUDY OF SELECTED DISTRICTS-BONO EAST REGION



BY

AKWASI SARFO ABOAGYE-AGYEMAN

Thesis submitted to the Department of Agricultural Economics and Extension of
the School of Agriculture, College of Agriculture and Natural Sciences,
University of Cape Coast, in partial fulfilment of the requirements for the award
of Master of Philosophy Degree in Agricultural Economics

OCTOBER 2020

DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature Date.....

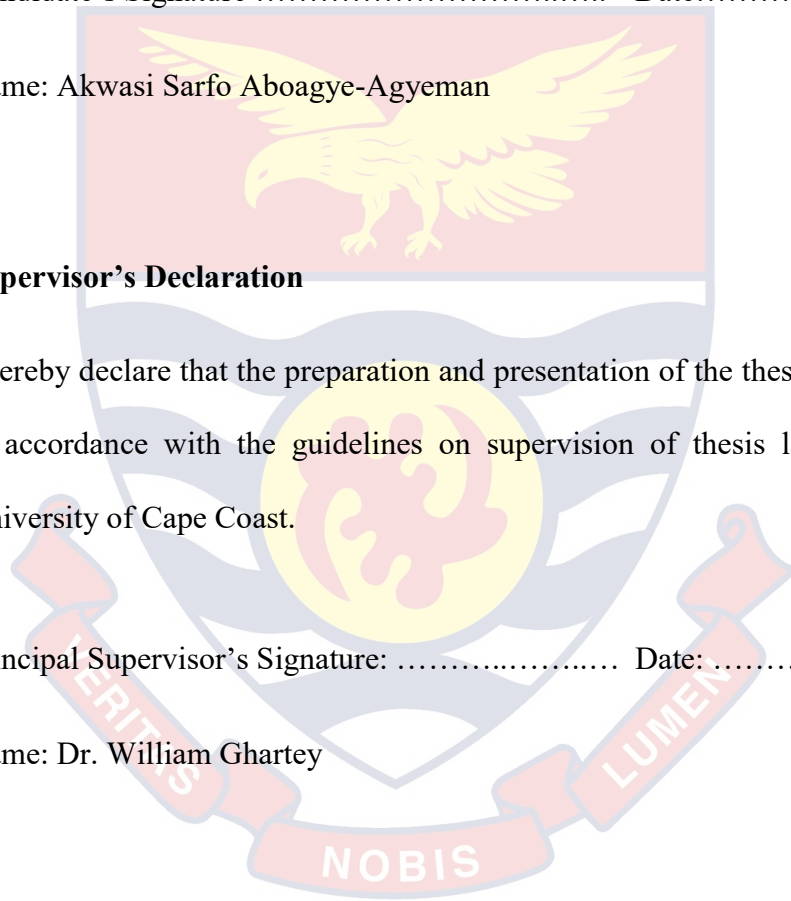
Name: Akwasi Sarfo Aboagye-Agyeman

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Principal Supervisor's Signature: Date:

Name: Dr. William Ghartey



ABSTRACT

The study ascertains empirically the effect of formal and informal credit utilisation on cashew farmers' productivity and examine the constraints to credit utilization. The study goes further to determine factors that affect access to formal and informal credit. The probit model was used to determine factors that affect access to formal and informal credit while ordinary least square model was used to ascertain the effect of credit utilisation on productivity. Kendall's coefficient of concordance was used to rank the constraints to credit utilization. The study finds that access to formal credit is significantly influenced by FBO, farm size and educational status, Sex influences access to informal credit and engaging in other economic activity has a negative significant influence on access to informal credit while savings account and assets ownership jointly influence access to both formal and informal credit. Formal and informal credit utilization has a significant effect on farmers' productivity. Constraints ranking revealed that the most pressing constraint to credit utilization faced by farmers is price fluctuation while the least pressing constraints to credit utilization faced by farmers is marriage activities. The study recommends that government must set up Cashew Board to control and regulate the price of cashew and also, stakeholders in agricultural industry such as MOFA, NGOs among others should educate and sensitize farmers on the need to join farmer-based organizations.

KEYWORDS

Access to credit

Formal credit

Informal credit

Productivity



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DEDICATION

To Nicholas Bempong Aboagye-Agyeman



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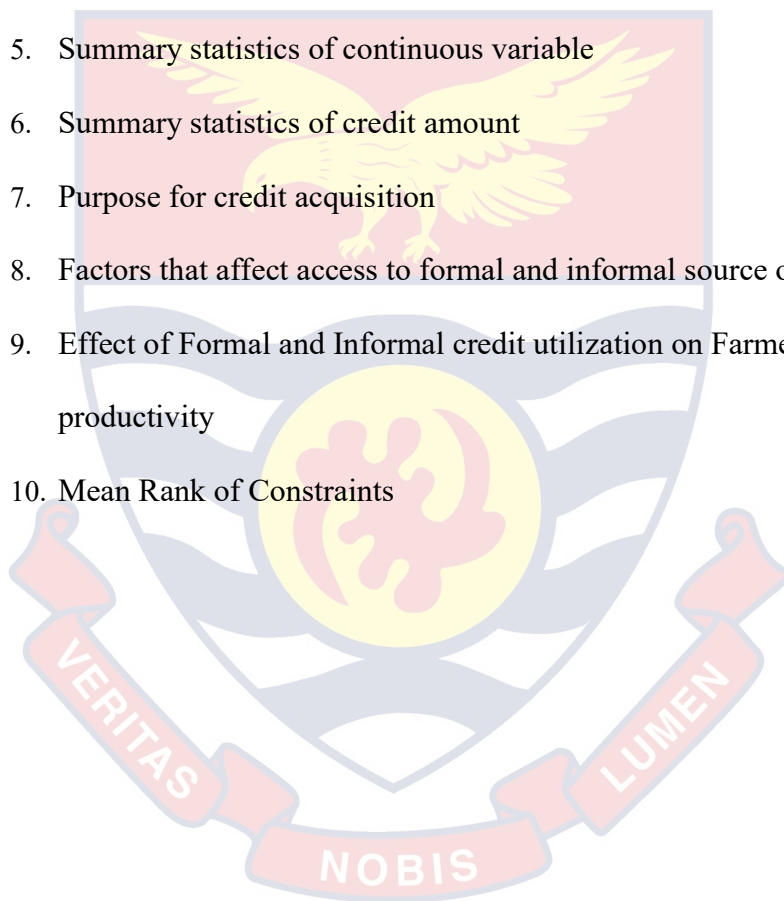
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LIST OF ACRONYMS

ADB	Agricultural Development Bank
ADRA	Adventist Development and Relief Agency
BOG	Bank of Ghana
FAO	Food and Agriculture Organisation
FBO	Farmer Based Organizations
GDP	Gross Domestic Product
GEPA	Ghana Export Promotion Authority
GSS	Ghana Statistical Service
MoFA	Ministry of Food and Agriculture
NGO	Non-Governmental Organization
OLS	Ordinary Least Square
RCN	Raw Cashew Nut
SPSS	Statistical Package for Social Sciences
SDGs	Sustainable Development Goals

CHAPTER ONE

INTRODUCTION

Background to the study

Agriculture plays a significant role in Ghana's economy, thus, a great contributor to poverty reduction, rural development, livelihood improvement and cushioning of economic shocks. In the formal and informal sectors of Ghana's economy, the agriculture sector provides employment for about 44.7% of the total workforce (Ministry of Food and Agriculture [MoFA], 2018). The sector contributed 22.1 percent to Gross Domestic Product (GDP) in 2013 and 19.7 percent to GDP in 2018 (Ghana Statistical Service [GSS], 2019) and it is the largest foreign exchange earner (MoFA, 2019). Although, its share to GDP has declined in recent times, the sector still remains the engine of growth and a major contributor to foreign exchange earnings. (Ghana Export Promotion Authority [GEPA], 2019). For the sector to remain the engine of growth and a major contributor to foreign exchange, there is a need to solve problems confronting the sector such as inadequate availability of credit, poor post-harvest handling, over reliance on rainfall, low use of technology (Quartey, Udry, Al-Hassan, & Seshie, 2012). One of the vital challenges among these challenges is inadequate access to credit.

The availability and use of credit allow farmers to overcome constraints in farm operations, purchase the needed input and make the needed farm investment at the right time (Bashir, Mehmood, & Hassan, 2010). Credit offers smallholder farmers the means to adjust and increase their operation and keep up with up-to-

date technology which by so doing enhance their efficiency and increases productivity. The use of irrigation facilities and high-powered farm implement like tractors, storage facilities can be owned by smallholder farmers through the use of credit (Bashir *et al.*, 2010). According to Sarfo (2018) for developing countries to achieve sustainable development, poor people must have access to flexible financial service, cost-effective agricultural inputs and a wide range of interventions.

In Ghana, there are two major sources of credit available to farmers. It is either formal or informal source. Considering the positive impacts of credit, government, non-governmental organisation and the private sector have rolled out several interventions to improve access to credit to farmers in rural areas (Sarfo, 2018). The establishment of Agricultural Development Bank (ADB) in 1965 by the government to provide credit to crop/livestock and smallholder farmers, establishment of Rural and Community Banks in 1976 are all interventions aimed at improving access to credit. Broadening access to credit in the rural areas led to the establishment of many microfinance institution in the 2000s (Asante-Addo, Mockshell, Siddig, & Zeller, 2017).

ADB, rural banks and community banks are all classified under the formal sector with inclusion of commercial and investment banks. The informal credit sector has always been in existence and provides support for the rural poor. Informal credit sector are institutions that provide support for the rural poor but are not registered or controlled by a regulating agency (Steel & Andah, 2008). The informal sector comprises friends, relatives, money lenders, land lords,

purchasing clerks, group susu and opinion leaders. Inadequate access to credit may affect the productivity of farmers because farmers will have no option than to use less amount of the inputs required or in the worse scenario ignore threats such as diseases and pest (Petrick, 2004).

Cashew (*Anacardium occidentale* L.) is a non-traditional export (NTE) crop grown as a smallholder crop in Ghana. In Ghana's agriculture sub-sector, cashew has become the leading non-traditional export earner (Osei-Akoto, 2010). Cashew as a tropical crop, grows well in all kinds of soil types. Cashew is known to grow well in poor semi-arid and transitional geographical zones. Cashew also grows well in areas with annual total rainfall of between 900mm and 1400mm and with dry and wet seasons (MoFA, 2019).

Cocoa, timber and minerals (gold, manganese, bauxite and diamond) which are known traditional export products have over the years experienced decline which has given the non-traditional export commodities especially cashew higher attention (Armah, 2018). The cashew sub-sector grew from 149.72 million in 2011 to 211.33 million in 2015 representing 31.4 percent growth in value (MoFA, 2016).

Cashew farming has become a big source of livelihood and income generation venture for many farmers in Ghana. The cashew sub-sector has been estimated to provide over 200,000 jobs (permanent and seasonal) especially, farm labourers and intermediaries (Osei-Akoto, 2010). In addition, processing and marketing of raw cashew nut (RCN) provides more than 5,000 seasonal and permanent jobs yearly in the cashew industry (Osei-Akoto, 2010).

In the year 2015, Ghana exported 232,835 metric tonnes (MT) of RCN and 231,555 MT of RCN in 2016 (MoFA, 2018) representing 7% decrease in foreign exchange revenue in 2015 export. The cashew sector contributed \$197 million worth of export revenue in 2016, representing 53% of total revenue of the \$371 million of agricultural non-traditional export (NTE). Cashew contribution to foreign exchange revenues can be increased since demand for cashew nut globally is growing at 4.97% per annum since 2001 (Malhotra *et al.*, 2017). Cashew in terms of the value of export is now next to cocoa, leading Rubber, cotton, banana and palm oil (Rabany, Rullier, & Ricau, 2015).

Statement of the Problem

The agricultural sector contributes to poverty reduction and improvement in the livelihood of the rural poor. In Ghana, smallholder farmers dominate the agriculture sector and on the average cultivate about 1.5 hector of land and adopt little usage of advanced agricultural technology (Allotey, Hamza, & Zakaria, 2019). Most of these smallholder farmers survive on less than \$2 a day and as results are unable to procure needed inputs necessary to support agricultural production (MoFA, 2016).

In bridging these shortfalls, government of Ghana, non-governmental organisations, private sector and international donors have introduced many credit support interventions. Establishment of ADB, rural banks, microfinance are all mitigation measures to enhance credit support to smallholder farmers to enhance their livelihood and increase productivity. On the other hand, relatives, neighbours, money lenders, farmer-based organisations and friends also provide

credit support to smallholder farmers (Mehrteab, 2005). The established agencies usually require collateral and guarantors in order to grants access to credit to farmers. Farmers are unable to meet these demands and those who are able to meet these demands are also faced with bottlenecks as their collateral and other documents have to go through scrutiny and laborious processes before the funds are released. Sometimes, the credit sum is reduced or rejected, this affects farmer's ability to make farm-related investment and purchase of farm input (Reyes & Lensink, 2011). As a result, in order for farmers to meet their production and consumptions needs, they turn to borrow from the informal sector.

Contribution and challenges of credit intervention in Ghana have occasioned a number of studies in the country, many researchers, Kuwornu, Ohene-Ntow and Asuming-Brempong (2012), focused on agricultural credit allocation and constraint analyses of selected maize farmers in Ghana. Awunyo-Vitor and Abankwah (2012), examined the contributions of formal and informal credit demand by maize farmers in the Ashanti and Brong Ahafo Regions of Ghana and ascertained whether formal and informal credit are substitutes or complements. Sarfo (2018) looked into credit use and its effect on profitability among smallholder maize farmers in the Brong Ahafo Region of Ghana. Owusu (2017) ascertained the effect of access to credit on agricultural productivity with concentration on cassava farmers in the Afigya-Kwabre district of Ghana.

Despite the contributions made by these studies, there is a perception that farmers who obtain credit from the formal sources are able to utilise credit effectively to achieve higher productivity as compared to farmers who obtain

credit from the informal sources. Therefore, this study has been designed to empirically ascertain whether this observation is true in the study area and among cashew farmers. Also, from reviewed literature, no study has been sighted empirically on the use of formal and informal credit and its effect on cashew farmers' productivity. Therefore, the study overcome other literature flaws and fill in gap by conducting comparative analysis of formal and informal credit utilisation and its effect on cashew farmers' productivity in the Bono East Region of Ghana.

Purpose of the Study

The purpose of the study is to ascertain through a comparative analysis of the effect of formal and informal credit utilisation on cashew farmers' productivity in the Bono East region of Ghana.

Objectives of the study

The objectives of the study is outlined as follows;

1. Determine factors that affect access to formal and informal credit among cashew farmers in the study area.
2. Ascertain empirically the effect of formal and informal credit utilisation on cashew farmers' productivity in the study area.
3. Examine the constraint to credit utilisation among cashew farmers in the study area.

Research Questions

1. What are the factors that affect access to formal and informal credit among smallholder cashew farmers?

2. What are the constraints to credit utilisation among smallholder cashew farmers in the study area?

Research hypothesis

Based on objective two, this hypothesis was tested:

H_0 = Formal credit utilisation has no significant effect on cashew farmers' productivity.

H_1 = Formal credit utilisation has significant effect on cashew farmers' productivity.

H_0 = Informal credit utilisation has no significant effect on cashew farmers' productivity.

H_1 = Informal credit utilisation has significant effect on cashew farmers' productivity.

Significance of the Study

Information on the sources of credit available to cashew farmers in the study area will be provided by the study and how they contribute to farmers' productivity. The study provides reasons behind farmers' acquisition of credit and ascertain the constraints to credit utilization among smallholder cashew farmers. Also, the study determined factors that affect access to credit among cashew farmers in the study area, this will enable prospective investors or farmers who have the intention to go into cashew production to know factors that affect access to credit and the effect of its utilization on productivity.

The information gathered from the study shall serve as a useful document for policy makers and guide them when it comes to formulating policies aim at

making credit readily available to cashew farmers. Findings from the study shall be of great importance to government, international agencies and financial institutions supporting the production, processing and export of cashew. The study will expose lapses in credit acquisition and recommend measures to close or fill the gaps in credit acquisition. The study will serve as a bedrock of knowledge for further research, add to literature, helps close knowledge and research gap.

Delimitations

The study took place in some selected districts in Bono East region of Ghana. Specifically, Techiman North and Nkoranza North. The study employed questionnaires and interview schedules in data collection. The study was limited to cashew farmers who accessed and used either formal or informal credit and its utilisation effect on productivity.

Definition of Terms

Credit is defined as a transfer of money, agricultural input and service from one institution or person to another with a contractual (verbal and written) agreement with the promise of repayment which usually attract interest and would be paid at a later date (Tia, 2011).

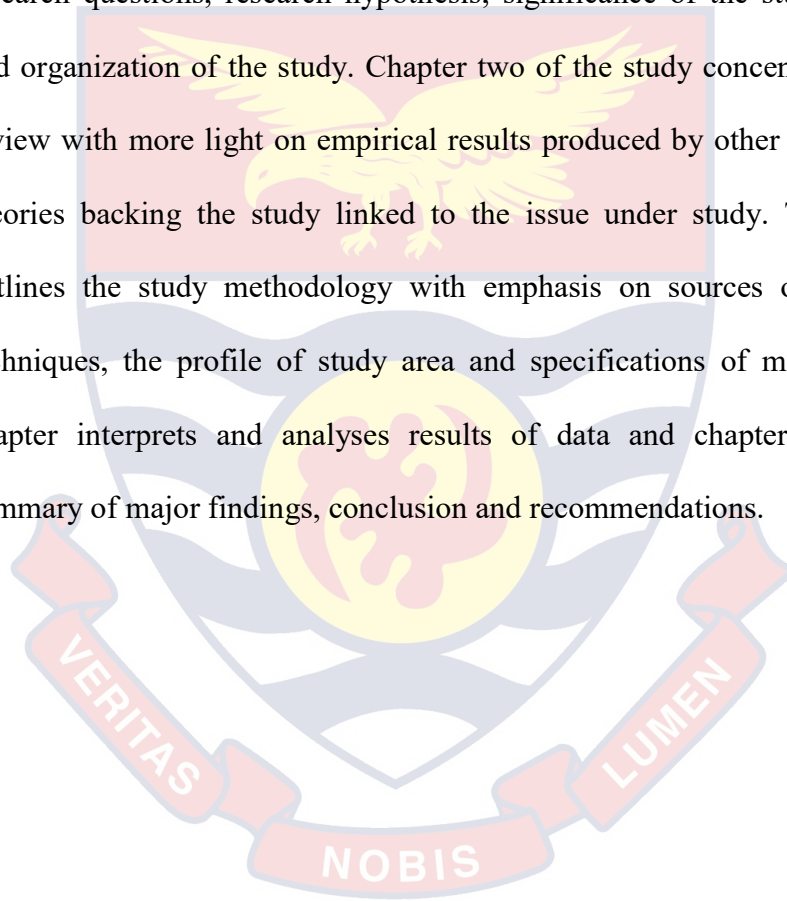
Informal credit sector are institutions that provide credit support to borrowers but are not registered or controlled by a regulating agency (Turkson, 2018).

Formal credit sector are financial institutions that operate under the jurisdictions and supervision of Bank of Ghana under the Banking Law (Act 930) (Bank of Ghana, 2016).

Productivity is the proportion or ratio of total farm output to the total farm input used in the production of agricultural goods (Keelson, 2017).

Organisation of the study

In all, five chapters made up this study. Chapter one consists of the background to the study, statement of the problem, objectives of the study, research questions, research hypothesis, significance of the study, delimitations and organization of the study. Chapter two of the study concentrate on literature review with more light on empirical results produced by other writers as well as theories backing the study linked to the issue under study. The third chapter outlines the study methodology with emphasis on sources of data, sampling techniques, the profile of study area and specifications of models. The fourth chapter interprets and analyses results of data and chapter five provides a summary of major findings, conclusion and recommendations.



CHAPTER TWO

LITERATURE REVIEW

Introduction

This chapter reviews literature on factors that affect access to credit and the effect its utilization on farmers' productivity. This chapter was sourced from academic journals, books, conference, seminars and credible online website to support the study.

Agricultural Credit and Rural Development

An efficient agricultural sector enables a country to feed its growing population, minimize rural-urban migration, influences industry to be sited near the source of raw materials there by creating employment, contributing to foreign exchange earnings, increasing agriculture growth to GDP. Due to multifunctional nature of agriculture, its vibrancy will have a great effect on every nation's industrial fabric and socio-economic development (Salami & Arawomo, 2013).

To transform traditional agriculture into modern large-scale commercial farming to enhance livelihood and rural development, credit plays a critical role. Credit is needed to invest in farm inputs which includes, breeds of livestock, fertilizers, pesticides, insecticides, irrigation facilities, modern implements among others and a suitable term of credit and repayment are necessary condition for agricultural development (Sarfo, 2018). Agricultural credit has a positive influence on net farm profit and productivity which promotes growth and development. The average hector of cultivated farmlands will be affected and reduced with the absence or inadequate credit in the agricultural sector, thereby,

impeding agricultural growth with consequences for the macro economy as a whole. The use of credit enhances the ability of farmers to use the required input on time (Bashir *et al.*, 2010). Credit offers smallholder farmers the means to adjust and increase their operation and keep up with up-to-date technology which by so doing enhance their efficiency and productivity. Farmers are able to take up productive activity to secure their livelihood, increase profitability as a result of availability of credit and its use (Sarfo, 2018).

Credit Market in Developing Economies

Household, firms and industries acquire credit from formal and informal sources in developing countries. However, every country has its unique way of providing funds to support productive activities. There are countries where access to credit exist more in the formalized sector than the informalized sector and vice versa. According to Atieno (2001) in his study in Kenya, there was inadequate access to credit and he understood it to be inadequate supply emanating from formal and informal institutions' rationing behaviour. Agbo, Iroh and Ihemezie (2015), identified that farmers in Nigeria are constraint in accessing formal credit due to bureaucratic processes, high interest rate, high transaction cost and as a result, resort to the informal sector to access credit.

In developing world, market imperfection dominates the informal market as compared to the formal market. This is because most of the financial sector reforms focused more on the formal credit sector resulting in financial market fragmentation (Aryeetey, 1997). Financial institutions in Ghana are mitigating market imperfections to address consumer demands. In the developing world,

most formal institutions are teaming up with the informal sector to increase supply of money to meet demand and access to credit (Aryeetey, 2008). In Ghana, according to Quartey *et al.* (2012) formal credit which comprises of regulated institution such as commercial, investment and agricultural banks exist but farmers usually access credit from friends and relatives, Susu collectors, money lenders and farmer groups.

The Ghanaian Financial System

Credit market available in developing countries including Ghana are categorized into formal market, informal market and semi-formal market (Turkson, 2018). The formal and informal financial sectors are however often discussed in Ghana (Munira, 2013). It is because they differ in service delivery and each has its target population (Aryeetey, 2008). The formal sector operates under the jurisdictions and supervision of Bank of Ghana under the Banking Law (Act 930) (BOG, 2016). According to Steel and Andah (2003), semi-formal institutions are dully licensed but are not under BoG's certification. It includes credit unions, cooperative societies and government credit schemes. The informal credit sector consists of savings and lending transactions outside the established regulatory institutions and they comprise of money lenders, friends. Relatives, farmer-based organization, Susu collectors among others (Turkson, 2018). The informal credit sector is growing because of the inability of the formal sector to satisfy the growing demands of borrowers (Owusu-Antwi & Antwi, 2010).

Formal Credit Institutions

The formal financial institution operates the under the Banking Law (Act 930), under the jurisdictions and supervision of Bank of Ghana. The company's code 1963 (Act 179) mandates formal financial institution to be registered under the companies Act (Steel & Andah, 2003). From the establishment of the British Bank of West Africa (BBWA) in 1897, the formal sector has gone through series of legislative amendment with respect to policy (Bawumia, 2010). These transformations led to the formation of ADB in 1965 and NIB in 1963 as a vehicle to drive development through the banking system (Bawumia, 2010). The reforms led to establishment of Rural Banks in 1976 and microfinance institutions in the 2000s (Asante-Addo, Mockshell, Siddig, & Zeller, 2017).

NIB was to provide credit support to industries while ADB was to provide agricultural credit and agro support to aid development. The formal banks require collateral, formal application, complex paper works and guarantors which disadvantages smallholder farmers who lack these requirements. According to Alhassan and Sakara (2014), formal institutions are unwilling to extend credit to small enterprises. Amidst these challenges, most formal institutions have made efforts to bridge the gap by reaching out to huge markets of the unbanked. However, these efforts are overly concentrated in the urban areas to the detriment of the rural communities (Osei-Assibey, 2009).

Semi-Formal Credit Institutions

These credit institutions are dully licensed but are not under Bank of Ghana's certification. It comprises of credit unions, savings and loans, NGOs and

government credit schemes. NGOs are poverty alleviation oriented and adopt microcredit methodology to reach out to their clients (Munira, 2013). Through the support of donors, they are able to reach out to their clients and target population.

Credit unions were first established in 1955 in Jirapa in the Upper West Region by Roman Fathers to encourage minimal savings among members (traders, farmers, non-agricultural workers and processors) to improve their socio-economic status by engaging in product works. (Munira, 2013). The primary objective is to provide credit to its members. However, according to Andah (2005) credit unions' secondary objective is to extend credit support to the entire community they operate by encourage community members to save with them. In 1968, a legislation was passed to integrate all credit unions which led to the formation of Credit Union Association with an initial membership of 60,000 from 254 Credit Unions (Quainoo, 1997). Members of CUs make deposit and may borrow up to twice their savings, collateral is sometimes required and a borrower needs guarantor who is a member and has an unblemished default record (Steel & Andah, 2003). Since CUs are welfare oriented, they usually have weak financial standings because of policies such as low interest rate on loans (Turkson, 2018).

In the 1980s, savings and loans companies (SLC) merged to provide financial support for target groups and markets (Turkson, 2018). SLC operates under the non-banking financial institutions law 2016 (Act 931) (Bank of Ghana, 2016). Bank of Ghana issues regulation to monitor and enhance their operations though they are not certified by Bank of Ghana (Munira, 2013).

Informal credit Sector

Less formalized financial players like traders, money lenders, landlords, Susu collectors, friends and relatives make up the informal financial sector (Owusu-Antwi & Antwi, 2010). It is difficult to define the structure for this financial market because everyone has their modus operandi and their activities are not regulated. There is a variation in interest rate, loan repayment, how much one can receive and the requirement needed to demand for loan.

This sector has gained prominence as a result of the bureaucratic nature of the formal sector to meet the demand of ordinary members of the society. A reform of the formal sector may lead to a decrease in the request of the informal sector (Aryeetey, 2008). Owusu-Antwi and Antwi (2010), classified credit transaction under this sector into commercial and non-commercial. Commercial transactions are transactions operated by money lenders, estate owners, Susu Collectors, traders and landlord while non-commercial transactions are conducted between family, friends and relatives.

People in the rural setting are comfortable with this sector because it supports them to meet other financial commitment such as supporting funeral expenses and caring for the sick (Ekumah & Essel, 2001). Landlords and traders usually give out credit not in money form but in what they trade in such as farm produce, housing, and lands in exchange for a service (Turkson, 2018). Credit from friends, relatives and families usually come with near-zero interest and are prompt in accessibility. Loans from money lender comes with higher interest rate because of the risky nature and usually attracts no collateral (Munira, 2013).

Loans from money lenders are price inelastic. Usually, these loans from money lenders are required during emergencies and as a result, the borrower has no option than to be an interest rate taker (Munira, 2013).

Cashew production in Ghana

Cashew (*Anacardium occidentale* L.) was brought into West Africa, particularly Ghana by the Portuguese in the precolonial era. In Ghana, it remained dormant until after independence in the 1960s where its cultivation resurfaced. Its cultivation was again abandoned shortly after the promotion in the country until the early 1990s where its interest was rekindled when Ghana embarked on Economic Recovery Programme (ERP) (Ajayi & Place, 2012; Osei-Akoto, 2010).

The ERP implementation resulted in commodity market liberalization where marketing centres were made accessible to cashew farmers which resulted into prompt payment of their nuts. The prompt payment of marketed nuts enthused farmers about the cashew crop. As a result, raw cashew nut export of 50t was recorded in 1991 and increased to 3,571 t by 1997 in Ghana (Osei-Akoto, 2010).

Brazilian variety, Tanzania Variety and Benin variety are the varieties of commodity cultivated in Ghana (GEPA, 2017). Cashew is often intercropped with staple and food crops to ensure food security among farm households and generate livelihood income. Cashew nut as a by-product of cashew tree is not the only income generating activity for the cashew tree. Cashew apple and gum are also profitable and income generating venture of the cashew tree. Cashew apple

can be processed into juice, eaten fresh while the gum is used in the industry (Gyedu-Akoto, 2011).

Cashew production serves as source of livelihood and income generation for many small holder farmers in Ghana. The cashew sub-sector has been estimated to provide more than 200,000 jobs (seasonal and permanent) especially, intermediaries and farm labourers (Osei-Akoto, 2010). In addition, processing, distribution and marketing of RCN provides over 5,000 seasonal and permanent jobs yearly (Osei-Akoto, 2010). Cashew production has been described as agricultural sector's goldmine if well harnessed (Peprah, Amoako, Adjei & Abalo, 2018). Cashew is cultivated within ten regions in Ghana, eighty-four districts were identified by MoFA (2018) to support cultivation and plantation of the tree crop. The major cashew producing districts and regions are listed below;

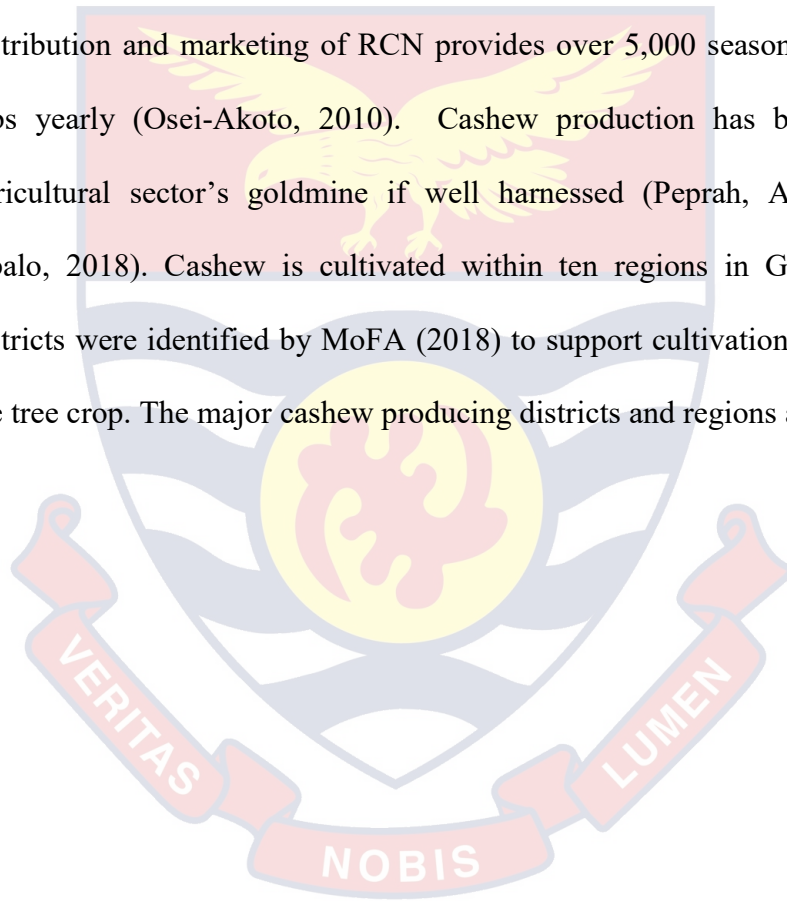


Table 1: Cashew producing Regions and Districts in Ghana

REGION	DISTRICT
Eastern	Afram Plains, Suhum Kraboa, Asuogyaman
Central	KEEA, Gomoa Asikuma, Twifo Hemang
Ashanti	Sekyere West, Sekyere East, Ejura Sekyeredumase, Offinso
Savanna	Sawla-Tuna-Kalba, Central Gonja, West Gonja, Bole
Northern	Yendi
North-East	Mamprusi
Bono-East	Techiman North and South, Nkoranza North And South, Atebubu, Kintampo
Bono	Jaman North and South, wenchi, Tain, Banda, Pru, Sane West and East
Oti	Nkwanta North and South, Krachi East and West, Krachi Nchumuru, Kadjebi, Jasikan
Volta	Hohoe, kpando

Source: (Armah, 2018)

Concept of Agricultural Productivity and Measurement

Productivity is commonly termed as ratio of output produced to the ratio of inputs used (Coelli *et al.*, 2005). Productivity is a measure of the ratio of volume of output to the ratio of volume of input used (Food and Agriculture Organization [FAO], 2017). Agricultural productivity is the proportion or ratio of total farm output to the total farm input used in the production of agricultural goods (Keelson, 2017). This study adopted the definition as espoused by (Keelson, 2017). For agricultural production to increase, there should be the need

or attempt to increase the quality and quantity of inputs utilization such as credit, fertilizer, agrochemicals, technology, reliable source of power and improved seed variety.

Productivity measure of a single input and output of a firm is simple, but in a situation where there is more than one input, it will be prudent to bring all inputs together as one input to enable productivity to be measured (Armah, 2018). With strict adherence to economic theory, the aggregation of inputs can be done. Productivity can be influenced by other external factors. When there are price hikes in farm commodities, farmers will have no option than to double their input to increase their output *ceteris paribus* (FAO, 2017). According to Armah (2018) traditional factors of productivity such as land, fertilizer, agrochemicals, labour, physical capital has been given much attention. However, Mozumdar (2012) argued that factors such as technology, public investment into agricultural research, policy reforms, infrastructural development and political stability are closely linked and important to agricultural productivity.

Fried *et al.* (1993) grouped the difference in productivity of farms into operating efficiency, production technology, location of the farm and the scale of operation. Productivity measure is an important evaluation of producers' performance and their output.

Theoretical Framework

Theoretical framework give support to a theory of a study

Rational Choice Theory

The rational choice theory was adopted for this study. Generally, the theory takes into consideration the choice and selective behaviour of individual (farmers) arriving at a decision (which source of credit to secure for their farming operations). The theory posits that individual (farmers) aim at maximising satisfaction by selecting the optimum bundle of goods and services (formal and informal credit source) constraints by income (Munira, 2013). According to Awunyo-Vitor (2018), analysis of rational choice theory on access to credit involves the following; desire for financial service, type and kind of service provided by credit institutions and the conditions under which the services are provided. Base on this, the individual (farmer) is faced with the problem of choice.

The theory goes on to explain that, the choice made by individuals (farmers) is the best decision that enables them achieve their objectives amidst their constraints (Awunyo-Vitor, 2018). According to Balogun and Yusuf (2011), individual access to credit refer to differences in quantum of credit that a farmer is expected to access at a given interest rate and time holding all other things constant. However, Osei-Assibey (2009) argues that access to financial service moves beyond such economic factors to include non-economic factors. Socio-economic characteristics and demographic characteristic of individuals forms the

non-economic factors. From literature, demographic factors cut across but the socio-economic factors differ depending on the focus of the studies (Munira, 2013).

The rational choice theory adopts the utility function to assign mathematical function and numerical values. Building on the arguments above on socio-economic and demographic characteristics as factors that affect access to credit, we derive the mathematical function below;

$$fA_i = f_i(S_i, D_i) \quad (1)$$

where;

fA_i = factors that affect access to credit

D_i = represents individual demographic characteristics such as sex, age, marital status, membership of farmer-based organization, education

S_i = represents individual total value asset, savings account, farm size, engagement in other economic activities.

Theory of the Firm

The theory of the firm is another theory underlining this study. This is an economic theory with focus on how firms make choices with regards to its production by analysing factors affecting such choices. Imperfect competition makes it imperative to analyse the outcomes of the strategies undertaken by firms. The theory relates to input-output function by employing factors of production to achieve a required level of output (Keelson, 2017). The theory hypothesised the

production of a firm to determine the level of input used which represents input-output function.

It is assumed, in the short-run, land is fixed while capital employed is variable, thus, output is dependent on capital used. Two components, make up Capital (K) in this study, thus, (credit accessed to purchase inputs) and human resource (labour) hired by the farmer. Using the function, the output of a farmer is determined by the level of input efficiently used.

Conceptual Framework

This study is conceptualized in relation to credit utilisation and its effect on cashew farmers' productivity. Before a farmer can have access to credit, there exist factors that affect access to credit. These factors are socio-economic and demographic characteristics such as marital status, sex, age, education, engagement in other economic activities, FBO, index of assets. A farmer being rational as stipulated by the rational choice theory will choose among the bundle of option (formal and informal source of credit), that will give the farmer the maximum satisfaction amidst the constraints. After the farmer has chosen which source of credit to borrow from, it is dependent on the farmer to utilise the credit received for the purpose of achieving higher productivity all other things being equal. Studies conducted in the area of credit (formal and informal) leaves a perception that farmers who obtain credit from the formal sources are able to utilise credit effectively and in effect achieve higher productivity than those who obtain credit from informal sources. So, this study, empirically, investigates using cashew farmers in the Bono East Region.

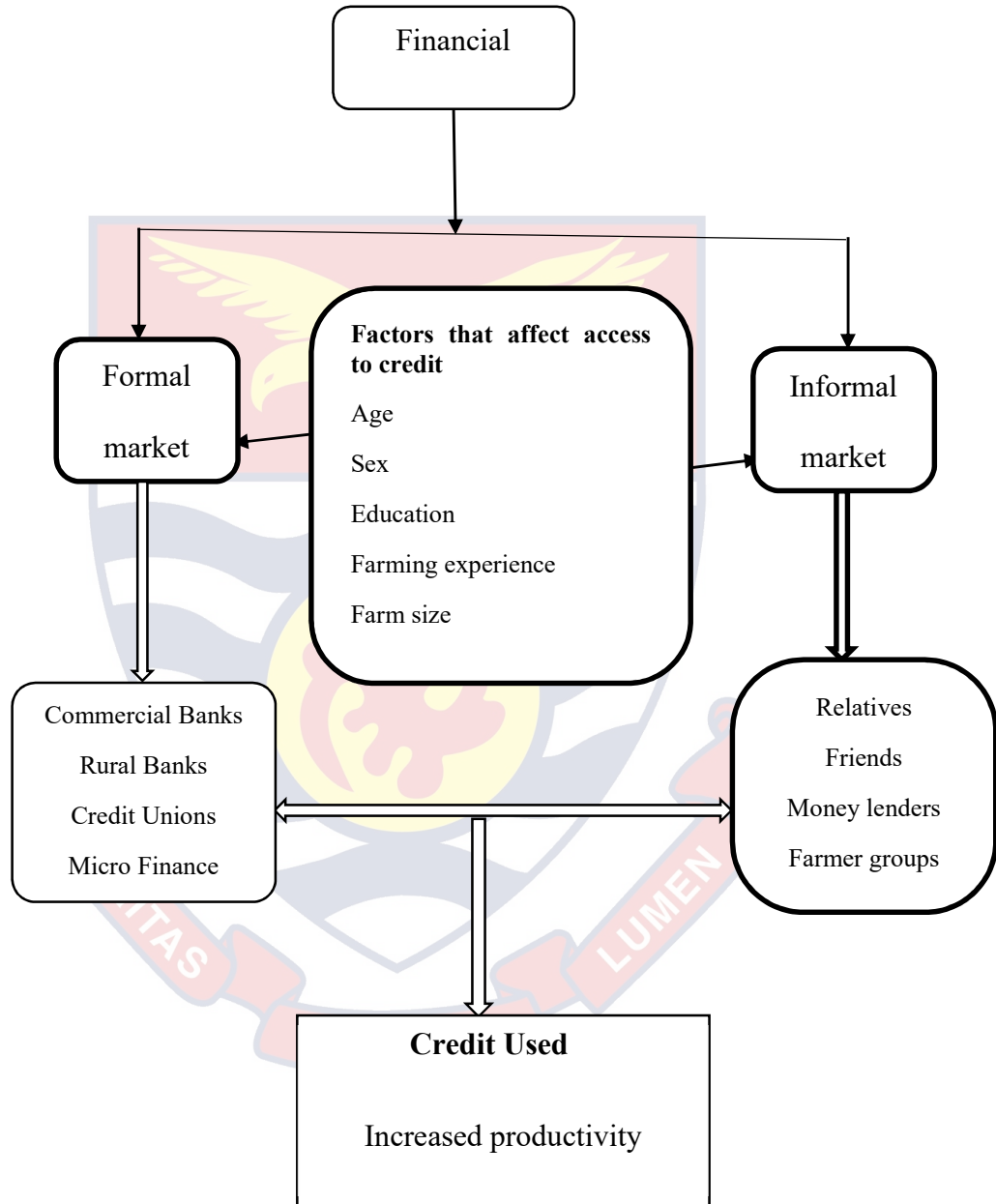


Figure 1: Conceptual Framework

Source: Author's own construct (2020)

Review of Empirical Literature

Empirical literature is reviewed to provide insight into studies conducted by other researchers in relation to the field of study to know what has been done, the findings and outcome of their research to guide the problem under study.

Factors that affect access to formal and informal credit

Sex and access to credit

Using the bivariate probit model, Munira (2013) found sex to be negative and a determinant of formal credit at 5% significant level but sex, however, was not a significant factor in accessing informal credit. She explained that money lenders in the informal sector grant credit based on the existence of relationship and the reputation one has built socially unlike the formal credit sector who looked at the ability of repayment of which women have the credibility to repay than men.

Awunyo-Vitor and Abankwah (2012) found males to access informal credit more than females. They argued that females cultivate small acreages and have few household assets to their possession and as such, their probability of repayment of credit or loan is very low because the financial players in the informal sector are willing to grant loans to client who can repay.

A study by Akudugu (2012) revealed that female farmers access credit from formal sources especially from rural banks more than male farmers. He explained that in reducing the financial constraints in rural communities by Banks

and NGOs, credit scheme packages mostly focused on empowering women than men.

Osei-Assibey (2014) found that there is no significant gender difference because credit institutions do not offer preferential treatment regarding gender in their supply of credit to enterprises.

Age and access to credit

Munira (2013) found age to be a significant factor to demand for informal credit as compared to formal credit. Age was significant at 10% for accessing informal credit. She explained that youthful farmers demand informal credit than older farmers. She argued that youthful farmers are mostly at beginning and exploring stage of farming, therefore has the will to put money and also invest in farming which increases the probability to demand for informal credit which are always readily available with less cumbersome processes.

Steiner, Giesbert and Bendig (2009) established that age is significant determinant of demand for formal credit in rural Ghana especially among the younger population. They explained that younger population are financially literate because they have access to education and would understand the processes involved in securing loan from the formal institution than older population.

Turkson (2018) established that there is no significant age difference between accessing credit from credit institutions in his study on loans accessibility by household enterprises in developing countries in Ghana. He attributed it to the fact that credit institutions do not offer preferential treatment with regards to age in their supply of credit to household enterprises.

Asset and access to credit

Abdul-Jalil (2015) found that ownership of asset is a significant determinate of access to formal and informal credit. The coefficient of assets was positive. He argued, owning asset can play a critical role in accessing credit from the formal and informal credit sector since the assets can be used as a collateral.

Turkson (2018) established that ownership of asset is a significant determinant of access to formal credit. There was a positive relationship between asset and access to formal loans, he explained that household with assets be it machinery, vehicle or both has 13.8 percent probability to access formal loans as compared to their counterpart without asset ownership.

Munira (2013) found the value of asset of a farmer is not a determinant of formal credit demand but a significant factor for accessing formal credit. The informal credit had a positive coefficient and was statistically significant at 5%. She explained formal sources of credit require collateral rather than assets while informal credit looks at the value of asset to determine the amount of money a farmer can access.

Awunyo-Vitor and Abankwah (2012) found in their study that ownership of asset has a significant influence on demand for formal credit. They argued that accessing formal sources of credit is basically premised on collateral security and asset ownership is a key factor. Hence farmers owning more assets have the greatest chance to demand formal credit as they possess the basic requirement, collateral.

Savings account and access to credit

Fuseini (2015) used heckman and standard probit model to determine access to formal and informal sources of credit. The study revealed having bank accounts increases the chance of access to credit by 11 percentage and 39 respectively than those without bank account. He explained, having bank account gives the financial institutions opportunity to access the credit ratings and credit history of the borrower.

Farm size and access to credit

Abdul-Jalil (2015) found that farm size has a positive coefficient and is a significant determinant in accessing both formal and informal credit. He explained that farmers demand for credit increases as farm size increases, thus, complement and support the increasing farm size.

Munira (2013) found farm size not to be a significant factor in determining access to formal and informal credit. The coefficient of farm size in the formal sector was positive while that of the informal sector was negative.

Arthur (2018) found farm size to be determinant of accessing formal credit. According to him, in order for farmers to meet the labour and input cost, farmers will demand credit from the formal sector which is consistent with literature that formal credit gives more loan amount than informal credit hence will the probability of demanding formal credit.

Education and access to credit

Awunyo-Vitor and Abankwah (2012) found farmers years of education to influence farmers' demand for formal credit. The study found a significant

relationship between years of education and demand for formal source of credit. However, the study revealed a negative and insignificant relationship between years of education and informal credit sector.

Munira (2013) found farmers' years of education to be a significant determinate of demanding formal and informal credit. Both sources of credit, formal and informal were statistically significant at 1 percent and 10 percent with marginal effect of 1.9 and 1.5 respectively. She argued that as a farmer educated his or herself by an additional year, it increases the chance of demanding more formal credit than informal credit. She explained, farmers who have attained more years of education have the probability of reading to understand loan application process and hence are likely to demand more formal credit.

FBO and access to credit

Nimoh, Tham-Agyekum and Awuku (2013) found in their study that, the formal credit sector with particular reference to agricultural development bank is influenced by being a member of farmer-based organisation. It significantly influence access to formal credit at ($p < 0.01$) level.

Abdul-Jalil (2015) found that being a member of a farmer-based organisation has a positive significant effect on the amount of credit a farmer can access from the formal source of credit. He argued, membership of farmer-based organisation increases the probability of amount a farmer can access by 1 percent as compared to a farmer who is not a member of farmer-based organisation. This implies that membership of FBO increases a farmer chance of getting credit from the formal sources all things being equal.

Engaging in other economic activity and access to credit

Awunyo-Vitor and Abankwah (2012) found that engaging in other economic activities has a positive significant influence on demanding formal and informal source of credit. They argued, engaging in other economic activities increases the probability of accessing informal and formal source of credit by 5 percent and 12.2 percent respectively. They explained that engaging in other economic activities gives a surety to loan repayment, which makes accessing formal credit easier as compared to informal sector who rely on relationship.

Munira (2013) found a negative and an insignificant effect between demand for formal source of credit and engaging in other economic activity. However, there was a negative and insignificant correlation between demand for informal source of credit and engaging in other economic activities. The estimate was significant at 1 percent with 31.9 percent marginal effect. She explained that to mean, engaging in other economic activities reduces the likelihood of demanding informal credit by 31.9 percent. Farmers are able to raise money from other economic activities rather accessing credit from the informal sector.

Credit utilisation and agricultural productivity

Sekyi, Domanban and Honya (2019) found in their study that, farmers who had access to informal source of credit and used it are able to produce a yield of 48.42 kg/ha as compared to those without access to informal source of credit. The study found a significant increase of yield by 57.61 kg/ha for those without access to informal source of credit if they turn to access it. They argued that

informal credit usage positively affects beneficiary farmers than their counterparts without it.

Chandio, Yuansheng, Sahito and Larik (2016) estimated the impact of formal credit usage on agricultural output found formal credit use to be significant determinant of productivity. They argued that 1 percent increase in formal credit utilization increases agriculture output by 0.86 percent. They concluded that formal credit utilization significantly affects agricultural productivity.

Akudugu (2016) found formal and informal credit use to have positive coefficient and significant effect on agricultural productivity. The study found formal and informal credit to be statistically significant at 5 percent and 1 percent respectively. The study concluded that the effect of formal credit on productivity is 3 times lower as compared to informal credit.

Using Kendall's Coefficient of Concordance to Rank Constraints

Amoah (2019) ranked constraints faced by producers, processors and distributors in the tilapia value chain. The study revealed that 72.9, 69 and 71 percent of respondents respectively agreed to the constraints set out in the study. The mean rank constrained showed high cost of feed, and high cost of input were the most pressing constraints faced by actors in the tilapia value chain while lack of access to ready market, theft and lack of access to ready market were the least pressing constraints faced by actors in the chain.

Keelson (2017) ranked the constraints faced by beneficiaries and non-beneficiaries of input credit scheme for cocoa farmers. The results revealed, Poor

producer prices and High interest rate on loan were the most pressing and least pressing constraints faced by farmers respectively.

Yussif, Obeng and Zakaria (2015) ranked the constraints faced by farmers in other to determine the level of agreement among farmers. It was revealed in the study that 59.6% of the farmers agreed among themselves that financial constraint is the most pressing constraints among all the constraints identified.

Conclusion

In summary, this chapter looked at empirical and theoretical literature on factors that affect access to formal and informal source of credit and the effect of its utilisation on farmers' productivity. The chapter also reviewed literature on constraints faced by farmers in utilisation of credit. The empirical review conducted on factors that affect access to formal and informal source of credit revealed that demographic factors cut across but the socio-economic factors differ depending on the focus of the studies. literature revealed that demographic factors such as age, marital status, sex, membership of farmer-based organization, education and socio-economic factors such total value asset, savings account, farm size, engagement in other economic activities influence access to formal and informal source of credit. The empirical review also showed that both informal credit utilisation and formal credit utilization have significant effect on productivity. However, existing literature have determined the effect of credit utilization using food crop such as maize, cassava and cash crop such as cocoa. However, in the area of cashew nut, no empirical study has been sighted.

Therefore, this study focused on empirical investigation using cashew farmers in the study area.



CHAPTER THREE

RESEARCH METHODS

This chapter described the methods used in examining the objectives for the study. The chapter is structured into research design, study area, population, sampling procedure, data collection instrument, data collection procedure, data processing and analysis and chapter summary.

Research Design

Research design forms the blueprint for the study (Burns & Grove, 2010). The Cross-sectional Survey design was adopted for the study. The cross-sectional survey design is economical and also, facilitates, easy and quick data collection and analysis of data (Fowler, 2002). This survey design involves asking respondents questions and also taking information from a sample to be a representative of the entire population. The design was adopted because, the data on all variables for the study was collected once and at one point in time unlike time series and longitudinal data which are collected over a time period. Thus, making the design relatively quick and easy to adopt. The study employed the design to compare the effect of formal credit utilization and informal credit utilization on cashew farmers' productivity and also, the design provides a framework that makes it easier to describe the characteristic of cashew farmers within the population who accessed credit for the 2019 farming season.

Study Area

The study was conducted in some selected districts in the Bono East region of Ghana. The region is part of the new regions recently created by the government of Ghana, created from formally Brong Ahafo Region (Local Government Services, 2018). The region is rich in good soils and climatic conditions. Vegetation types in the region consist of semi-deciduous forest and fertile soil conducive for the production of a variety of cash and food crops like cashew, cocoa, maize, onion, groundnut among others. The region has a population estimate of 1,179,649, (Local Government Services, 2018) total land area of 39,557 square kilometres (Ghana Districts, 2019), with an annual average rainfall of 750 to 1050 mm. The region shares boundaries with Bono Region to the west, to the north with Northern Region, to the south with Ashanti Region and to the east with Volta Lake (Ghana Districts, 2019). The region has eleven districts with Techiman as its regional capital. There are market centres in each district which promotes business and commerce. The study was conducted in two out of the eleven districts, Techiman North district and Nkoranza North district. These districts were chosen because it is documented for leading cashew production in the region and has the sources of credit available in each district (GEPA, 2019).

Techiman North District

Techiman North district lies between longitudes 2°30' West and 1°49' East and latitude 7°35' South and 8°00' North. It has a total population of 59,068 with 48.7 percent being males and 51.3 percent being females. It has an

area land size of about 389.4km² with Tuobodom as its district capital (Ghana Districts, 2019). It is bounded politically and administratively to the south with Techiman Municipality, North-west with Wenchi Municipality, with Kintampo South District to the North

and Nkoranza North District in the North-East (GSS, 2014). The major occupation in the district is agriculture constituting 49.1 percent, 20 percent in the service industry, 12.7 percent in craft and other related trade activities and 5.1 percent are engaged into elementary occupation (GSS, 2014).

The district experiences moderate to heavy rainfall with semi-equatorial and savannah climates. Within the month of April to July, Major rains start and minor rains are experienced within the months of September to October. Dry seasons are experienced between the months of November and last until March. Cash and food crops are produced in the district with ochrosol-oxysols and oxysols soil types supporting the production of cocoa, cashew, maize, tomatoes, cassava, yam, mango and plantain. The main vegetation zone in the district is three, namely, Transitional zone can be found from the South-East and West up to the North of the District and to the North-west is the Guinea-savannah woodland. Semi-deciduous zone in the South. The predominant tribe in the district is the Akan ethnic group with Bonos constituting 75 percent of the Akan ethnic group. The other significant ethnic group in the district are, Grusi, Mole Dagbani, Mende, Guan, Gruma, Ewe, Kusase and Dagarti (GSS, 2014).

Nkoranza North District

Nkoranza North District lies within longitudes 1° 10'W and 1° 55'W and latitudes 7° 20'N and 7° 55'N, it covers a total area of about 1374 km² MoFA (2019) with Busunya as its district capital and has a population 65,895 with 50.5 percent being males and 49.5 percent being females (GSS, 2014). 81.5 percent of the population reside in rural communities. The district share boundary to the North with Kintampo South, to the South with Nkoranza South, to the East with Atebubu-Amantin and to the West with Techiman Municipal. Two rainy seasons are experienced in the district. Major raining season is experienced between the months of April and June while the minor rainy season is experienced between the months of September and November (GSS, 2014).

The district experiences an annual average temperature of 26° C with a maximum and minimum temperature of 30.9°C and 21.2°C respectively. The vegetation of the district is part of the transitional zone between the forest belt of the south and savannah woodland of the northern Ghana. Agriculture and its related activities dominate the economy of the district with industry, service and commerce following in that order. Food and cash crops are cultivated in the district, among the food and cash crop cultivated are, cashew, cocoa, yam, plantain, cowpea, maize, cassava, tomato, sorghum among others with yam and maize being the main crops cultivated. Within the district, there is a huge ethnic diversity. Although there is ethnic diversity in the district, the Bonos dominate and constitute about 60 percent of the population (GSS, 2014). The Bonos are the natives of the district and Bono, one of the Twi dialect is the widely spoken

language in the district. Konkombas, Dagartis and Kasem are the other major ethnic groups found in the district (GSS, 2014).



Figure 2: Map of Bono East Region of Ghana showing the various Districts

Source: (Ghana Districts, 2019)

Population

The targeted population for the study were all cashew farmers in the Techiman North and Nkoranza North Districts in the Bono East region of Ghana. According to MoFA (2018), the two districts have a total cashew farmer population of about 30,055. The population for the study comprised all cashew farmers who accessed credit for the 2019 farming season across the targeted

population in the study area. The accessed population included people from diverse cultural, ethnic, social and educational backgrounds.

Sampling procedure

Techiman North and Nkoranza North districts were purposively selected for the study because of the district's great contribution to total cashew output in Ghana for the 2018 production year (MoFA, 2019). Also, all sources of credit selected for this study are available in the districts. The study adopted multi-stage sampling technique to enable categorization of the target population into groups without restrictions and allow flexibility to the researcher to carefully choose a sample from the population. At the initial stage, four (4) communities from each of the two districts were chosen randomly. In the second stage, respondents from these communities were stratified into farmers who accessed credit (formal source and informal sources) and those who did not access credit for the 2019 farming season to establish significant difference in some selected variables. Simple Random sampling approach was used to enable every farmer (respondents) have a fair chance of being selected.

In determining the sample size, Krejcie and Morgan (1970) sample size determination table was adopted for the study. Two hundred (200) cashew farmers were sampled for the study. Because of the arguments espoused by Hair, Anderson, and Tatham (1998) that a sample size of hundred (100) or more is enough to conduct any statistically significant test, two hundred respondents sampled for the study was considered appropriate.

Data Collection Instrument

To achieve the objective set out in the study, the study employed a well-structured questionnaire. The instrument was designed with the help of the study supervisor. To solicit confidential information, open and close-ended questionnaire was administered. Close-ended questions was asked to restrict respondents to provide answers to specific questions asked while the open-ended questions were to allow respondents provide detailed information, express their opinion on the questions asked in the study. Four sections made up the questionnaire. Section A provides information on the socio-economic and demographic characteristic, section B provides information on the access to credit and sources of credit available to respondents, section C provides information on the total output/yield harvested by respondents and section D provides information on constraints to credit utilisation by respondents.

The instrument was pre-tested in the Techiman municipality to assess its content and face validity. The instrument was pre-tested in Techiman municipality because it has similar socio-economic, demographic and population characteristic as Nkoranza and Techiman North Districts (GSS, 2014). The pre-testing was conducted in communities such as Tadieso, Techiman Township, Koase and Mangoase. The pre-testing commenced from the 25th of June, 2020 to 28th of June, 2020. After the pre-testing, some variables that were not added to the instrument were added and those that were not necessary was deleted. The questionnaires contained a cover letter at the top page that explained the nature of

the study, confidentiality, assurance of anonymity and the fact that participation is voluntary since the study was solely for academic purpose

Data Collection Procedure

The primary data was gathered using structured questionnaire. A structured interview was used to solicit information from respondents who couldn't read and understand the content on the questionnaire and the respondent's choice of answer was selected by the interviewer. Those who could read and understand were given the questionnaire to fill themselves. Most of the questionnaires were filled by the researcher and field assistants with few filled by the farmers (respondents). The nature and objectives of the study were explained to respondents with much emphasis on the study being for academic purposes. The data collection covered one week from the 6th of July, 2020 to 12th of July, 2020. Simple random sampling was used to reach respondents.

Three field assistants were recruited to assist with administering of the questionnaires. These assistants were recruited based on their level of education and language proficiency, specifically English and Twi because that was the common language familiar to respondents in the study area. The assistants were trained on the purpose for the study and on the administering of the instrument.

Data Analysis Procedure

The data for the study was evaluated and measured against the objectives of the study to ensure consistency and accuracy of responses obtained from the field. The data was coded and input into the computer using IBM SPSS (25).

STATA version 15 and IBM SPSS (25) were used for data management and analysis.

The results were presented in the form of tables and graphs. Descriptive statistic such as mean score, standard deviation, frequency tables and inferential statistic (regression analysis) were used to analyze continuous, binary data and categorical data.

Empirical Model Specification

In examining the determinants of both formal and informal access to credit, the study adopted the bivariate probit model used by (Awunyo-Vitor & Abankwah, 2012). Again, in examining the utilization of credit and its effect on productivity of cashew farmers, the study adopted the Ordinary Least Squares (OLS) estimation techniques and Kendall's Coefficient of Concordance was used to determine the constraints to credit utilisation faced by cashew farmers.

The decision by a farmer to access credit whether formal or informal is assumed to be influenced by several factors such as individual characteristics, household, socio-economic and institutional factors. This means that a farmer access to credit is a latent variable. Let assume, the latent variable to be (Y_i) which also depend on a number of explanatory variables. This leads to qualitative response model which can be formulated as:

$$Y_i = \alpha + \beta X_i + \mu_i \quad (3)$$

Where the farmer decision to access credit or not (Y_i) is assumed to be dependent variable on his or her evaluation of the benefits and marginal cost associated with usage and non-usage of credit. In reality, the benefits and

marginal cost accompanied with Y_i is unobservable and hence the dependent variable in equation 1 cannot be estimated. To be able to examine the determinants of credit, another variable Y^* that leads to a binary outcome for the dependent variable is estimated:

$$Y^* = 1 \text{ if farmer access credit and } 0 \text{ otherwise} \quad (4)$$

Several techniques or methods such as the probit model, Linear Probability Model (LPM) and logit model can be used to estimate a binary dependent variable. However, since the dependent variable does not follow the normally distributed model, the probit or logit model which follows the Maximum Likelihood method is more preferable (Cameron & Trivedi, 2005). Though the LPM can also estimate a binary dependent model, but the probit and logit models are more advantageous than LPM because, the probability values lie between 0 and 1 unlike the LPM where the estimated probability values can lie outside 0 and 1. Therefore, adopting linear estimation techniques like the Ordinary Least Squares or Linear Probability Model would yield bias and inconsistent results. Because of the shortcomings of the OLS and LPM, the study adopted probit model to determine the factors that affect access to credit (formal and informal).

In order to examine the factors that affect access to formal and informal source of credit among cashew farmers selected for the study, the study adopted and modified the bivariate probit model used by (Mohieldin & Wright, 2000; Awunyo-Vitor & Abankwah, 2012). The econometric specifications are therefore presented below;

$$y_{1i}^* = \beta_1' x_{1i} + \varepsilon_{1i} y_{1i} \begin{cases} 1 & y_{1i}^* \geq 0 \\ 0 & y_{1i}^* < 0 \end{cases} \quad (5)$$

$$y_{2i}^* = \beta_2' x_{2i} + \varepsilon_{2i} y_{2i} \begin{cases} 1 & y_{2i}^* \geq 0 \\ 0 & y_{2i}^* < 0 \end{cases} \quad (6)$$

$$(\varepsilon_{1i}, \varepsilon_{2i}) \sim BVN(0, 0, 1, 1, \rho)$$

Where for the purpose of this study,

y_{1i}^* is the propensity of farmer to use formal credit

y_{1i} = observed farmers who use formal credit

y_{2i}^* = the propensity of farmers to use informal credit

y_{2i} = observed farmers who use informal credit

x_{1i} and x_{2i} are explanatory variables of β_1' and β_2' to be estimated .

For probit model, the estimated coefficients just indicate the sign and direction of variable and do not give any economic interpretation of the model. Hence the marginal effect will be interpreted. There are three ways of calculating the marginal effects, which are: (i) Marginal Effects at Averages (MEA), that is at the average point of each individual variable or the (ii) Average Marginal Effects (AME) that is averaging all the slopes for individuals and (iii) Marginal Effect at Representative Value (MER) that is computing at specific values. In this study, AME was interpreted because averaging the dummy variables in MEA will not be meaningful. The AME is estimated using the formula:

$$AME = \frac{1}{n} \sum_{i=1}^n \frac{\partial E(L_i|\omega)}{\partial \omega_i} = \frac{1}{n} \sum_{i=1}^n [\lambda(\beta' \omega_i) * \beta_i] \quad (7)$$

Where n represents the number of smallholder farmers.

For the second objective, the study adopted the Ordinary Least Square (OLS) estimation method to examine the effect of credit utilization on cashew farmers' productivity. The application of OLS is subject to the assumptions

underlying the Classical Linear Regression Models (CLRM) such that the conditional mean function is specified as:

$$E(y^i / F_{ai}) = F\beta$$

And the resultant estimator ($\hat{\beta}$), which must satisfy the basic assumption underlying the classical regression model is given below:

$$\hat{\beta} = \min \sum_{i=1}^n ((E(y^i / F_i) - (F\hat{\beta}))^2)$$

Where, $\hat{\beta}$ is the estimator under OLS that minimizes the conditional mean function? The estimator, which is the sum of the squared error is assumed to be Best Linear Unbiased Estimator (BLUE) under the Classical Linear Regression Model (CLRM) (Cameron & Trivedi, 2005). Under such an assumption, it is important to ensure that the model is not only linear in parameters but also with an error term that is both serially uncorrelated and homoscedastic. The use of the OLS is also subjected to assumption of random sampling of the observations of the study. The model for achieving this objective is assume to follow the homoscedasticity and no autocorrelation and again assume no multi-collinearity among the explanatory variables in the model. Having justify the used of the OLS method, the econometric model for examining the effect of credit used on total productivity is given as:

$$TP = \beta_0 + \beta_1 \text{credit used} + \beta_2 \text{Education} + \beta_3 \text{ Farmsize} + \beta_4 \text{Seed Type} + \beta_5 \text{Age of cashew tree} + \beta_6 \text{Age of cashew tree square} + \beta_7 \text{Household size} + \beta_8 \text{FBO} + \beta_9 \text{Farming Expereince} + \beta_{10} \text{Agrochemicals} + \varepsilon \quad (8)$$

Justification for Choice of Variables used in the Study

Farm size was measured as a continuous variable and defined as total size of land (acres) cultivated. According to Yahuala (2008) the larger the cultivated land size, the more the inputs required which demands additional capital in the form of credit.

Education is a dummy variable measuring the educational status of the farmer. This variable is assigned the value '1' if the farmer has attained any form of formal education and '0' if otherwise. Its coefficient could be either positive or negative. It is expected that a farmer with any form of education would have more knowledge and understanding about the importance of accessing credit hence we expect a positive sign. A study by Alhassan and Sakara (2014), posit that accessing formal credit is influenced by having attained any form of formal education therefore a positive sign is expected.

Marital status of a farmer is a dummy variable which is assigned '1' if the farmer is married and '0' if otherwise. In this study, it is assumed that single farmers have higher loan repayment as compared to married farmers because single farmers have few dependencies. Also, married individuals are less mobile and do not relocate as often as singles as a result informal credit providers turn to favour married farmers (Munira, 2013)

Membership of farmer-based organization is a dummy variable and takes '1' if the farmer is part of an FBO and '0' if otherwise. Farmers who are part of FBOs are able to use the group as collateral to secure credit from the formal sources as compared to the informal sources. This is usually achieved through

combined efforts there by reducing the risk of defaulting loan repayment. A positive sign is expected because there a likelihood of accessing credit from both sources with FBO (Fuseini, 2015).

Engagement in other economic activity was dummied to take the value of '1' if a farmer engages in other economic activity which generate income for the farmer apart from cashew farming and '0' if otherwise. It is expected in this study for the variable to have a negative sign.

Assets of the farmer is measured as the total value of tangible household assets owned by the farmer. A valuable asset ownership can be very attractive to credit institutions who require collateral for loan. Farmers with valuable assets are more likely to access credit from both sources of credit since the assets can be used as collateral (Awunyo-Vitor & Abankwah, 2012). Therefore, value of assets is hypothesized to have a positive influence on access to both formal and informal source of credit.

Savings account is a dummy variable which takes the value of '1' if a farmer has savings account with a recognized financial institution and '0' if otherwise. A farmer with savings account is likely to access credit from the formal source since the financial history of the farmer will be known by the institution. The sign for this variable is expected to be positive (Fuseini, 2015).

Membership of farmer-based organization is a dummy variable and takes ‘1’ if the farmer is part of an FBO and ‘0’ if otherwise. Farmers who are part of FBOs are able to use the group as collateral to secure credit from the formal sources as compared to the informal sources. This is usually achieved through combined efforts there by reducing the risk of defaulting loan repayment. A positive sign is expected because there a likelihood of accessing credit from both sources with FBO (Fuseini, 2015).



Table 2: Variables Definitions, Unit of measurements and hypothesize sign

DEFINITION	UNIT OF MEASUREMENT	Expected sign for access of credit	Expected sign for Productivity
Dependent variables			
Productivity	Total yield per acre of land		
Access to formal credit	Dummy (1 if a farmer access formal credit and 0 otherwise)		
Access to informal credit	Dummy (1 if a farmer access formal credit and 0 otherwise)		
Independent variables			
Formal credit used	Ghana Cedi		+/-
Informal credit used	Ghana Cedi		+/-
Sex	Dummy (1 if farmer is a male and 0 otherwise)	+/-	
Marital status	Dummy (1 if farmer is married and 0 otherwise)	+/-	+/-
Age of farmer	Years of the farmer	-	-
Farm size	Measured in hectares	+	+
Household size	Number of people in farmer's household		+
Seed type	Dummy (1=local, 0=improved)		+/-
Form of education	Dummy (1 if farmer has some form of formal education and 0 otherwise)	+/-	+/-
Household asset	Ghana cedi	+	+
Other economic activity	Dummy(1 if a farmer engages in other economic activity and 0 otherwise)	+/-	+/-
Savings account	Dummy (1=if farmer has savings account 0=otherwise)	+/-	+/-
FBO	Dummy (1 if farmer belongs to association and 0 otherwise)	+/-	+/-
Agro chemicals	Dummy (used agro chemical=1, otherwise=0)		+/-

Source: Authors own construct (2020)

Identification and Ranking of Constraints Faced by Cashew Farmers

Kendall coefficient of concordance was used to rank the mean of all constraints to ascertain the most pressing constraints and least pressing constraints faced by respondents. To ascertain the level of agreement among respondents, coefficient of concordance, a non-parametric statistical procedure, widely used in literature, was used to ascertain the degree of agreement among the cashew farmers. Spearman ranking, freedman ranking and garret ranking are all ranking methods that can be used to rank the mean of the identified constraints but the kendall coefficient of concordance was chosen because of its small variance which makes it more efficient and robust due to its small gross error sensitivity.

The selected constraints identified in the study was among respondents who accessed credit for the 2019 farming season and the constraints they faced in utilization of the credit. The identified constraints included, school fees payment, health upkeep, funeral activities, wedding activities, high cost of input, poor producer price and high cost of labour. Constraints such as frequent fire outbreak and price fluctuation were identified through pre-test. A five-point Likert-Scale was used to determine the degree of the constraints faced by respondents. The extent of the constraints was measured as follows; extremely low (1), low (2), moderate (3), high (4), extremely high (5).

Computation was done for each of the constraints to ascertain the mean rank. The constraints with the highest mean rank were rank the most pressing constraints and the constraints with the lowest mean rank was rank the least pressing constraints.

Amoah (2018) algebraically expressed Kendall's Coefficient of Concordance as;

$$K = \frac{12[\sum S^2 - (\sum S/n)]}{rm^2(n^2 - 1)} \quad (9)$$

Where;

K= Kendall's Coefficient Concordance

S= Sum of ranks for the utilization constraints being ranked

m = Total number of respondents (farmers)

r= Total number of constraints being ranked.

Table 3: Measurement of constraints faced by Cashew Farmers

Constraints	Extrem ely low (1)	Low (2)	Moder ate (3)	High (4)	Extremel y high(5)
Price fluctuation					
Frequent fire outbreak					
Poor producer price					
High cost of inputs					
High cost of labour					
School fees payment					
Health upkeep					
Funeral activities					
Marriage activities					

Source: Authors own compilation (2020)

CHAPTER FOUR

RESULTS AND DISCUSSION

Introduction

This chapter presents and discusses the results of the study. Four major sections make up this chapter. Section one presents an overview and summary of descriptive statistics of the socio-economic and demographic characteristics of respondents and the purpose of credit acquisition. Section two and three presents the results of econometric analysis of factors that affect access to formal and informal credit and a comparative analysis of the effect of formal and informal credit utilization on cashew farmers' productivity and finally constraints to credit utilization.

Socio-Demographic Characteristics of the Respondents

The socio-demographic characteristics and socio-economic characteristics of respondents are presented in Table 4.

Sex of Respondents

From Table 4, Out of the two hundred cashew farmers reached, majority of the respondents representing 65 percent were males while 35 percent were females. This corroborates with the finding of Wongnaa and Ofori (2012) that cashew farming was dominated by males and they attributed the reasons for male dominance in cashew farming to be, most of the women work in cashew farms to support their husbands. The women play an auxiliary role by picking and gathering the fallen fruits from the cashew trees and detaching the nuts from the fruits

Table 4: Socio-economic characteristics of the respondents

Variable	Observation	Frequency	Percentage
SEX	200		
Male		130	65
Female		70	35
MARITAL Status	200		
Married		180	92
Not Married		20	08
Savings Account	200		
Yes		161	80.50
No		39	19.50
Education	200		
Educated		147	73.50
No education		53	26.50
FBO	200		
Yes		88	44.00
No		112	56.00
Agrochemical	200		
Yes		53	26.50
No		147	73.50
OTHER Economic Activity	200		
Yes		193	96.50
No		7	3.50

Source: Field Survey (2020)

Educational status of respondents

According to Table 4, out of two hundred cashew farmers reached for the study, 73.50 percent have attained some form of formal education while 26.50 percent have no formal education at all. The results is similar to the findings of Armah (2018) who established that 74 percent of cashew farmers interviewed had formal education while 26 percent had no formal education. When farmers have some form of formal education, they are able to read and understand the laborious processes that come with accessing credit especially from the formal sources of credit. With education, farmers are able to utilize credit effectively, all other things being equal.

Farmer based organisation

Table 4 indicates that out of two hundred respondents reached, 44 percent belong to farmer-based organization while 56 percent of the respondents do not belong to any farmer-based group. As shown by the results, majority of the cashew farmers in the study do not belong to farmer groups, which is worrying. Membership of farmers in these social groups generate social capital that members can use as a 'social collateral' for accessing credit and other productive ventures (Udry & Conley, 2006). From interaction with respondents on the field, it was observed that farmers were now being educated on the need to join farmer groups. Among farmers who belong to farmer groups, 34.94 percent met one to three times in a year, 44.58 percent met four to six times in a year and 15.48 percent met more than seven times in a year.

Savings account

According to Table 4, 80.50 percent of respondents had savings account while 19.50 percent had no savings account. This corroborates the findings of Fuseini (2015) who established that, when farmers have savings accounts with financial institutions, the financial institutions are able to evaluate the credit history of the farmer on time, which helps the institution to ascertain the amount of loan to grant to the farmer, all other things being equal.

Agrochemical

From Table 4, 73.50 percent of the respondents did not use agrochemicals on their farms while 26.50 percent used some form of agro chemicals on their farms. This result is consistent with the findings of Armah (2018) who found that

majority of cashew farmers did not apply pesticide on cashew tree. On the field interactions with farmers revealed that, farmers did not apply pesticides with the reason that, using pesticides kill insects which serve as agent of pollination and also ADRA, an Adventist NGO that introduced cashew cultivation to the study area did not use pesticides on their cashew farms.

Engagement in other economic activity

According to Table 4, 96.50 percent of the respondents engaged in other economic activities while 3.50 percent engaged in only cashew farming. This result corroborates the finding of Munira (2013) who found that 87.50 of rice farmers in Northern Region engaged in other economic activities such a trading, teaching and other on farm activities. These findings are necessary and helpful. When farmers engage in other economic activities, they are able to draw finances from such activities to support cashew farming.

Table 5: Summary statistics of continuous variable

Variable	Obs	Mean	Std.Dev.	Min	Max
Output(yield)	200	2112.629	2000.378	200	15000
Household_Size	200	6.2	2.869	1	24
Age of cashew tree	200	10.262	6.046	2	30
Farm Size	200	8.364	9.433	1	93
Age	200	48	13	24	95

Source: Field survey (2020)

From Table 5, cashew farmers produced a minimum yield of 200 kilogram (kg) of cashew nut, a maximum yield of 15000 kg of cashew nut, an average yield of 2112.63 kg and an average yield kg/acre of 253kg. This is higher than MoFA

(2016) national average of 200 kg/acre. Out of the two hundred respondents reached in the study area, 42.56 percent cultivated local seed which they received from family and friends who have matured cashew tree on their cashew farms. 54.87 percent cultivated both local and improved variety and 2.56 percent cultivated only improved variety. Farmers accessed the improved variety of cashew from MoFA departments in the districts and from NGOs who are into cashew development like Adventist Development and Relief Agency (ADRA) and Comcashew (Armah, 2018). According to Table 5, 73.33 percent of the farmers in the study area cultivated cashew on their own land, 17.44 percent cultivated cashew on family land, 3.1 percent cultivated cashew on rented land and 6.2 percent practiced shared cropping.

Respondent had an average household size of 6 members with a minimum of a member and a maximum of 24 members. Respondents had an average land size of 8.3 acres, minimum of an acre and a maximum of 93 acres. The standard deviation for farm size is seen to be higher than the mean showing the existence of possible outlier. Therefore, farm size was logged in the regression model. Per these results, it implies that farmers in the study area cannot be defined as smallholder farmers (MoFA, 2016). MoFA (2016) defined smallholder farmers as farmers who cultivate less than 2 hectares. Cashew trees in the study area had a minimum age of 2 years, maximum age of 30 years and an average age of 10 years which is significant for productivity.

Access to Credit

From Figure 3, 149 cashew farmers accessed credit during the 2019 production season representing 74.50 percent while 51 cashew farmers representing 25.50 percent did not access credit. This suggests that in the study area, access to credit to support cashew farming is high.

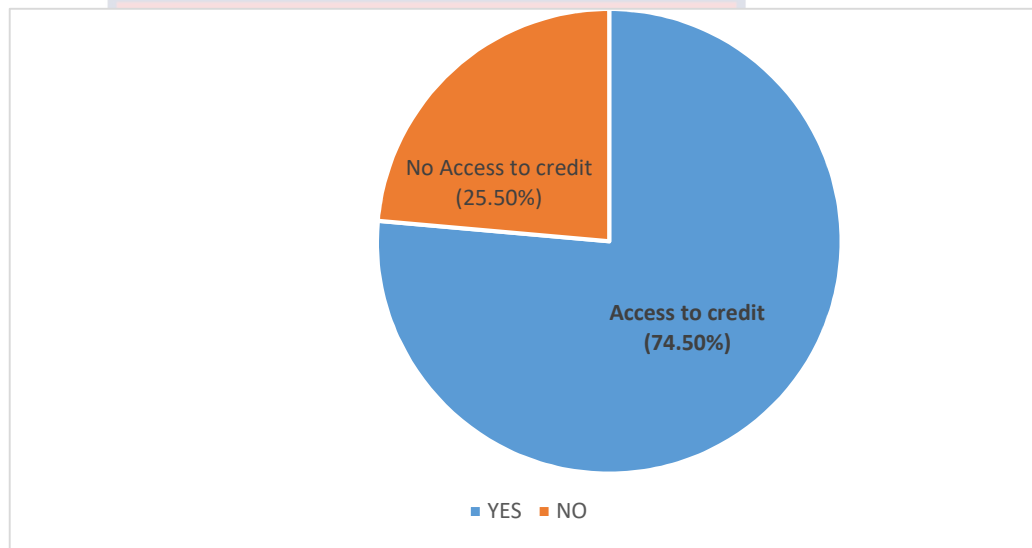


Figure 3: Distribution of access to credit.

Source: Field Survey (2020)

Source of credit to farmers

The sources of credit as presented in Figure 4 are the formal and informal sources. Among the cashew farmers who accessed credit for the 2019 production season in the study area, 20 percent acquired credit from the formal source, 58 percent sourced credit from the informal credit source while 22 percent sourced credit from both the formal and informal sector. From a summation of the sources of credit, 34 percent sourced credit from the formal sector while 66 percent sourced credit from informal sector. This confirms the findings by Owusu-Antwi and Antwi (2010) that in Ghana, informal sources of credit lead the provision of

credit to farmers. This is no different for cashew farmers in the study area. Strict and laborious processes of formal credit acquisition could be the reasons behind the dominance of the informal credit sources as lead providers of credit to cashew farmers in the area under study.

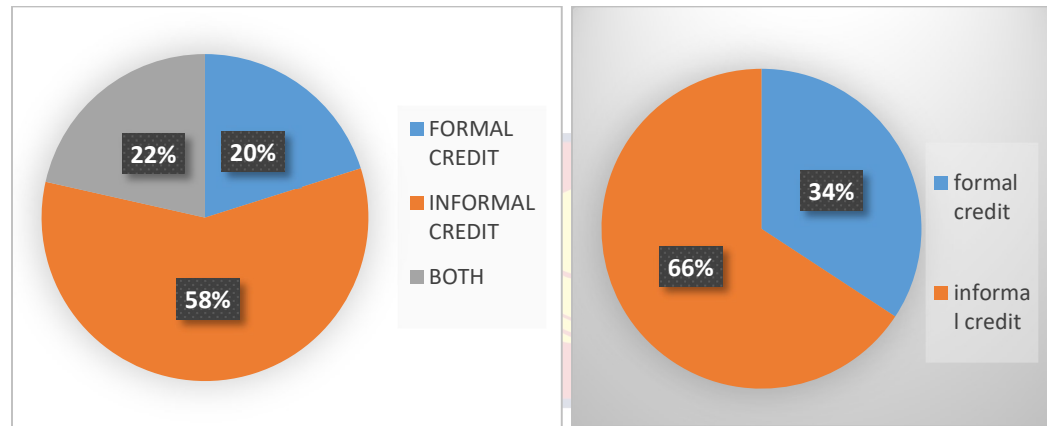


Figure 4: Distribution of source of credit to farmers

Source: Field Survey (2020)

Distribution of the Credit Sources Accessed

In the context of this study, formal credit sources was categorised into four (4). These are commercial banks, rural banks, microfinance and credit unions. The informal credit sources for this study were categorised into four (4). These are friends, relatives (extended and nuclear), money lenders (purchasing clerks) and farmer groups. From Figure 5, among those who accessed credit from the formal source, 16.13 percent secured credit from rural banks, 8.06 percent secured credit from microfinance institutions, 11.29 percent secured credit from commercial banks and 64.52 percent secured credit from credit union. The reason for high acquisition of formal credit from credit union from observation is that, in the study area, credit unions belong to churches and teachers. Farmers in the study

area trust these institutions because they were once victims of financial fraud from DKM, among others. From Figure 5, rural banks are the second highest contributor of credit from formal source in the study area by extending 16.13 percent of credit to farmers. This is not intriguing because per the code governing the establishment of rural banks, provision of credit to the rural poor is critical and vital.

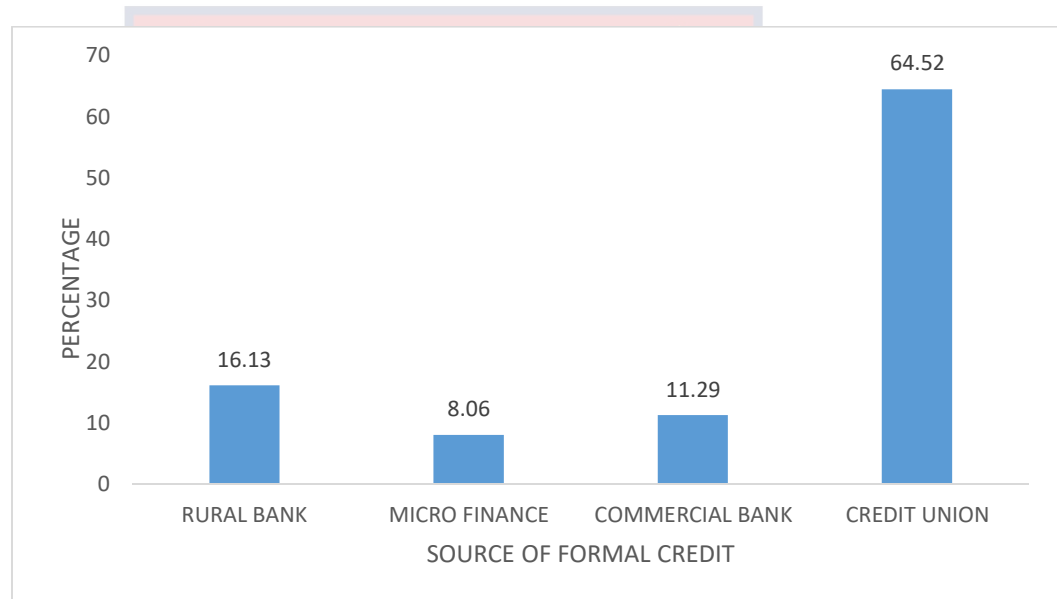


Figure 5: Formal sources of credit

Source: Field Survey (2020)

According to Figure 6, among those who acquired credit from the informal source, 3.36 percent of farmers secured credit from friends, 15.13 percent sourced credit from relatives, 77.31 percent acquired credit from money lenders (purchasing clerks) and 4.2 percent sourced credit from farmer groups. The reason for high acquisition among money lenders (purchasing clerks) from observation on the field survey was that, there exist competition among cashew marketing companies. So, farmers who have been consistent and loyal to these marketers are

given incentives such as cash and inputs to do on-farm preparation such as weeding and pruning. This has contributed to the high access to credit in the informal sector and from purchasing clerks. From Figure 6, 18.49 percent acquired credit from family and friends. The results is inconsistent with the findings of Munira (2013) who found that 93 percent of rice farmers sourced credit from family and friends.

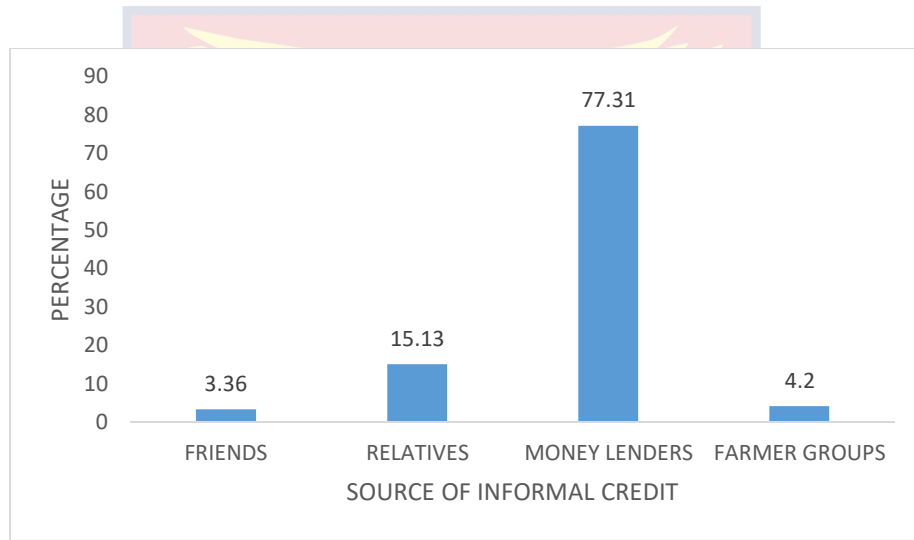


Figure 6: informal source of credit

Source: Field Survey (2020)

Table 6: Summary statistics of credit amount

Variable	Obs	Mean	Std.Dev.	Min	Max
Informal	100	583.193	408.401	150	3000
Formal	49	1203.175	1640.709	400	13000

Source: Field Survey (2020)

Characteristics of credit amount

According to data gathered from the field as presented in Table 6, informal sources of credit granted a minimum amount of GH¢ 150.00, a maximum loan of GH¢ 3000.00 and an average amount of GH¢ 583.20 while formal sources of credit granted a minimum amount of GH¢ 400.00, a maximum loan of GH¢ 13,000.00 and an average amount of GH¢ 1,203.18. Comparatively, formal sources of credit granted the maximum amount of credit to respondents, although, majority of the respondents sourced credit from the informal credit source. This result confirms the findings by Munira (2013) that in Ghana, formal sources of credit grant the highest amount of loans to farmers as compared to the informal sources of credit although the informal sources of credit is mostly accessed by farmers.

Table 7: Purpose for credit acquisition

What was your purpose for credit acquisition?	Frequency	Percentage
cashew farming	72	48.32
cashew farming, other activities, on-farm(non-cashew)	77	51.68
TOTAL	149	100

Source: Field survey (2020)

From general observation, all those who accessed credit for the 2019 farming season did so for the purpose of cashew farming. However, after receiving the loan amount, farmers did not spend the credit or loan solely on the purpose of which the credit or loan was acquired. As it can be seen in Table 7, 48.32 percent spent the loan amount on only cashew farming while 51.68 percent spent the loan amount on cashew farming, other farming activities such as yam,

tomato, cocoa, mango among others and on social and other activities such as wedding, funerals, on their health upkeep and payment of school fees of household members. This implies that farmers did not utilize accessed credit solely on the purpose of which the credit was obtained for which is worrying and can affect agricultural production. The results are similar to studies by Anyiro and Oriaku (2011) who found that about 53% of smallholder farmers in Abia State, Nigeria utilise the amount borrowed into other activities instead of utilising it for the purpose acquired.

Analysis of Empirical Results from Econometric Estimations

This section provides an interpretation of the regression results from bivariate probit estimate. The probit estimation is presented in table 7 below;

Bivariate Probit Estimates of Factors that Affect Access to Formal and Informal Credit

The bivariate probit model was estimated to determine the differing factors that affect access to formal and informal credit. Factors such as asset, sex, farmer's age, savings account, farm size, marital status, education, FBO and engagement in other economic activity was estimated on access to formal and informal credit by cashew farmers in the study area. The regression results as shown in Table 8 revealed a Wald chi square value of 11.350 which is significant at 1 percent. This means that the explanatory variables considered in the model jointly influence access to both formal and informal source of credit.

Table 8: Factors that affect access to formal and informal source of credit

VARIABLES	Access to formal Credit		Access to informal Credit	
	Coefficients	Marginal Effect	Coefficients	Marginal Effect
ASSET	0.415*** (0.025)	0.111	0.347*** (0.025)	0.102
SEX	0.155 (0.229)	0.027	0.487** (0.212)	0.134
FARMERS AGE	0.328 (0.222)	0.073	0.210 (0.214)	0.022
SAVINGS ACCOUNT	0.831*** (0.276)	0.226	0.589** (0.253)	0.255
FARMSIZE	0.080*** (0.029)	0.024	0.014 (0.012)	0.018
MARITAL STATUS	0.423 (0.381)	0.110	0.480 (0.385)	0.168
EDU	0.830*** (0.250)	0.278	0.262 (0.242)	0.209
FBO	0.422* (0.223)	0.134	-0.072 (0.212)	-0.024
OTHER ECONOMIC ACTIVITY	-0.350 (0.559)	-0.097	-1.366*** (0.509)	-0.306
Constant	-2.151*** (0.708)		0.316 (0.651)	
Athrho	-0.518*** (0.154)			
Rho	-0.476 (0.119)			
Likelihood ratio test	Prob > chi2 = 0.000			
Wald test of rho=0: chi2(1) = 11.3508				
Observations	74		181	
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1				
Source: Field Survey (2020)				

From Table 8, asset has a positive coefficient and it is a significant determinant of access to formal and informal source of credit at 1 percent significant level. Owning an asset increases the probability of access to formal and informal source of credit by 11.1 percent and 10.2 percent respectively. This means that a farmer with an asset (farm and household asset) has the probability

of accessing credit from the formal sector more than the informal sector although both are significant factors of accessing credit. The reason being that the formal sector usually require collateral of which owning an asset, is a key factor as compared to the informal sector which normally rely on social relationship as a key factor to grant credit although owning an asset as a form of collateral is important. The results is consistent with the findings of Abdul-Jalil (2015) who found asset ownership to be a significant factor influencing access to both formal and informal credit.

Sex has a positive coefficient and it is a significant factor for accessing tcredit from the informal source at 5 percent significant level. Sex however is not a significant factor of access to formal credit. Being a male farmer, increases the probability of accessing credit from the informal sector by 13.2 percent. An explanation to this finding is, more men are into cashew production than women and as a result, informal credit providers see men as having the capacity to repay loans than women. Also, since men are the head of household and control and own most of the household assets, dealing with men is convenient and preferable since most decision in the household are taken by men. However, the formal sector does not look at these conditions but look at who is able to meet the terms and condition of the credit agreement. The results is consistent with the findings of Awunyo-Vitor and Abankwah (2012) who argued that females cultivate small acreages and own few household assets and as such, the probability of repayment of credit or loan is very low because the financial players in the informal sector are willing to grant loans to client who can repay.

Savings account has a positive coefficient and it is a significant factor of accessing credit from formal and informal source of credit. The estimates are significant at 1 percent and 5 percent for access to formal and informal source of credit respectively. Having savings account increases the chances of accessing formal and informal source of credit by 22.6 percent and 25.5 percent respectively. This means that a farmer with savings account has the probability of accessing credit from the informal source more than the formal source although both are significant factors of accessing credit. This is because, the financial institution a farmer saves with, already has the credit history of the farmer and as a result, can evaluate the loan application to determine the amount to loan the farmer as compared to the informal sector who only rely on the information given by the farmer to determine the amount to loan out all other things being equal. Therefore, the formal sector are likely to credit ration a farmer than the informal sector because of the credit history information available to the formal sector. Hence, the likelihood of a farmer accessing credit from the informal sector is more than the formal sector. These results, however, contradicts with the findings of Fuseini (2015) who found savings account to significantly influence accessing credit from the formal sources more than the informal source of credit.

Farm size has a positive coefficient and it is also a significant determinant of access to credit from the formal source at 1 percent significant level. Farm size has a positive coefficient but however it is not a significant determinant of access to informal credit. An increase in farm size by an acre, increases the probability of accessing credit from the formal sector by 2.4 percent. This means that a farmer

with large farm size is likely to access credit from the formal sector than a farmer with smaller farm size. A plausible understanding to this finding is, having large farm size increases the responsibility of maintaining and managing the farm effectively to increase farm yield or output than a farmer with small farm size. As a result, formal credit source prefers to loan money to farmers with large farm size because, with large farm size, a farmer is likely to obtain higher yields and has an increased probability of repaying the loan than a farmer with small farm size all other things being equal. This is consistent with the findings of Abdul-Jalil (2015) who found large farm size to have significant influence of accessing formal credit.

As shown in Table 8, education has a positive coefficient and it is a significant determinant of accessing credit from the formal source at 1 percent significant level. Education however is not a significant determinant of accessing informal credit. Being an educated farmer, increases the likelihood of accessing credit from the formal sector by 27.8 percent. An explanation to this finding is, a farmer being educated is able to read and understand the loan application process from the formal sector than a farmer with no education. Hence, increasing the probability of educated farmer's ability to access credit from the formal sector. This finding meets the a priori expectation of this study and is consistent with the findings of Munira (2013) who argued that formal credit requires more appreciation of the terms and condition and require paper works to read and fill and as such, increasing the probability of an educated rice farmer's access to credit from the formal source.

FBO has a positive coefficient and it is also a significant factor of access to credit from the formal source at 10 percent significant level. FBO however, has a negative coefficient and is not a significant determinant of accessing informal credit. Joining a farmer-based organization, increases the probability of accessing credit from the formal sector by 13.4 percent. The reason being that, when farmers organize themselves into groups, it reduces the risk of defaulting loan repayment, hence, increases the likelihood of farmers in groups to access formal credit than farmers who are not members of farmer-based groups. Giving out loans to farmers is always perceived to be risky due to seasonality nature of agriculture. All other things being equal, when farmers organize themselves into groups, the group membership can be used as collateral to secure credit from the formal source as compared to farmers who are not members of any farmer groups with all the risk associated in consideration. This is consistent with the findings of Abdul-Jalil (2015) who finds that being a member of farmer-based organization increases the probability of access to formal source of credit than farmers who do not belong to any farmer-based organization.

Engaging in other economic activity in addition to cashew farming according to Table 8 is seen to have a negative coefficient and has insignificant relationship with access to formal credit. However, the results show a negative coefficient and negative significant relationship between engaging in other economic activities and access to informal credit. The estimate is significant at 1 percent. The decision of a farmer to engage in other economic activity reduces the likelihood of accessing informal credit by 30.6 percent. This means a farmer who

engages in other economic activity is less likely to access informal credit. The reason being that, a farmer who engages in other economic activity is able to generate income from what they engage in or do which can be used to support cashew farming. As a result, the zeal to borrow or access credit from the informal sources reduces. Also, interest rate and other commitment associated with accessing informal source of credit may draw the farmer's attention to switch profit from the other income generating activity to invest into cashew farming rather than borrowing or accessing informal source credit. This corroborates the findings of Munira (2013), who found that engaging in other economic activity has a negative significant relationship with access to informal credit. She explained that to mean that when a farmer gets involved in other economic activity, it reduces the probability of a farmer from borrowing from the informal source of credit because farmers are able to raise revenue to support their activities. However, the results are inconsistent with that of Awunyo-Vitor and Abankwah (2012) who found a significant and a positive relationship between engaging in other economic activity and demand for informal credit.

From the discussion above, it is evidently clear that factors that affect access to formal and informal credit among cashew farmers in the study area are influenced partly by some socio economic and socio demographic characteristics. Asset and savings account influence access to formal and informal credit. Formal credit access is influenced by farm size, membership of farmer-based organization and education while sex and engagement in other economic activity influence access to informal source of credit. However, farmers' age and marital status are

not significant factor to access credit from either formal or informal sector although its coefficient is positive.

Effect of Formal and Informal Credit Utilisation on Farmers' Productivity

This section provides an interpretation of the regression results from ordinary least square (OLS) estimate on the effect of credit (formal and informal) utilisation on farmers' productivity. The result of the R-square according to Table 9 shows that 47.9 percent of the variation of the dependent variable is explained by the explanatory variables. Again, formal credit used and informal credit used, age of cashew, age of cashew square, log farm size, household size, seed type and education were seen to be statistically significant while agrochemical and marital status were statistically not significant.

According to Table 9, formal credit used has a positive and significant influence on productivity at 10 percent significant level. This can be explained as, an increase in the amount of formal credit used by GH1 increases cashew farm productivity by 34.6 percent. This implies that formal credit utilization helps farmers to support financially their production activities which in effect helps to increase farm productivity. According to Akudugu (2012) farmers utilize formal credit to invest confidently in agricultural production technology which as a result increase productivity in terms of output. This corroborates the findings of this study. Also, informal credit used is seen to have a positive and 1 percent significant influence on productivity according to Table 9. This shows that an increase in the amount of informal credit used by GH1 increases the productivity of cashew farmers by 43.3 percent. This means that when a farmer borrows credit

from the informal credit sector and utilize it on the farm, it has a significant influence on farm productivity. The positive and significant relationship between informal credit utilization and cashew farm productivity is consistent with the findings of Khoi *et al.* (2013) who found informal credit utilisation to have a significant effect on productivity.

Table 9: Effect of Formal and Informal credit utilisation on Farmers' productivity

VARIABLES	productivity	productivity
Formal credit used	0.346* (0.182)	
Informal credit used		0.433*** (0.117)
Farmers' age	0.083** (0.033)	0.086** (0.033)
Age of farmers sq.	-0.002** (0.001)	-0.002** (0.001)
Logfarmsize	0.036*** (0.006)	0.034*** (0.007)
Household Size	0.423 ** (0.178)	0.353* (0.180)
Marital status	0.165 (0.387)	0.423 (0.401)
Local and improved seed	0.304*** (0.110)	0.363*** (0.114)
Agrochemical	0.080 (0.212)	0.201 (0.155)
Education	0.317*** (0.110)	0.256** (0.108)
FBO	0.230** (0.108)	0.183 (0.112)
Constant	7.024*** (0.274)	6.846*** (0.264)
Observations	76	172
R-squared	0.431	0.474

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Source: Field Survey (2020)

Comparatively, according to Table 9, the effect of informal credit utilisation on cashew farmers' productivity is 8.7 percent times higher than formal credit utilization in the study area. This means that a farmer who used informal

credit increases productivity more than a farmer who used formal credit. Various reasons could account for the difference. Formal credit requires a lot of paper works and consideration before loan application is granted which delays the credit needed to make farm investment on time unlike the informal credit source where loan application involves no paper works but based of relationship and trust. Its delivery is on time and readily available. Since agriculture production is time and seasonal in nature, when credit is granted on time, farmers are able to undertake the necessary farm investment which translate positively to increasing farm productivity. The results is consistent with the findings of Akudugu (2016) who found the effect of formal credit to be lower than informal credit.

Log farm size, according to Table 9 has a positive and 1 percent significant effect on productivity. This explains that a percentage increase in an acre of farm size will result to an increase in cashew productivity by 3.4 percent. The findings of the study is similar with the findings of Akudugu (2011) who found a positive relationship between farm productivity and farm size.

The age of a farmer is seen to have a positive coefficient and 5 percent significant influence on farm productivity while age of a farmer square is seen to have a negative coefficient and it is negatively significant at five percent. This implies that a farmers' age has a diminishing effect on productivity, that is, as a farmer grows by an additional year, productivity increases by 8.3 percent. From Appendix A, productivity increases from 0 to 20 years but beyond 21 years, productivity start diminishing by 0.2 percent as a farmer grows by an additional year.

Seed type plays a vital role in cashew production. The results of the study shown in Table 9 reveals that adopting or planting local and improved seed variety of cashew has a positive and 1 percent significant effect on cashew productivity. This means that a farmer who cultivate local and improved variety of cashew seed increases productivity by 36.6 percent. The results is consistent with the findings of Armah (2018) who found seed type to be a significant determinant of cashew productivity. He found that planting both local and improved variety of cashew is a significant contributor to cashew farm productivity.

All other things being equal, a farmer who has attain some form of formal education is likely to understand basic farming techniques. As shown in Table 9, education has a positive coefficient and it is statistically significant at 5 percent. This implies that attaining some form of formal education at any form increases the productivity of cashew farmers by 22 percent. This can be explained to mean, farmers having attained some form of formal education will have better understanding of adopting improved and advanced method of farming. The results corroborate the findings of Reimers and Klasen (2013) who found education to increase agricultural productivity by 3.2 percent.

From the results, formal and informal credit utilization which are the main indicator variable are seen to have a positive and significant effect on cashew productivity. Other variables such as log farm size, education, farmers' age, age of farmer sq. and seed variety (local and improved) also have significant effect on cashew productivity.

Identification and ranking of constraints to credit utilisation faced by farmers

From the pre-test conducted for this study, a number of constraints were identified. It was revealed that farmers after accessing credit, do not spend all the loan amount on only cashew production but on other activities as well. Farmers asserted that these had some degree of consequence on their operation. However, there were mixed feeling and reactions about the number of constraints identified depending on the geographical location of the farmer. Some farmers asserted they spent part of their money on fire belts to prevent bush fires from attacking their farms which increases expenses on labour cost, others too said, school fees payment, health upkeep, funeral activities, and wedding activities limit them from spending all the loan amount on cashew farming.

Kendall's coefficient of concordance was used to rank the mean of the various constraints identified; Chi-square test was used to test the significance of the constraints at 0.05 significance level in the study. 59.2 percent of respondents agreed to the constraints identified in the study which is consistent with literature, confirmed in studies conducted by (Keelson, 2017; Atakli, 2018; Amoah 2019).

Constraints such as price fluctuations, frequent fire outbreak, poor producer price, high cost of labour, high cost of input, marriage activities, school fees payment, funeral activities and health upkeep were selected for this study. The constraints faced by farmers were ranked on a scale of 1 to 5, with 1 being the least pressing constraints and 5 being the most pressing constraints. The most pressing constraints to credit utilization occupying 1st and 2nd position faced by

farmers were price fluctuation and high cost of labour while the least pressing constraints to credit utilization occupying 8th and 9th faced by farmers were funeral activities and wedding activities. The constraints faced by farmers are discussed in Table 10.

Table 10: Mean Rank of Constraints

Constraints	Mean Ranking	Rank
Price fluctuation	7.51	1 st
High cost of labour	7.20	2 nd
Frequent fire outbreak	6.48	3 rd
Poor producer price	6.17	4 th
Health upkeep	4.90	5 th
High cost of inputs	4.07	6 th
School fees payment	3.93	7 th
Funeral activities	3.29	8 th
Marriage activities	1.45	9 th

Source: field survey, 2020

N= 149; df=3; Rank 1=most pressing constraint; Rank 9 =least pressing constraint; Kendall's W=0.592; chi square (χ^2)= 706.155; Level of sig=0.05

The most pressing constraints identified in the study according to Table 10 is price fluctuation. Farmers expressed their dismay and frustration with the prices of cashew during the marketing season. According to farmers, prices plummet more than three times in a week which affect their projection and put them at higher risk in defaulting the loans or credit they accessed for the production season and as a result divert parts of borrowed funds into other economic

activities. This confirms the assertion by Peprah *et al.* (2018) who reported that price fluctuation is a major pressing constraint faced by cashew farmers in the Jaman South district in Ghana.

High cost of labour is seen from Table 10 as the second most pressing constraints faced by farmers. It was observed that cashew farmers request for the service of labourers to support farming activities such as pruning, weeding and harvesting. Labourers charge farmers according to the kind of activities performed and the distance to the farm from home. The charges range from GH25 to GH60 per person per day. Farmers confirmed the charges were too high and this has affected their productivity and income negatively putting them at risk of defaulting repayment of the loan accessed. Again, according to the respondents, due to the high cost of labour, they sometimes were left with no option than to leave their fallen cashew fruits on their farms to rot than to hire labour at higher cost to pick and gather the fallen fruits which when they sell, contributes nothing significant to their income. This had led to a reduction in income, reduction in total yield and have reduced their credit ratings in the sight of lenders, making them unable to access credit and also increase the amount of credit they want to access. This corroborates the findings of Keelson (2017) who found high cost of labour to be a pressing constraint among smallholder cocoa farmers.

The least pressing constraints to credit utilization faced by farmers according to Table 10, were funeral and marriage activities. According to farmers, they spent part of the loan amount on these social activities which limit the amount of money they spend on cashew farms, which eventually, reduce their

yield. However, these were least among the constraints because the geographical, ethnic and religious background influence the extent of constraints a farmer will face. Aged farmers were spending on health and attending funerals, youthful farmers were spending on school fees among others.



CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Introduction

This chapter provides a summary of major research findings, conclusion and policy recommendation and suggestions for further research

Summary

The objective of the study was achieved by describing the socio-economic characteristic of cashew farmers, ascertaining the purpose of credit acquisition among cashew farmers, factors that affect access to formal and informal credit and examining the constraints to credit utilization.

Descriptive statistics such as standard deviation, mean, percentages and graphs were used to describe the socio-economic characteristic and the purpose for credit acquisition. Bivariate probit model was adopted to determine factors that affect access to formal and informal credit, OLS regression model was used to compare the effect of formal and informal credit utilization on cashew farmers' productivity. Kendall's coefficient of concordance was used to examine the constraints to credit utilization.

It was revealed from the study that majority of cashew farmers in the study were males, had attained formal education, engaged in other economic activities, did not belong to Farmer Based Organization, had savings account, used agro chemical and were married. Cashew farmers in the study area had an average age of 48 years, average household size of 6, average farm size of 8 acres, average cashew tree age of 10 and an average output of 2112 kg per year.

The results revealed that the formal and informal sources of credit available in the study area were Rural Banks, Microfinance, Commercial Banks, Credit Unions and friends, relatives, money lenders (purchasing clerks), farmer groups respectively. Informal source of credit supplied an average amount of GH 583.193 while the formal source of credit supplied GH 1203.193. Among the formal credit, 64.52 percent secured loan from credit unions while in the informal sector 77.31 percent secured loan from money lenders (purchasing clerks). Among the respondents who secured, credit, 48.32 percent spent the money on cashew farming only while 51.68 percent spent the money on cashew farming and other economic activities.

Bivariate probit model revealed that savings account and assets jointly influence access to formal and informal credit in the study area. Specifically, access to formal credit is significantly influenced by FBO, farm size and educational status. Sex positively influences access to informal credit and engaging in other economic activity has a negative significant influence on access to informal credit.

The results of OLS regression revealed that, formal and informal credit utilization has a significant effect on farmers' productivity. The null hypothesis that the key indicator variable, formal and informal credit utilization has no significant effect on farmers' productivity was rejected. Other inputs such as age of farmer, age of farmer sq., log farm size, household size seed type was seen to have a significant effect of farmers' productivity while agrochemical and FBO had insignificant effect of farmers' productivity.

Kendall's coefficient of concordance was used to rank constraints to credit utilization faced by farmers. The results revealed that the most pressing constraints occupying 1st and 2nd position faced by farmers were price fluctuation and high cost of labour while the least pressing constraints occupying 8th and 9th faced by farmers were funeral activities and wedding activities.

Conclusions

Cashew farming in the study area is dominated by males. Cashew farmers have attained formal education, engaged in other economic activities, did not belong to Farmer Based Organization, had savings account, used agro chemical and are married.

Farmers' borrow more from the informal sector, however, the formal sector supplies the highest amount of credit. Farmers divert some of the amount of money borrowed in to other activities rather than the purpose for which it was acquired.

Access to formal credit is significantly influenced by being a member of FBO, farm size and educational status, Sex positively influences access to informal credit and engaging in other economic activity has a negative significant influence on access to informal credit. Savings account and assets ownership jointly influence access to both formal and informal credit.

Formal and informal credit utilization as key indicator variable has a significant effect on farmers' productivity. However, the effect of the use of informal credit on farmers' productivity is higher in magnitude as compared to formal credit use.

The most pressing constraint to credit utilization faced by farmers is price fluctuation while the least pressing constraints faced by farmers is wedding activities.

Recommendations

The following recommendations are made for policy direction and action to be taken;

Stakeholders in the cashew industry such as (MoFA, NGOs and Ghana Export Promotion Authority) supporting and promoting the cashew industry should sensitize and educate farmers on the need to join FBO.

The Government of Ghana must take conscious steps to formulate policies geared towards increasing credit to farmers. The core mandate of these institutions, ADB, NIB and Rural Banks should be revisited and assessed critically.

The government must set up Cashew Board to control and regulate the price of cashew as it has been done for the cocoa sector where COCOBOD control and regulate the price of cocoa which is also a cash crop.

Farmers should adopt planting both local and improved variety of cashew because it was established from the study that planting both local and improved variety of cashew has a significant effect of cashew productivity.

Suggestion for Further Research

The study covered two districts out of eleven districts in the region. It is suggested that further research should attempt covering more districts in the

region to give a comprehensive overview of the effect of the use formal and informal credit on cashew farmers' productivity.

The study was limited to compare the effect of the use of formal and informal credit on cashew farmers' productivity. Further research should combine the use of formal and informal as one variable (credit) and compare it with non-users of credit to ascertain the effect on cashew farmers' productivity.



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APPENDICES

APPENDIX A

As seen from the coefficient age square, as the farmer grows by additional year, productivity increases up to point and eventually diminish. The turning point of diminishing returns of productivity is arrived at by differentiating the productivity function with respect to age of the farmer, the turning point of farmer's age is calculated below;

$$\frac{d(\text{productivity})}{d(\text{farmers' age})} = \beta_5 + 2\beta_6 \text{Age}$$

β_5 = The coefficient of age of a farmer

β_6 = The coefficient of age of farmers' sq.

$$\frac{d(\text{productivity})}{d(\text{farmers' age})} = 0.083 + 2(\text{age})$$

$$\text{Turning point} = \frac{0.083}{2(0.002)}$$

$$\text{Turning point} = \frac{0.083}{0.004}$$

$$\text{Turning point} = 20.75 \text{ year}$$

APPENDIX B

OVTEST

Ramsey RESET test using powers of the fitted values of Productivity

Ho: model has no omitted variables

F(3, 174) = 2.88

Prob > F = 0.3076

LINKTEST

Productivity	Coef.	Std.Err.	T- STATISTIC	P>t	Confidence Interval
hat	2.334	1.006	2.320	0.021	4.319 0.349
hatsq	-0.087	0.066	-1.330	0.185	- 0.217
cons	-5.063	3.848	-1.320	0.190	2.528 12.653

Variance inflation factor

VARIABLES	VIF	1/VIF
FBO	1.769	0.565
FARMSIZE	1.489	0.672
SEEDTYPE 3	1.429	0.7
IQA23 2	1.393	0.718
FORMAL Credit	1.365	0.733
HOUSEHOLD COM	1.315	0.76
AGROCHEMICAL	1.226	0.816
EDUCATION	1.189	0.841
INFORMAL credit	1.144	0.874
IQA15 2	1.133	0.883
Mean VIF	12.825	.

APPENDIX C

UNIVERSITY OF CAPE COAST
 COLLEGE OF AGRICULTURE AND NATURAL SCIENCES
 SCHOOL OF AGRICULTURE
 DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

INTRODUCTION

This questionnaire seeks to conduct a **comparative analysis of the effect of formal and informal credit on smallholder cashew farmers’ productivity in the Bono East Region of Ghana**. I request your participation in the study by filling or responding to questions in the questionnaire during an interview. Any information given for this study will be used for academic purpose and it will be treated with utmost confidentiality. You are assured that any information given will not be shared with a third party neither will it be used against you. **CONSENT**

If you accept the above statement, kindly, sign or thumbprint as an evidence of your willingness to participate in the study.

Sign/Thumbprint.....

Date.....

Section A: Socio-Economic and demographic characteristics of Respondents

A1.	Sex	i. Male [] ii. Female []
A2.	Age of respondent (Years)	
A3.	Marital status	i. Married [] ii. Not Married []
A4.	Level of Education	i. Educated [] ii. Not Educated []
A5	How many years of experience do you have in cashew farming?	
A6	What is the composition of members of your	i) Adult Males ii) Adult Females

	household?	iii) Children (under 18)
A7	Which of the following people support your farm Activities	i) Family Members [] ii) Labourer [] iii) Both Family Member & Labourers
A8	Age of cashews farm (years)	
A9	Is cashew farming your only source of livelihood?	i. Yes [] ii. No []
A10	If no, what other form of livelihood activities are you engaged in	i. Civil Servant [] ii. Public servant [] iii. Private worker [] iv. Other (Specify).....
A11	What other crops do you grow apart from cashew?	I. grains and cereals [] ii. Fruits and Vegetables [] iii. Roots and Tuber [] iv. Oil palm [] V. others (specify).....
A12	Why do you grow these crops?	i. Food [] ii. Income [] iii. It is less expensive to cultivate [] iv. Other specify.....
A13	What is the nature of ownership of the land you are producing your cashew on? (choose all that apply)	i. Own land [] ii. Family land [] iii. Rented land [] iv. Shared cropping [] Others (Please Specify).....
A14	What is the total land size (acres) allocated to cashew farming?	
A15	What type of varieties was used in the cultivation of the cashew crop	i. Local variety [] ii. improved variety [] iii. both Variety of cashew seed []
A17	Do you apply agrochemical on your farm?	I. Yes [] Ii. No []
A18	If yes what kind of agrochemical?	I. Pesticides [] Ii. Weedicide [] Iii. Others []
A19	Do you apply fertilizer on your farm?	I. Yes [] Ii. No []
A20	If yes what kind of fertilizer?	I. NPK [] Ii. Foliar [] Iii. Others []

A21	Do you have savings account?	I. Yes [] II. No []
A22	If yes, where do you save?	i. Commercial banks [] ii. Rural bank [] iii. Susu [] iv. Mobile Money v. Other (specify).

<i>Do you have any contact with the following type of Institutions?</i>		<i>Did you have access to these institutions?</i>	<i>How many times do you receive extension visit or services</i>
A23	Extension Services	i. Yes [] ii. No []	i. 4-6 times in a year [] ii. 7+ times in a year [] iii. Other specify
A24	Farmer Based Organisation Name:	i. Yes [] ii. No []	i. 1-3 times in a year [] ii. 4-6 times in a year [] iii. 7+ times in a year [] iv. Other specify.....
Do you own any of the following Household assets?			
A25	Assets	TICK	
<i>Farm Assets</i>			
	Spraying machine		
	Irrigation pump		
	Tractor		
<i>Household Assets</i>			
	house		
	car		
	television		
	Refrigerator		
	Deep freezer		
	Jewellery		
	Uncut Cloth		
<i>General Assets</i>			
	motorcycle		
	bicycle		
	Mobile phone		
	Land (Non-farm)		

Section B: ACCESS TO CREDIT AND SOURCES OF CREDIT TO CASHEW FARMERS

B1	Did you receive credit in 2019?	i. Yes [] ii. No []				
B2	Did you receive credit from the formal source?	i. Yes [] ii. No []				
B3	Did you receive credit from the informal source?	i. Yes [] ii. No []				
B4	What was your purpose for credit acquisition?	i. Cashew farming [] ii. School fees [] iii. Social activities [] iv. Health [] v. Other farming activities []				
B5.	Indicate your Sources of Credit, Amount of Money Requested, Amount Received, payment mode and default penalties					
	Source of credit	Tick	Amount Requested	Amount Received	Amount spent on cashew farm	Default penalties
B5a	<i>Formal sources</i>					
	Rural banks					
	Micro finance					
	Commercial Banks					
	Credit unions					
	MASLOC					
	Others.....					
B5b	<i>informal sources</i>					
	Friends					
	Relatives					
	Moneylenders (purchasing clerk)					

	Farmer groups					
	Others.....					
B6.	What condition was required before credit was granted?	i. Collateral	[]			
		ii. Credit worthiness	[]			
		iii. Guarantor	[]			
		iv Group member	[]			
		v. Others (specify).....				

SECTION C: EFFECT OF CREDIT ON PRODUCTIVITY

C1		2019
	Total harvest of dry nut from farm (bags)	
	Total harvest bought by LBC (bag)	
	Output price (per bag)	

Section D: CONSTRAINTS TO CREDIT UTILIZATION

Please indicate your level of agreement to the constraints you faced to credit utilization?	extremely low	low	moderate	high	extremely high
Unfavourable weather condition	1	2	3	4	5
Lack of access to extension agent	1	2	3	4	5
Poor producer price	1	2	3	4	5
High cost of inputs	1	2	3	4	5
High cost of labour	1	2	3	4	5
School fees payment	1	2	3	4	5
Health upkeep	1	2	3	4	5
Funeral activities	1	2	3	4	5
Wedding activities	1	2	3	4	5
Others	1	2	3	4	5