

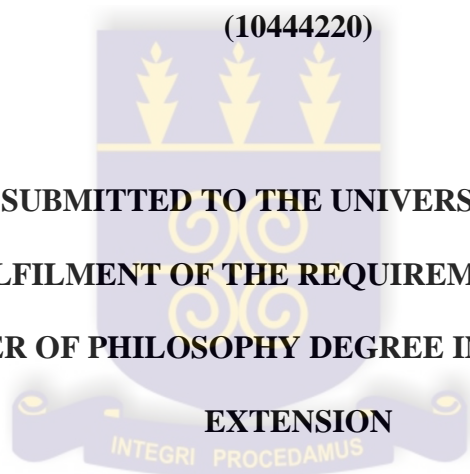
**THE INFLUENCE OF AGRICULTURAL INFORMATION SOURCES ON THE  
PRACTICES AND LIVELIHOOD OUTCOMES OF CASSAVA FARMERS IN  
UPPER WEST AKIM DISTRICT**

**BY**

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**THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON  
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**DEPARTMENT OF AGRICULTURAL EXTENSION  
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**JULY, 2015**

**DECLARATION**

I, Grace Antwi, author of this thesis, do hereby declare that, the work presented in this thesis, with the exception of the identified quotations, is a product of my own research, written entirely by me under supervision in the Department of Agricultural Extension, College of Basic and Applied Science, University of Ghana. None of the materials contained herein, has been presented either in whole or in part for any other degree in this university or elsewhere.

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## ABSTRACT

Cassava farmers in the district have a variety of information needs; however, these information requirements are unmet by the public extension agents who are mandated to deliver agricultural information to the farmers. The main objective of the study was therefore to determine the sources of agricultural information available and its influence on the farm practices and livelihood outcomes of the cassava farmers in the district. The survey research methodology was employed, and used multi-stage sampling to select 200 farmers from the communities for the study. Primary data was collected using structured questionnaires. The data collected was stored and analyzed using SPSS Version 21 Software. Both descriptive and inferential statistical tools were used in analyzing the data. Chi-square test of independence was the main inferential statistical tool employed in the analysis of the data because most of the variables of interest were measured on nominal and ordinal scale. The study showed that the sources of agricultural information mainly used by the cassava farmers were fellow farmers (82%), radio (66%), agricultural extension agents (46%), input dealers (38%) and with the least source used being newspapers/agricultural bulletins (6.5%). The study also found that age, farming experience and land tenure arrangement of the farmers significantly influenced sources from which agricultural information were obtained. It was also noted that, although, majority of the farmers sourced for agronomic, market and credit information, it was only credit information which was found to have a significant influence on the farm practices undertaken by the farmers. A statistically significant relationship was observed between farmer's agricultural practice and their level of yield and income but not well-being and food security. It

was recommended that extension officers in the district should extend credit information to the farmers and assist them to access credit. This may ensure that agricultural information obtained by the cassava farmers can be put into practice in other to improve their livelihood outcomes.



## DEDICATION

I dedicate this work to my lovely husband Mr George Kofi Ntim for his enormous support in diverse ways, my mother Madam Esther Dankwaa for her care and my son Kristodea Kwesi Agyemang Ntim.



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May the good Lord bless you all and enrich your folds. Amen!

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## LIST OF ABBREVIATIONS

ABL	Accra Breweries Limited
AEM	Agricultural Environmental Measures
CRI	Crop Research Institute
DFID	Department for International Development
FAO	Food and Agriculture Organisation
FCUBE	Free Compulsory Universal Basic education
GDP	Gross Domestic Product
GGBL	Guinness Ghana Breweries Limited
GSS	Ghana Statistical Service
IFAD	International Fund for Agricultural Development
ICT	Information Communication Technology
ISFM	Integrated Soil Fertility Management
MOFA	Ministry of Food and Agriculture
NHIS	National Health Insurance Scheme
PSI	President Special Initiative
RTIMP	Root and Tuber Improvement and Marketing Programme
SRID	Statistics Research and Information Directorate
SPSS	Statistical Package for Social Sciences
UNCTAD	United Nations Conference on Trade and Agricultural Development
WAAPP	West African Agricultural Productivity Programme

## **CHAPTER ONE**

### **BACKGROUND**

#### **1.0 Introduction**

The chapter gives an overview of cassava production in Ghana and its importance, farmer's agricultural information needs and sources. It also presents the research problem, research questions, objectives and the significance of the study.

#### **1.1 Cassava in the economy of Ghana**

In Ghana, majority of the population lives in rural areas where agriculture serves as their main source of livelihood and survival (Nelson and Agbey, 2005). Ghana's agriculture is mainly characterised by small scale producers, with an average farm size of about 1.2 hectares. The small holder farmers account for about 80% of domestic production (MOFA, 2010). The ultimate purpose of production for these farmers is to meet the household's immediate food needs before considering any other interest. The small holder farmers are engaged in the cultivation of diverse food crops among which cassava serves as one of the most important crop. Cassava was brought to Africa in the 16th century where it suddenly became one of the most important food crops. The crop can be found in all tropical regions around the world including Ghana. In Ghana cassava is cultivated in eight regions with the exception of Upper East and Upper West Region. It is either planted as a mono crop or intercropped with other crops such as maize and beans. Cassava is the third largest source of food carbohydrate after rice and maize. It serves as an important commodity in the diet of many Ghanaian's with an estimated per capita consumption of 151.4kg (Sagoe, 2006).

Cassava production contributes significantly to incomes and rural livelihoods for both men and women (Kleih, Phillips, Wordey and Komlaga, 2013). It offers employment, food and income for farmers, processors and distributors along the value chain. According to Anaglo (2011) more than 70% of Ghanaian farmers depend on cassava farming and processing as part of their livelihood activities. The relative importance of the crop stems from its adaptability to a wide range of agro-ecologies, including marginal lands and erratic rainfall conditions. The plant can withstand intense drought making it a tolerant crop. It can also be produced on small scale without the need for mechanization, thus exclusively produced by low-income small holder farmers (FAO, 2013).

Ghana is the 6<sup>th</sup> largest producer of cassava in the world in terms of value, with the commodity constituting 22 per cent of Ghana's Gross Domestic Product (GDP). Cassava is one of Ghana's main staple crops with an annual production above 10 million metric tonnes (Angelucci, 2013). Incomes from cassava production and post-harvest processing represent around one fifth of Ghana's agricultural GDP. The crop which was mostly grown by poor farmers on marginal lands has become a multipurpose crop that responds to the priority of many countries including Ghana. Cassava has been earmarked as a food security and industrial crop with the potential of transforming the livelihoods of thousands of farmers. It is becoming an important cash crop with the potential for use as an industrial raw material for the manufacturing of starch and flour. It can also be utilised in different forms such as for the production of gari, agbelima, kokonte and fufu.

Currently, the crop is being used for the production of cassava beer by Guinness Ghana Breweries Limited (GGBL) and Accra Breweries Limited (ABL) a subsidiary of Diageo Plc and SABMiller respectively. All these products offer opportunities for cassava farmers



to increase their production, income and improve their livelihoods. However this has not been achieved although Ghana has the potential to increase annual production. MOFA (2013) indicated an average growth rate of about 6% in the production of the crop as a result of the activities of the Root and Tuber Improvement Marketing Project (RTIMP) and West Africa Agriculture Productivity Programme (WAAPP).

The average yield of the crop is estimated at 16.8mt/ha against the attainable yield of 48.7mt/ha under rain fed conditions (MOFA, 2013). It is obvious that current crop yield lags far behind the attainable potential yield. An improvement in yield will require a change in farmers' attitude towards the traditional methods of production and the adoption of recommended management practices. This can be achieved through extensive education. It is said that the available technologies on production of the crop, if adopted by farmers can enhance production considerably. However, access to information is a potential for improving farmers implementation of innovative practices to increase yield (Sharma, Jha, Kumar, Sachan and Kumar, 2008). Inadequate access to information may be a factor responsible for the low production levels because of how far farmers' progress in their farm enterprises depends largely on the availability of and access to accurate and reliable information (Oladije, 2011).

## **1.2 Agricultural information needs and sources**

Farmers have diverse information needs and the information needs vary between market oriented, transitional and subsistence based farmers. Soyemi (2014) mentions that women farmers' information need cut across production, post planting, marketing, sales and policy oriented information. In fact every aspect of the agricultural production cycle requires

exchange and communication of information. The diverse information needed by farmers for the daily running of their activities renders them unproductive if unmet.

According to Marker et al. (2002) as cited in UNCTAD (2010), lack of information can also contribute to poverty. Lack of information adds to the vulnerability of farmers therefore, rural farmers need to have access to information that is efficient for their livelihoods. In recognition of the importance of agricultural information for farm productivity the government of Ghana and WAAPP established the innovative e-extension programme. The programme was to enhance farmer's access to agricultural information but coverage and access to the service remains a challenge. Agricultural information/technologies are mainly developed by the state research organization, universities, agricultural colleges, some non-governmental organization and farmers in Ghana. Farmers receive this information mainly from agricultural extension agents but in spite of the immense contribution of the public extension service, access to improved agricultural information by farmers still remains a challenge. Farmers therefore rely on other sources for information. The relevance of the various sources of agricultural information available to farmers has been the focus of research over the years, however most of the available literature focused on farmers access to the various information sources and their most preferred source of information (Sharma et al. 2008; Ayoda, 2010; Bawa, Ani, and Bzugu, 2014; Anaglo, Boateng and Boateng, 2014). Research has shown that by and large farmers' information exposure is most likely to be an important factor influencing their adoption of improved practices (Iran, Muhammad, Khan and Asif, 2006).

Therefore there is the need to investigate the information sources available to the farmers and its influence on their practices and livelihood outcomes.

### **1.3 Statement of the problem**

In Ghana majority of people live in the rural areas with their livelihoods linked to agriculture of which Upper West Akim is not an exception. Upper West Akim is predominantly known for the cultivation of cassava. Cassava farming serves as one of the major livelihood activities for the people. However, despite the major contribution of the crop in stimulating growth to both the individual and the nation its production is faced by a number of challenges. Cassava farming is mostly dominated by small holders who use traditional methods of cultivation. This results in low production output which affects the income of farmers. Also are the issues of land acquisition, access to credit, low yields, root price instability, cost of root production, cost of processing and availability of means of transport (Kleih, Phillips, Wordey and Komlag, 2013). Other identified problems are market access and diseases which also constrain efficient production (ACET, 2013).

To curb these problems, several initiatives have been undertaken to improve the production of the crop. The Crop Research Institute (CRI), RTIMP, several NGO's and bilateral partners in Ghana have undertaken diverse research on the crop to come up with technologies and management practices that will help improve production. Although extensive research has been carried out on cassava, impact on production has been low and farmers continue to use traditional methods of production which leads to low yields. The low levels of adoption of these technologies are said to be among the major problems affecting agricultural development in Ghana. Masambuka-Kanchewa, (2013); Koskei,

Langat, Koskei and Oyugi, (2013) indicated limited access to information as one of the major factors that affects farmers' adoption of innovative practices. Agricultural information is therefore important to increase uptake of innovations but farmers in Upper West Akim rarely feel the impact of agricultural innovations probably because they have no access to such vital information or because it is poorly disseminated. The cost of information from planting decision to marketing can make up 11% of the total production cost (De Silvia and Ratandiwakara, 2008) hence; information plays an important role in cassava production.

In Ghana, the Ministry of Food and Agriculture (MOFA) is the major source of information to farmers, but is faced with numerous constraints. One of such constraints relevant to this study is the low extension officer to farmer ratio. The inadequacy of extension personnel in the district results from the deficit in the national extension officer to farmer ratio 1:1500 (MOFA, 2013). This situation prevents extension staff from meeting the needs of all farmers with provision of extension education. As a result farmers rely on other sources for the information they need. The lack of access to timely, accurate and relevant agricultural information results in poor farm practices which affects yield and subsequently the income and wellbeing of the farmers.

Furthermore, in investigating farmer's information sources and use it is necessary to identify farmers' attitudes toward the various information sources because farmers are clearly not a homogenous group, and understanding the specific factors that influence their selection of information sources, access and use is very crucial (Zarmai, Okwu, Dawang,

and Nankat, 2014). Ngathou, Bukenya and Chembezi (2006) indicated that farmer characteristics have an influence on the sources of information farmers consider valuable. Mittal and Mehar (2015) also revealed that socio economic characteristics such as age, level of education and farm size are significantly related to a farmer's decision to use agricultural information from different sources.

Additionally, Babu, et al. (2012) observed that an individual's information search characteristics and how the information is converted into specific practice through use translate into final welfare outcomes such as farm productivity and income. However, concerns persist that different management practices lead to differences in the yield (Assuming-Brempong, 2010), income and subsequently well-being of farmers thus the need to investigate.

#### **1.4 Main Research Question**

The following research questions were derived from the problem statement above with the main research question being; "To determine the influence of agricultural information sources on the farm practices and livelihood outcomes of cassava farmers".

#### **1.5 The specific questions;**

- i. What are the sources of agricultural information available to the cassava farmers?
- ii. How do the personal characteristics of the cassava farmers influence their access sources of agricultural information?
- iii. Does the type of information accessed by the farmers influence their farm practices?

- iv. Does the farm practice of the farmers influence their livelihood outcomes?

### **1.6 Main Research Objective**

The main objective of the study is to determine the sources of agricultural information and its influence on the farm practices and livelihood outcomes of cassava farmers in the Upper West Akim District.

### **1.7 The specific objectives:**

- i. To identify the cassava farmers' sources of agricultural information
- ii. To determine the influence of farmer characteristics on their sources of agricultural information.
- iii. To determine the relationship between the types of agricultural information accessed and the farm practices of the cassava farmers
- iv. To examine the relationship between the cassava farmers farm practices and their livelihood outcomes.

### **1.8 Significance of the Study**

In this modern information age, having access to information is critical to achieve economic development. Agricultural Information plays an important role in agricultural development and the public extension service is tasked to deliver that information to farmers. However the high cost of extension and limited funding for extension education in Ghana prevents this objective from being achieved which is a matter of concern. The inability of extension service to satisfy the information needs of farmers presents a gap which needs fulfilling hence farmers rely on other informal information sources to satisfy

that need. Knowing the sources of information available to farmers and their channel of communication will enable agricultural programme developers to channel interventions targeted at farmers through the appropriate medium. It is also important for policy makers to understand the existing information services providers in the district to ascertain their usefulness in disseminating new technologies. This will serve as a guide to policy makers in agricultural development to develop appropriate strategies that must be pursued to ensure farmers' access to information in the area of study and country at large. Finally it will add to the body of knowledge on the effect of agricultural information access on livelihoods and also provide the reference for further research.

### **1.9 Operationalization of terminologies**

**Information Source:** refers to an individual or an institution that initiates a communication scenario. It could be the research institute or extension agent or even an individual farmer who purvey relevant agricultural messages to other farmers.

**Access:** the availability of agricultural information from different sources and the ability of cassava farmers to make use of the information.

**Household food availability:** sufficient quantities of food available on a consistent basis.

**Household food affordability:** having sufficient resources to purchase non-cultivated household food items for a nutritious diet.

### **1.10 Organization of the study**

Chapter one gives a general introduction to the study. This includes the background, problem statement, the research questions and research objectives. It concludes with the significance of the study. Chapter two is devoted to a review of literature that underpins the concepts used in the study. Chapter three deals with methodology, precisely the research design used, sampling procedure, study population and how data was gathered and analyzed. Chapter four presents the findings of the study and Chapter five finally presents a summary of the entire thesis and draws out major finding and conclusions of the study.



## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.0 Introduction**

This chapter presents the conceptual framework of the study which shows the interrelationships between the variables conceptualized by the researcher to have effect on the phenomenon under investigation. This is followed by the theoretical perspective for the study and finally literature reviews with regard to the concept of agricultural information, sources of agricultural information, personal factors that influence access to and use of information from the various sources and the influence of the information use on the practices and livelihood outcomes of farmers.

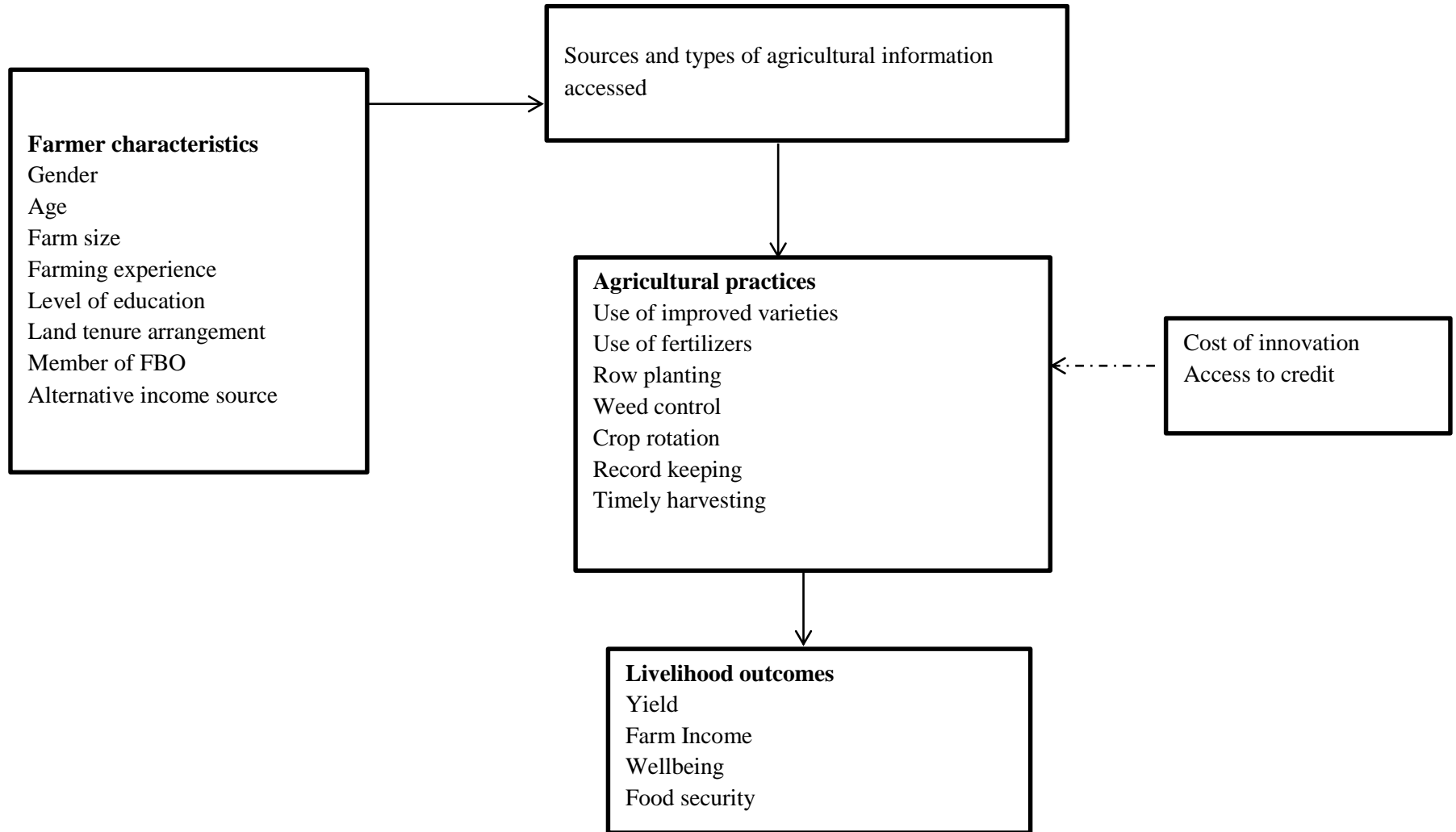
#### **2.1 Description of the conceptual frame work**

Concepts are the building blocks of models or theories. A conceptual framework is an interconnected set of ideas (theories) about how a particular phenomenon functions or is related to its parts. The framework serves as the basis for understanding the causal or correlational patterns across events, ideas, observations, concepts, knowledge and other components of experience (Svinicki, 2010, p 5). It also guides the study in investigating the relationship between the key variables.

Drawing on available literature on agricultural information access, it was found that socio economic factors influence farmers' access to agricultural information (eg Ngathou, Bukonya and Chembezi, 2006; Ayoade, 2010; Mittal and Mehar, 2015). The researcher therefore conceptualize socio-economic factors (gender, age, level of education, farming

experience, farm size, alternative income source, land tenure arrangement) have influence on the farmer's sources of information. The sources and types of agricultural information accessed influence the farmer's farm practices based on the use of the information. The researcher further conceptualizes that the farm practices undertaken by the farmers will have an influence on their livelihood outcomes such as yield which is likely to influence their income, well-being and food security. The conceptual frame work for the study is shown in Figure 2.1 on the next page.

**Figure 2.1: Conceptual framework**



Source: Author's conceptualization

## **2.2 Theoretical Approach**

The theoretical approach used to guide the study is drawn from selected components of the diffusion of innovation theory and the social learning theory. While different in their orientations and uses, each makes a unique contribution to the understanding of farmers' information search and use habits.

### **2.2.1 The Diffusion of Innovation theory**

The diffusion theory developed by E. M. Rogers in 1962 is one of the oldest theories in social science. It explains how an idea over time gains momentum and spread through a population or social system. According to Rogers (2003), diffusion is the process where by an innovation such as an idea, a practice or new technology is communicated through certain channels over time among members of a social system. The theory explains the factors that influence the rate at which an idea/innovation is taken up by individuals. The end result of the theory is that people as a part of a population or social system adopt a new idea, product or behavior. For instance, the individuals in the social system who adopt an innovation first are referred to as the early adopters while those who are last to adopt are referred to as the laggards. The early adopters are mostly opinion leaders in the community who have influence on other members of the social system.

An innovation is an idea, a practice, behavior, an object, technology, product or services that is perceived new by individuals or the unit of adoption (Rogers, 2003). Therefore innovation could be a new cassava variety, an improved planting method or a new

pesticide. Rogers categorizes the attributes of an innovation that enhances its adoption into five: Relative advantage, Compatibility, Trialability, Complexity and Observability.

Innovations that are perceived by individuals as having greater relative advantage may be easily accepted by an individual. For instance if a new variety of cassava is introduced and the farmer perceived it as higher yielding than the local variety he is likely to adopt. Secondly the innovation should be compatible with the old or existing values or practice i.e. if it is a variety it should have some similarities with the old varieties. Thirdly the farmer then experiment or tries it on limited basis to observe the outcome. The outcome and the less complex the innovation, determines the rate of adoption.

Adoption of a new idea is caused by human interaction through interpersonal networks such as face to face communication. Face to face communication enables direct contact between the source and receiver of the information. An example is the exchange of information between a farmer and extension agent or farmer to farmer communication. The nature of the relationship between the information exchangers determines the conditions under which a source will or will not transmit the innovation to the receiver. If the initial adopter of an innovation discusses it with two members of a given social system and they equally pass on the information then the innovation spreads. Opportunities abound because of relative advantage but same does uncertainties as the innovation may not produce the expected outcome. Hence farmers weigh the cost and benefits before deciding on adopting an innovation. Another important element in the diffusion of innovations is the

communication channel. The communication channels used in the diffusion of an innovation may influence the rate of adoption (Rogers, 2003).

Communication is the process through which participants create and share information with one another in order to reach mutual understanding (Rogers, 2003). The communication of information occurs through channels and between sources. One of the possible ways of reducing uncertainties is accessibility to information which occurs either through interpersonal communication channels or mass media. Therefore the use of appropriate communication channel in the sharing of information plays a key role in influencing farmer's agricultural practice.

### **2.2.2 Application of the theory to the adoption of improved agricultural practices**

According to the diffusion of innovation theory, adoption is seen as a process. The theory helps to explain how farmers' access agricultural information and their use/adoption of improved agricultural practices. Farmers adopt practices that they are aware of and this can be achieved through the use of appropriate communication channels. Mass media as an information source for instance is appropriate in stimulating farmer's interest in an innovation. Interpersonal sources such as family and friends (social system) influence farmers' adoption of an innovative practice (Leuwis, 2004). According to Adebayo and Oladele (2012) the communication channels used in disseminating information about an innovation plays an essential role in its adoption. He stated that, mass media channels are used to create general knowledge about the innovation which helps to reduce uncertainty

whiles interpersonal channels are more effective in forming and changing attitudes towards the innovation as well as the making the decision to adopt or reject the innovation. These sources serves as the channels where the farmer seek more information about the innovation, assess and compares the old practice with the new practice, then finally decide whether to adopt the innovation or not.

### **2.3. Social learning Theory**

The social learning theory is based on the traditional behavioral theories which focus mainly on reinforcement. Bandura (1977) posited that learning is a cognitive process that takes place in a social context purely by observation or instruction even in the presence or absence of direct reinforcement. It also indicates that learning can occur by observation of a behavior and also by observation of the consequences of the behavior a process known as vicarious reinforcement. After observation of the behavior an individual makes a decision as to implement the behavior or not thus learning can occur without a change in behavior. In agriculture, social learning refers to learning that takes place through social interactions between a farmer and individuals in his social and economic network. According to the theory farmers observe the decisions and experiences of their fellows or people in their social network before adopting a technology. Such learning can influence a farmer's decisions at various stages such as choice of crops and inputs; method of input application; or any other form of technology adoption. Although learning might have occurred after the observation it may not necessarily lead to a change in behavior that is adoption of the practice or technology. The nature of the innovation, the information sources, channels of communication and the characteristics of the social groups are elements that can influence

technology adoption. Aside this, the output of the technology/practice is also an important factor that may influence its adoption.

## **2.4 Concept of agricultural information**

Agricultural information refers to sets of information and messages that are relevant to agricultural production activities of farmers such as crop production and protection, animal production and management, and natural resource production and conservation (Tadasse, 2008). Bawa, Ani, and Bzugu (2014) also conceive agricultural information as a productive resource that has the potential to limit and influence the efficiency of production. Drawing on these definitions, the researcher conceptualized agricultural information as information passed on to farmers through the public extension services and other information sources primarily to help farmers improve yield, income and subsequently living conditions.

Agricultural information is considered as an essential input to agricultural education, research development and extension activities. Different kinds of information are required by different kinds of users for different purposes. Information and knowledge in general is an important resource for development. In fact the relevance of information for effective agricultural development caused Rao (2006) to classify it as the fourth factor of production. The digital divide makes every activity in the modern world dependent on access to information and communication. The current issues of climate change coupled with dwindling natural resources calls for agricultural information that is not static but changes with the needs of time. Therefore agricultural activities can only be improved



through relevant, reliable and useful information (Opara, 2008). Access to timely, relevant information can alter people's decision making capacity which is critical to increase agricultural productivity (Kacharo, 2007). McNamara (2009) also opines that access to timely information about commodity prices and preferences of consumers enable farmers make informed production decisions as well as balance their investment. In fact, the progression of farmers in their farm enterprises depends largely on the availability of and access to accurate and reliable information.

According to Camble (1992) as cited by Sani, Omenesa, Sambo, Abdullahi, and Yuguda, (2015), farmers require information to be able to manipulate the factors of production such as land, labour, and capital resources into meaningful and productive use. Agricultural information influences agricultural productivity in various ways.

First of all, it helps farmers in making informed decisions concerning their labour and inputs to sustain growth of agricultural activities. Also, timely access to relevant market information helps increase the bargaining power and income of farmers (Aker, 2008, Zanello and Srinivasan, 2012). In addition, access to agricultural information is necessary to contribute to both food security and economic growth (Soyemi, 2014).

Sife, Kiondo and Lyimo-Macha (2010) mentions that accelerated communication of information, in the interplay with other factors, can increase productivity; enhance access to services; widen markets; simplify transactions; substitute for physical transport and create new socio-economic opportunities, among many other benefits.

## **2.5 Agricultural information sources**

Agricultural information sources refer to the various medium and channels through which farmers seek information on improve agricultural practices. According to Errington (1986) as cited by Solanoa, Leo, P e´rezd, and Herrero (2003) information sources are classified according to their origin: internal and external; according to their media: direct observation, verbal or written and according to their sources: recorded numerical data, comments from people and the decision-maker’s own past experience. Kapoor and Kumar (2015) also classified information sources as personal/impersonal commercial and non-commercial sources. The personal source comprises of fellow farmers/ friends, extension agents, sales persons, trade show and the impersonal made up of field demonstration, articles in print media and advertisement. For the purpose of this study the cassava farmers sources of agricultural information was categorized into interpersonal and mass media. Interpersonal sources refers to the process where farmers obtain information by face to face contact whiles mass media refers to information access through machine mediated such as radio, television and mobile phones.

Farmers have diverse information needs and this need influence their information seeking behavior and the sources which they seek for agricultural information. However their information source may be influenced by their cropping enterprise, location and availability. For instance, Opara (2008) revealed that farmers in Imo State of Nigeria access information from diverse sources but agricultural extension agents were ranked as their most preferred source of information. Similarly, Daudu, Chado, Igbashal (2009); Anaglo, Boateng and Boateng (2014a) reported extension agents as the most preferred

source of information by farmers. Ndagi, Oduwole, Taiwo, Muhammed and Rahman, (2013) indicated extension agents as the most important source utilized by farmers.

Contrary to these, Sharma et al. (2008) reported that personal sources like neighbours, friends, progressive farmers and opinion leaders played important roles in the transfer of technologies to farmers. The use of the sources by majority of the respondents was attributed to their credibility. Similarly, Lwoga, Stilwell, and Ngulube (2011) discovered family, friends and neighbours as the major source of agricultural information to farmers followed by the public extension staff. Ronald, Dulle and Honesta (2014) on the other hand, in their case study of rice producers in Tanzania identified family, personal experience, neighbours and agriculture extension officers respectively as key sources of information used by the farmers. Nenna (2014) also found out in Kogi State of Nigeria that majority of farmers (85%) learned of inorganic farming practices from other sources other than extension agents while only 15% learned from extension personnel. This indicates the challenge that farmers face with accessing information from extension personnel hence the need for extension personnel's to improve their efforts in meeting the needs of farmers. Although farmers access information from various sources, the value attached to the information is dependent on their perception of the credibility of the source hence extension agents have to gain and win the trust of farmers if they are to accept and adopt practices and technologies transferred to them.

Beside these observations, Meitei and Devi (2009), in rural Manipur, found that farmers needed a variety of information related to seed varieties, pesticides, and fertilizer. The preferred medium was radio, followed by television and newspapers. This is confirmed by

Ayoade (2010) from his study of cowpea farmers who ranked information from friends and mass media such as radio and television as the most effective source. Mtega (2012) also in his study of access to and usage of information among rural communities in Tanzania revealed that information was accessed mainly through radio, television, newspapers and magazines, and also through cell phones and face-to-face communication. These variations in information sources are as a result of the difference in the various localities where the studies were carried out and also the availability of the information sources in the area.

## **2.6 Factors influencing use of agricultural information sources.**

The choice and use of agricultural information sources is influenced by institutional, psychological, economic and personal factors. Due to time and cost constraints these study considers only cassava farmers personal characteristics on their use of agricultural information sources. Farmer characteristics such as education, age, gender, income level, farm size, farm experience and being a member to farmer based organisation were considered. Mittal and Mehar (2015) noted that, socio economic factors such as age, education and farm size influence the information source relied on by a farmer. These factors are internal characteristics and may vary from one farmer to the other hence the need to examine them and determine which of them influence farmer's sources of agricultural information as well as the type of information accessed.

### **2.6.1 Age of farmer and sources of agricultural information**

Age is an important determinant in a farmer's information source selection. According to Schnitkey et al. (1992) as cited by Jenkins et al. (2011), as age increases a farmers'

decision to acquire accurate agricultural information decreases because his planning horizon shortens and is less likely to spend time and money in searching for latest information on improved technologies. On the other hand, Kacharo (2007) reported that age has a negative output on the agricultural information sources used by farm women in Ethiopia.

Ayoade (2010) also observed that age was significantly related to the information sources used by cowpea farmers. Mtega (2012) equally found out that age was significantly related to a farmer's choice of agricultural information sources. Likewise, Bawa, Ani, and Bzugu (2014) opined that age have a tendency to influence the sources farmers access agricultural information from. All these findings indicate that age plays a role in influencing the sources used by which farmers access agricultural information.

Contrary to these observations, Gunawardana and Sharma (2007) showed that age has no association with the information seeking behavior of farmers on improved agricultural practices. Nadi, Oduwole, Muhammed and Rahman (2013) also revealed that age was not significantly related to the information sources utilized by farmers. Rehman, Muhammad, Ashraf, Mahmood, Ruby and Bibi (2013) reported that age has no significant relationship with the sources to which farmer's access agricultural information. This they explained could have resulted from the fact that all the farmers had subscribed to a particular information source (agricultural magazine) in Pakistan hence their ages did not play a role with regard to their access to agricultural information.

### **2.6.2 Gender and sources of agricultural information**

Gender plays a significant role in agriculture. Majority of the labour force employed in agriculture are women. Women are also engaged in the cultivation of diverse crops including cassava. For instance in terms of cassava production both sexes play a significant role with men engaged in production while women take control of processing although some women also cultivate. Irrespective of the essential role women play in agriculture they are limited in terms of access to productive resources such as land, inputs, credit and extension information hence have to look to other sources to meet their information needs. For instance, Tadasse (2008) revealed that although in Ethiopia both males and females are engaged in agriculture, access to agricultural information and utilization favoured males with female headed households having limited access. The information needs of both male and female farmers vary as well as the sources to which they seek for agricultural information however female farmers encounter problems with regard to accessing information (Esharenana, Monday and Inoni, 2003).

Mtega (2012) reported difference between gender and the choice of agricultural information sources utilised by farmers. In Nigeria, for instance, Nadi et al. (2013) revealed that gender was significant to the information sources utilised by cashew farmers. The situation of differential access to information between male and female farmers' affects the yields of the females.

### **2.6.3 Educational level and sources of agricultural information**

Education plays an important role in the sources use by farmers to access agricultural information. It is obvious that while the educated farmers can access information from multiple sources such as the internet; news bulletins and farmers magazines the non-educated or less educated are limited with the sources to which they can get agricultural information. Solano et al. (2003) revealed that a farmer's educational level has influence on the preference of the farmer towards the various Agricultural information sources.

Similarly, Jenkins et al. (2011) disclosed that the educational level of people influence their sources of information. Rehman et al. (2013); Mittal and Mehar (2015) tells the same story that education has highly significant positive relationship with the kind of information sources utilised by farmers.

Contrary to these, Ayoade (2010) revealed that there was no significant relationship between the educational level of farmers and effectiveness of the agricultural information sources utilised by them. This was also confirmed by Kapoor and Kumar (2015) when they found out that the educational level of farmers did not have significant influence on the number of information sources used by the farmers in purchasing agri-inputs except for seed which had a negative relationship.

### **2.6.4 Income level and sources of agricultural information**

Income influences the source through which farmer's access agricultural information. Differences in people's income affect their knowledge and the kind of information they attach importance to. Besides if a farmer receives all the necessary information needed to

improve his production and has no income to implement the knowledge received, it will not have any influence on his productivity. Several studies have indicated the importance that income plays in a farmer's access to and utilization of information. Jenkins et al. (2011) explained that farmers with higher income are more likely to seek information from sources such as crop consultants where the information given is detailed and tailored to the farmers need while farmers with low income are likely to seek information from the public extension. Higher income also gives the privilege to search for precision information from multiple sources as compared to low income. Tadesse (2008) posited that the household's income level is an important factor in determining its access to and use of different technologies. He mentioned a positive significant relationship between a household's income and their adoption decision. Mtega (2012) revealed that income influence the choice of information sources utilised by farmers.

Likewise in India, Surendra and Mahesha (2015) showed a significant relationship between a farmer's annual income and the information sources utilised by him.

### **2.6.5 Farming experience and sources of agricultural information**

Farming experience is the number of years a farmer/household has spent in the production of a particular crop. The experience a farmer has with a crop determines the accumulated years of knowledge on production. According to Schnitkey et al. (1992) as cited by Jenkins et al. (2011) age is correlated with farming experience thus as experience increases with farming technologies the desire of utilization of information from the various sources decreases because of the experience acquired.



Ugboma (2010) also revealed farmer's personal experience as the main source of information for their fish farming in Niger Delta State. Contrary to this, Gunawardana and Sharma (2007) found from their study that there was no significant relationship between farming experience and the information seeking behaviour of farmers. This confirms Ndagi et al.'s (2013) conclusion that farming experience was not significant to influence cashew farmer's attitude towards the various agricultural information sources.

#### **2.6.6 Farm holding size and sources of agricultural information**

Several studies have revealed the influence that farm size has on farmer's sources of information. Mittal and Mehar (2015) reported that a farmers' farm holding size influences the information sources relied on by him. In India, Kapoor and Kumar (2015) explained that small and marginal farmer's access information from limited sources such as fellow farmers/friends while those with large land holding sizes seek information from diverse sources. They indicated that farm size has a positive and significant relationship with the number of information sources used by farmers for buying agricultural inputs. It is believed that farmers with large farm sizes are able to cultivate more thus wealthy and able to access information from various sources compared with those with limited farm holding size.

Contradictory, Surendra and Mahesha (2015) from their study in India revealed no significant relationship between farm holding size and the information sources utilised by paddy farmers.

### **2.6.7 Farmer group membership and sources of agricultural information**

Farmer groups have proven to be useful ways to access resources, extend knowledge and information to other farmers in a group. Farmers who belong to a group are exposed to the resources of their fellow farmer such as their experience in farming, successful practices undertaken and many more. Farmer groups also serve as effective mechanisms to increase farmers' livelihood by reducing information asymmetries and transactional cost.

In conformity with the above, Ofuoku, Enalkle and Nnodim (2008); Ofuoku and Agbamu (2012); Ayieko, Bett and Kabuage (2014) opined that most farmers subscribe to groups for access to extension services, credit and marketing. Bandiera and Rasul (2003) stated that group membership (members in the same social network) enhances the capacity of an individual to access information about an innovation and its benefit from other members. It also increases individual farmer's awareness and as a result increases the likelihood for adoption of new technology. However, being in a group does not guarantee equal access to services. Tetteh (2013) indicated no significant relationship between membership of farmer groups and access to extension service. Addai, Owusu and Danso-Abbeam (2015) confirmed this when they indicated from their study that being a member of a farmer based organisation does not enhance technical efficiency by easing access to productive resources.

### **2.6.8 The influence of agricultural information on adoption of improved farm practices**

Access to agricultural information plays an important role in agricultural productivity aside other factors such as soil, weather and fertilizer application. For improvement in agricultural productivity and livelihood of farmers, farmers have to make use of information on improved practices accessed from the various sources. Several studies have been conducted on agricultural technology adoption and factors that hinders it. In this study adoption of agricultural technologies is used interchangeably with utilization of agricultural information (since agricultural information can be in the form of introduction of a new technology) to reflect its influence on the practices of farmers.

According to Genius, Pantzios and Tzouvelekas (2006), informational incentive improves farmer's technological adoption which revises their perception about the profit effectiveness of new farming decisions. However, aside having access to agricultural information, Odoemenem and Obinne (2010) opines that the level of adoption of improved crop production practices is also influenced by intensity of extension contact, amount and use of credit and cooperative membership. According to them the adoption/use of improved cereal technologies by farmers varies in various degrees. This is because, the intensity of contact of the farmer with the information source provides him with up to date information about the technology and technical assistance with the application of the technology to their farming systems. As explained by Rogers (2003), adoption starts by sharing information with the potential users of the innovation through mass media and

interpersonal communication channels. He emphasised that interpersonal communication channels through fact to face contact improves farmers' adoption of new innovations.

Similarly, Komolafe, Adesiji and Ajibola (2014 p: 99) mentions that, "a farmers adoption decision is influenced by the degree of exposure to the information. The more interest showed by the farmer on a topical issue the more her/his propensity to move through the mental stages that lead to adoption of the information".

In a study of the analysis of extension service in crop production in Kwara State Nigeria by Ayanwuyi, Adeola and Oyetoro (2013) the authors concluded that agricultural practices introduced to farmers through extension education was relevant to their farming activities. They revealed that although all crop farmers received education on the production of their crops (maize, yam and cassava) and indicated the relevance of such knowledge, there was no significant difference in their land use but there was a difference in the yield of the various crops. This implies that having access to information and putting the information to use through practices renders results irrespective of the land size under cultivation.

Uzonna and Qijie (2013) found out that extension training was significantly correlated with the adoption of improved farm practices by farmers in the Adana, Southern Turkey. In proving the importance of continual access to information from the sources on practices, Gailhard, Bavorova and Pirscher (2012) showed that frequent communication with actors in interpersonal network such as formal agricultural organizations and neighbourhood farmers influence continuous innovation adoption of Agricultural Environmental Measurers (AEM). Singh and Hensel (2013) also reported that, indeed extension education has impact on improving knowledge of sustainable agricultural practices. In addition,

Genius, Pantzios and Tzouvelekas (2006) showed that acquisition of information from different agricultural information sources correlates with the adoption of organic land conservation measures.

Finally, Mwanji (2014) revealed that a radio programme (Mugambo Wa Murimi) on farming practices of farmers in the Gatanga Constituency of Nairobi helped farmers to improve their practices. The findings of the study revealed that the program Mugambo Wa Murimi had influenced most of the farmers to become better at their farming practices.

## **2.7 Livelihood outcomes**

Livelihoods are set of capabilities, assets, and activities that are required to make a living (Chambers and Conway, 1992). Farm households engage in diverse livelihood activities in order to achieve their life goals; for rural people the main livelihood activity engaged in is farming with very few of the population also engaged in alternative livelihood strategies such as trading and driving. Livelihood strategies refer to the activities realized by households that results in the attainment of their livelihood outcomes while livelihood outcomes are the achievements and benefits that households anticipate to obtain through the implementation of specific livelihood strategies and activities. These outcomes have conventional indicators such as increase income; improve food security, reduced vulnerability and more sustainable use of the natural resource base (DFID, 2001). Livelihood outcomes may vary among different groups of people, while some people's main objective is to increase income others may focus on their well-being. Although the attainment of well-being in terms of food, water, shelter and health is a basic necessity it is

not common to all people especially the poor. Therefore a livelihoods approach to research provides an insight into the lives of the poor by identifying some of the factors that affect them. For the purpose of this study, the following were employed from DFID (2001): crop yield, income and household's well-being in terms of education, health care, portable water and food security.

### **2.7.1 Income**

A household's main objective is to increase income and reduce poverty. Moreover income can only be increased by a combination of the household's assets and capabilities. For instance if the natural capital such as land available to a household is inadequate, or not fertile combining other assets (human and finance) to achieve the maximum output (yield) is difficult. A household's dissatisfaction with its income/consumption model gives rise to basic needs perspectives which goes far beyond income. This includes the need for basic health and education, clean water and other services which are required to prevent people from falling into poverty. Poverty has recently been defined in terms of the absence of basic capabilities to meet physical needs (Farrington, Carney, Ashley and Turton, 1999). Therefore a farmer's inability to acquire these basic needs calls for attention from stakeholders.

### **2.7.2 Well-being**

Well-being is defined differently by different class of people based on their perception of life. From the economics stand point it is defined as life satisfaction. That is a good or satisfactory condition of existence characterized by health, happiness and prosperity.

Dodge, Daly, Huyton and Sanders (2012) view it as the balance point between an individual's resource pool and the challenges faced. If an individual has enough resources to meet his or her needs then he can be said to be in a good state of well-being. The term well-being and quality of life are used interchangeably by various authors but some argue well-being as a component of quality of life. Although economists accept "life's satisfaction as a measure of well-being, they also agree with evidence from psychology that an individual's expression of life satisfaction is a measure of different aspects of his life's opportunity and outcomes" (Galloway, Bell, Hamillton, and Scollion, 2006 pp 32). From the above definitions it is clear that to achieve a good state of well-being, an individual has to acquire enough resources. Therefore people with little resources have little chances of achieving well-being.

### **2.7.3 Food security**

Food security is a circumstance that occurs when all people, at all times, have physical and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996) as cited by FAO (2006). The application of this concept to the family level with individuals within the household is termed as household food security. The essential elements of food security are the availability and affordability of food. These were the two essential elements used by the researcher to measure food security. A household is therefore said to be food insecure when individuals within the household do not have physical and economic access to food to meet their dietary needs.

## **2.8 The Influence of farm practices on the livelihood outcomes of farmers**

### *Yield*

Improve agricultural practice is key to ensuring food security. For improvement in agricultural productivity and enhancement in the livelihood of farmers, access to information and awareness programmes on good agricultural practices is very important (Abosedo, Alabi and Oluyemisi, 2014).

It is expected that with adequate agricultural information, farmers will adopt improved practices which will lead to improvement in yield, income and well-being of the farmers. Agbaje, Saka, Adegbite, and Adeyeye (2008) in their study of the influence of agronomic practice on yield found out that, with the three cultivars used in the experiment, the two put under improved management practices received increased yields and reduction in the incidence of insect attack.

Similarly, Nyamasoka, Nyamugafata, Madyiwa and Nyamangara (2015) revealed that to curb against low yields, urban farmers (men and women) were introduced to improved practice of combining poultry manure, sewage sludge or cattle manure with mineral fertilizers to attain an average maize yield of 1.5t/ ha. However, although more women practiced organic manure application than men, the application rates were low thus obtained lower yields. This implies that although improved management practices can be adopted by farmers if the right measure and procedures are not followed the expected results may not be achieved. Apart from the procedures undertaken, the agro ecological zone of a farmer can have an influence on crop yield. Kassie, Zikhali, Pender and Köhlin (2009) investigated whether reduced tillage results in more or less productivity gain than



chemical fertilizer in two agro ecological zones (low rainfall and high rainfall areas). The results indicated that reduced tillage enhanced crop productivity compared to chemical fertilizer in the low rainfall area whiles contrary occurred in the high rainfall area.

### *Income*

In investigating the influence of agricultural practices on the income of farmers Adofo, Shaibu and Yakubu (2011) found that, the revenue of farmers increased after their acceptance to apply improved agricultural technologies. Likewise, Anyiro and Onyemachi (2014) revealed that rural farm women who used cassava value added innovations had higher income levels compared to those who did not adopt. These are indications that farmers' acceptance of innovative practices are likely to cause a change in their livelihoods. Afolami, Obayelu and Vaughan (2015) confirm this from their study which showed that the use of improved cassava varieties increases the annual income of farmers and subsequently cause an improvement in their well-being. In addition Hailu, Abrha, and Weldegiorgis (2014) indicated that agricultural technology acceptance has a positive significant effect on farm income.

## **2.9 Summary**

The chapter described the various components of the conceptual frame work. It also reviewed literature on agricultural information sources and farmer characteristics that influence their access to and use of the various information source. The characteristics included gender, age, and educational level, farming experience, farm size and land tenure

arrangement. The chapter highlighted on livelihoods and how agricultural information influences the livelihood outcomes of farmers.

## **CHAPTER THREE**

### **METHODOLOGY**

#### **3.0 Introduction**

This section deals with the details of the methodology employed in the study. Emphasis is placed on the approaches used in the research and the instruments used for the data collection. The chapter also provides information on the research design, study area, population of study, sampling procedure used and sample size, data collection procedure and data analysis. The chapter ends with a summary.

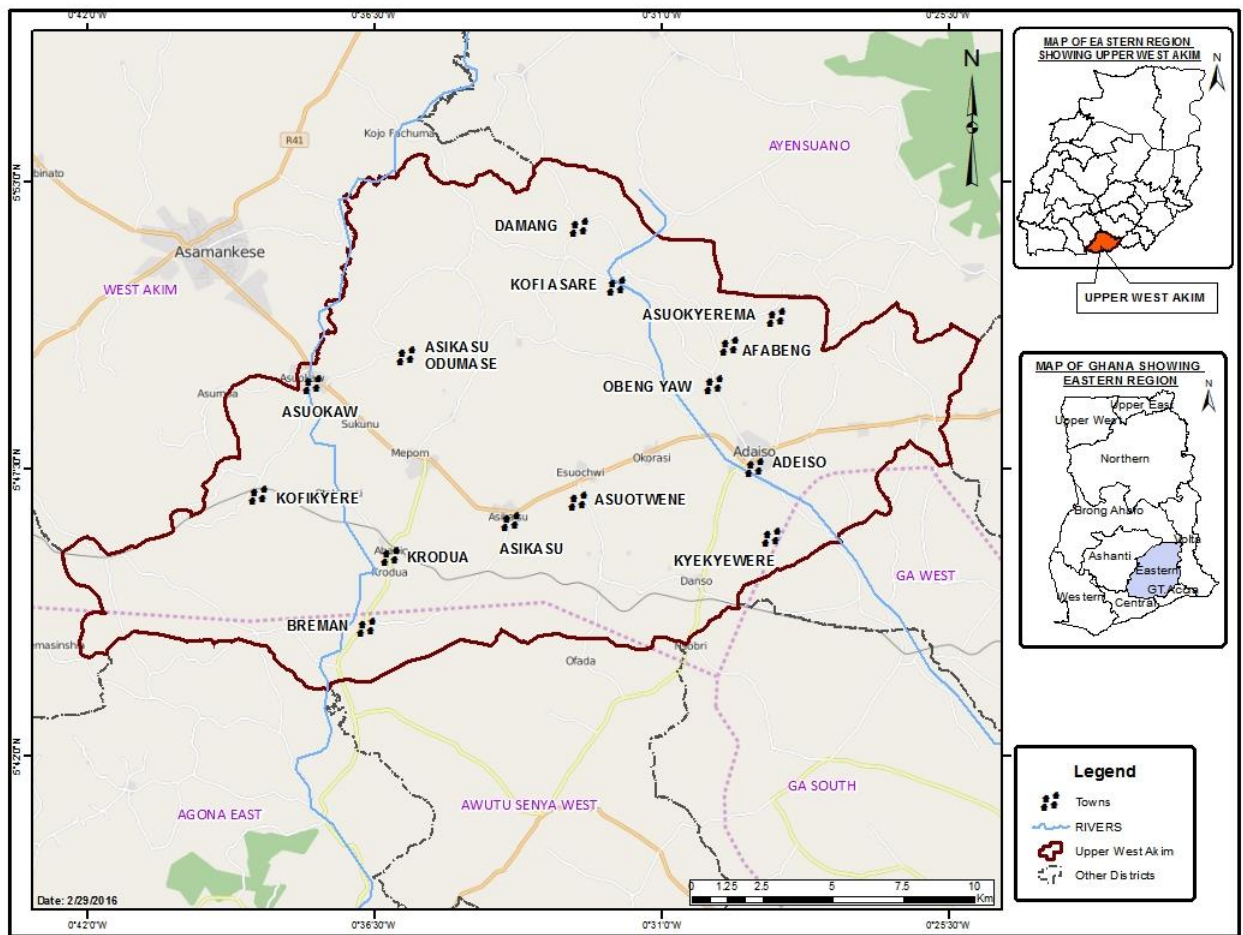
#### **3.1 Description of study area**

Upper West Akim District is in the Eastern Region of Ghana and lies between longitudes  $0^{\circ} 25'$  West and  $0^{\circ} 47'$  West and latitudes  $5^{\circ} 40'$  North and  $6^{\circ} 00'$  North, covering an area of about 987 square km. In the 2010 Population and Housing Census, the population of Upper West Akim District was 95,161; with an annual growth rate of 1.4%. The district was established in 2012 by Legislative Instrument (L. I.) 2049 with Adeiso as the district capital. It was carved from the West Akim Municipality and shares boundaries with West Akim Municipal Assembly to the North; Agona, Awutu-Efutu-Senya and Ga West districts to the South; Nsawam Municipal to the East and Ayesuano and Suhum Municipal to the West.

The district is mostly low lying with few hilly areas which lies within the semi-deciduous forest zone leading to high degree of rainfall for crop cultivation and human use. The vegetation is mainly characterized by tall trees with evergreen undergrowth endowed with economic trees. Some areas are also waterlogged therefore used for rice cultivation.

Notable is the Ayensu River which stretches in the district. The predominant occupation in the district is subsistence agriculture followed by commerce, especially trading and artisanal. Major crops cultivated are cassava, maize, citrus fruits, cocoyam, plantain, vegetables, oil palm and cocoa.

**Figure 3.1: Map of Upper West Akim Showing Sampled Communities**



**Source: Centre for Remote Sensing and Geographic Information Services (CERSGIS 2015)**

### **3.2 Research design**

The research design is a detailed outline of how an investigation will take place. De Vaus (2001) refers to it as a logical matter that enables us to answer the research questions in a convincing way rather than a logistical one. According to him any research design can use any data collection methodology that is either qualitative or quantitative. Therefore, the research design helps the researcher by reducing the chances of drawing incorrect inferences from the data.

This study adopted descriptive design and used quantitative data collection methodologies to answer the research questions. A cross sectional survey was used to determine the influence of agricultural information sources on the practices and livelihood of cassava farmers in the Upper West Akim District of the Eastern Region. This approach was chosen because the researcher could not cover the whole population in the district hence a cross section of the population was chosen to represent the entire district in order to generalize the results. The cross sectional survey provides a snap shot of study factors and outcome in a population at a particular point in time (Kumar, 2011). This type of survey will enable the researcher to provide a picture of the various agricultural information sources in the district, their level of access, type of information accessed and the influence of the information use on their practices and livelihood outcomes at the time the study was conducted. In this type of study the frequency of specific factors and outcomes can be calculated for the given population (community) and levels of exposure and outcome status can be compared. A cross sectional survey allows the researcher to compare many different variables or cases of interest at the same time (Bryman, 2012). It is also well suited for

descriptive and inferential studies because it enables the researcher to describe the data as well as examine the relationship between variables (Bryman, 2012). The limitation of the cross sectional survey is that it cannot be used in measuring change. This is because in measuring change it is necessary to have at least two cross sectional studies at two points in time on the same population (Kumar, 2011).

### **3.3 Study population**

According to Yount (2006) a population refers to all the subjects the researcher wants to study. The population used for this study was mainly cassava farmers in the Upper West Akim District.

### **3.4 Unit of analysis**

The unit of analyses is the major entity that the researcher seeks to analyse. It is the entity that generalization of the research will be made upon. The target population for the study was cassava farmers (farmers who cultivated at most 2ha of land). Therefore the major unit of analysis for this study is cassava farmers.

### **3.5 Sample size**

The sample size refers to subsets of units or individuals from the populations that have been selected for the study. Burmeister and Aitken (2012) define it as the minimum number of participants required to identify a statistically significant difference if a difference truly exist. There are several ways of calculating the sample size for a study. This includes using a census for small populations, imitating a sample size of similar studies, using published tables, and applying formulae check to calculate a sample size (Al

– Subaihi, 2003). Therefore for this study the sample size is chosen based on imitation of similar studies which was done by Ayoade (2010) on cowpea farmers in the Oyo State of Nigeria. The sample size used for his study was 120 farmers from a list provided by the Oyo State Agricultural Development Programme agric extension block. However, 200 cassava farmers were selected for this study because of the non-availability of data on population of cassava farmers in the district. Besides, Nigeria and Ghana have similar socio-economic conditions.

### **3.6 Sampling procedure**

Sampling is the process of selecting a group of subjects for a study in such a way that the individuals represent the larger group from which they were selected (Yount, 2006). The study adopted the multistage sampling procedure. The first step was the purposively selection of the district because of the intensity of cassava activities in the area. The district is divided into clusters (geographical areas/operational areas) by the Ministry of Food and Agriculture. There are ten operational areas which are namely Adeiso, Afabeng, Asuaba, Krodua, Kumikrom, Abamkrom, Mepom, Asuokaw, Asikasu and Okurase. Out of the ten operational areas a simple random sampling was done to select five. The simple random sampling was done using the drop without replacement method. The names of the ten operational areas were written on pieces of paper, folded and dropped in a basket. The basket was whirled and the first piece of paper was selected. The procedure was repeated for the selection of the subsequent areas; Adeiso, Asikasu, Asuokaw, Afabeng and Krodua. This was followed by another simple random sampling without replacement where names of the communities under the five operational areas were written on pieces of paper and the selection of communities done. Three communities were originally selected from each of

the five operational areas however it became difficult to reach respondents in some of the communities. This was because respondents were mostly available only on taboo days hence the process had to be reviewed because of time. Sixteen communities were selected in all. Table 3.1 shows the distribution of respondents selected from various communities. The variation in the number of respondents selected from each community was as a result of the size of the community and intensity of cassava farming in the area. The actual selection of respondents was made difficult because of the non-availability of a list. Hence to locate respondents every community visited was divided into two blocks or four based on the size. A systematic approach was used to select respondents from households. The study was originally designed to obtain 50% males and 50% females but unfortunately this method identified more males than females. Besides in some households with both male and females the females opted for their husbands to respond to the questions.

**Table 3.1: Sampling frame**

District	Operational area	Communities	Number selected
	Adeiso	Obeng Yaw	15
		Kyekyewere	13
	Asikasu	Asikasu	13
		Asuotwene	7
		Asikasu Odumase	20
		Amoakrom	10
	Asuokaw	Asuokaw	17
		Kofi Kyere	7
	Afabeng	Afabeng	16
		Asukyerema	10
		Damang	9
		Kofi Asare	6
		Ampofo	10
	Krodua	Kwao Baah	12
		Breman	15
		Takorase	10
5		16	200



### **3.7 Development of data collection instruments**

Primary data was collected for the study (Ref to Appendix 1). The data collection for the study began with the design of questionnaires which was made up of closed ended and open ended questions. It was designed to measure variables that underpin the study and as proposed by literature. The questionnaire comprised of 50 questions divided in to four sections labeled A – D, each section was designed to measure a specific objective in the study. Section A was made up of 9 items that draw out information on the cassava farmer's personal characteristics, Section B was made up of 4 items incorporated with sub questions to seek information on the sources and types of agricultural information accessed by the farmer's. Section C, draws out information on the influence of the cassava farmer's information use on their farm practices whiles Section D measures the livelihood outcome of the cassava farmers. The questionnaires were reviewed by research supervisors and the appropriate corrections were effected so as to ensure the reliability of the research instrument. Table 3.2 represents operational framework for development of the research instrument.

### **3.8 Data collection procedure.**

The data collection procedure involved pretesting and the main administering of the research instrument.

**Table 3.2: Development of data collection instrument**

Objective	Information Required	Source of Information	Data Collection
1. Personal Characteristics of Cassava farmers	Gender, Age, Educational level, Farming Experience, Farm size, membership to farmer organization, alternative source of income	Cassava farmers	Interview questionnaire
2. Sources of agricultural information	Interpersonal and mass media	Cassava farmers	Interview questionnaire
3. Types of agricultural information accessed	Agronomic, market, weather and credit information	Cassava farmers	Interview questionnaire
4. Livelihood outcomes of the cassava farmers	Yield, income, well-being and food security	Cassava farmers	Interview questionnaire

**Source: Author's construct, 2015**

### 3.8.1 Pre-testing

A pre-test is the collection of all those techniques and activities that allow researchers to evaluate survey questions and survey procedures before data collection begins (Caspar and Peytcheva, 2011). The pre-test was conducted before the actual survey to assess the content of the question, respondents understanding of general concepts, time duration in administering a questionnaire and to gauge their opinions about the sensitivity or difficulty of the questions. This served as a device for estimating the response rate of the questionnaire. Questions were adjusted based on experience and feedback. The pre-testing was done to ensure everything works as intended and to get an idea about the potential response rate. The pre-test was done with 20 cassava farmers at the Suhum Kroboa Koalter district in the Eastern region. The district has similar characteristics with the area of study.

The questionnaires were self-administered to respondents by the researcher. Based on the results obtained from the pre-test, necessary modifications were made on the questionnaire for the main study.

### **3.8.2 Data collection**

The data collection was done within 24<sup>th</sup> March to 18th April, 2015. In order to speed up the collection of the data because of time, two research assistants who were national service persons from the West Akim Municipality were engaged. They were trained by the researcher for a day on the objective and purpose of the study, each question on the data collection instrument was well explained to them and they were asked to undertake trials with each other to ascertain their understanding of the questions. Primary data was used to source information from the cassava farmers. The questionnaires were administered mostly in the Twi language because that was the major speaking language in the district. Between 45 to 50 minutes was spent on the administration of one questionnaire.

### **3.9 Data analysis**

First of all the data was coded for most of the closed ended questions whiles the open ended questions were assigned major categories based on their similarities, after which they were also coded. All the coded variables were entered in to the Statistical Package for Social Science (SPSS) version 21.0 software for analysing the data. The data collected from respondents were analysed using descriptive and inferential statistics. The results were computed into frequencies, percentages and means whiles the Chi-square test of independence was used to determine the relationship between the various variables. In

situation where 20 percent of the cells have expected count of less than 5 or 0 the cells were collapsed in other to meet the Chi-square rule.

### **3.10 Analytical methods**

Four main concepts were used as the basis of analysis for the study. They were the farmer personal characteristics, the sources and types of agricultural information accessed by the farmers, the farm practices of the farmers and their livelihood outcomes. The variables used for the farmer characteristics include gender, age, education, number of years of farming, member of farmer organization, alternative income source and farm size. The type of agricultural information accessed was grouped into agronomic, market and credit information. Finally the variables used for the practices of the farmers were use of improved variety, planting in rows using recommended planting distances, practice crop rotation, use both organic and inorganic fertilizers in balanced proportions for improvement of soil fertility, proper field sanitation, records of all farm operations, weed at least thrice before cassava matures, harvest of cassava during 6 to 18 months of age. These variables were grouped into categorical data. These are briefly described in the sub section below.

#### **3.10.1 Sources of Agricultural Information Accessed**

Eight indicators were used as the farmers' source of agricultural information. These included

1. Fellow Farmer
2. Agricultural Officer
3. Input dealer
5. Radio
6. Television
7. Mobile phone

4. Traders

8. Newspaper/Agric bulletin

The sources of agricultural information were analysed using descriptive statistics. As to whether a farmer receive information from a particular source or not, respondents were scored zero or one for 'No' or 'Yes' response respectively. A total score was then computed for each respondent. These total scores were transformed into categorical data of three groups i.e. source of agricultural information was transformed into 'low source', 'moderate source' and 'high source'. Farmers who seek information from 0 – 3 sources were categorized as low source while those who seek information from 4 – 5 and 6 – 8 sources were grouped as moderate and high sources respectively.

### **3.10.2 Types of Agricultural information Accessed.**

Nine indicators were used to measure the type of agricultural information accessed by the cassava farmers. These include

- i. New planting varieties
- ii. Planting in lines at correct spacing
- iii. Weed Control
- iv. Fertilizer use (organic and in organic)
- v. Disease Prevention and Control
- vi. Storage
- vii. Market Opportunities
- viii. Credit information

The above indicators were regrouped into three that is agronomic information (new planting varieties, planting in lines at correct spacing, weed control, fertilizer use, disease prevention and control, storage), market information and credit availability. As to whether a farmer accessed a particular type of information he was marked a ‘Yes or No’.

### **3.10.3 Farm Practices of the Cassava Farmers.**

These were used to measure the farm practices of the cassava farmers. The use of improved variety, plant in rows at correct spacing, crop rotation, use both organic and inorganic fertilizers in balanced proportions for improvement of soil fertility, proper field sanitation, records of all farm operations, weeding at least thrice before cassava matures, timely harvest of cassava. Descriptive statistics of the number of farmers who under took the practices above was noted. Measurement of the indicators above was done using a 4 point Likert type scale based on the farmer’s level of practice. The indicators were ranked as Never = 1, Rarely = 2, Sometimes = 3, always = 4. The highest total score a respondent could obtain was 32. A categorical data was produced from summation of the total scores. Respondents with scores of 8-15 points were classified as ‘low practice’, 16-22 points as ‘moderate practice’ and 23-32 points as ‘high practice’.

### **3. 10.4 The Livelihood outcomes of the Farmers.**

The indicators used for measuring the farmers’ livelihood outcomes included their yield (cassava and other cultivated crops), income, well-being and food security.

### *Yield*

The yield was calculated by computing the number of fresh tubers obtained from each acreage of land if harvested at the same time. The tubers are mostly packaged in sacks hence the number of sacks obtained per rope of land was obtained. This is because the land for cassava cultivation is divided into 10 ropes per acre in the district. The average weight of a sack of fresh cassava tubers was 91kg. Yield was then calculated for each farmer according to the acreage of land cultivated. This was done by multiplying the number of bags obtained from a rope of land by 10 ropes (1acre). The figure obtained is then multiplied with the average weight of a bag of cassava (91kg) to obtain the actual yield per acre. The minimum and maximum yield per acreage was then computed. Based on the figures obtained farmers with yield below the mean were classified as low yield while those with yield above the mean were classified as high yield.

### *Income*

Farmers' income was computed by summing all the income they receive for the year from the sales of cassava if harvested at once including those consumed and given as gift. These sums were obtained by multiplying the number of bags obtained by the farmer from the cultivated land against the unit price of a 91kg bag of cassava (25ghc). A summation of the amount stated for the various income sources was used as the farmers' average annual income. The incomes were put into two categories; low and high. Farmers whose income was less than the mean income were considered as low and those whose incomes were above the mean were classified as high.

### *Well-being*

The well-being of the respondents was measured using three indicators. This includes the farmers' access to health care, access to good drinking water and affordability of childrens education. Measurement of the indicators above was done using a 4 point Likert type scale based on the farmers' level of well-being. The indicators were ranked as Never = 1, Sometimes = 2, Often = 3, always = 4. The highest total score a respondent could obtain was 12. A categorical data was produced from summation of the total scores. Respondents with scores of 1 - 6 points were classified as 'low level of well-being' and 7 - 12 points as 'high level of well- being'. This was done to prevent violation of the chi-square rule.

### *Food Security*

There are four levels of measuring food security, the global level, national, household and individual level. These levels are sequentially linked from global, national to household but not causal (Nangteng and Asuming-Brempong, 2003). Therefore Food security at the national level does not guarantee food security at the household level. Food security was measured using only two indicators. That is availability of food to the household and the affordability of non-cultivated food items to the house hold. The indicators above were measured using a 4 point Likert type scale based on how food secured the farmers were. The indicators were ranked as Never = 1, Sometimes = 2, Often = 3, always = 4. The highest total score a respondent could obtain was 8. A categorical data was produced from summation of the total scores. Respondents with scores of 1 - 4 points were classified as 'less food secured' and 5 - 8 points as 'highly food secured'.



### **3.11. Summary**

The chapter described the survey method as the research design used for the study. It gives a description of the study area where the research was carried out. Also the sampling methods employed were the multi stage sampling, cluster sampling and the simple random sampling for the selection of respondents. The sample size for the study was developed based on sample of similar studies. In all 200 cassava farmers were selected for the main study. The data was analysed by using the SPSS version 21.0. The Chi-square test of independence was used to determine the relationship between the various variables.

## CHAPTER FOUR

### RESULTS AND DISCUSSIONS

#### 4.0 Introduction

This chapter presents the results and discussions with regard to the objectives stated. Specifically, the chapter provides a description of the sampled farmers in respect of the personal characteristic variables considered in the study. Also the influence of these personal characteristics on the source of agricultural information is discussed. Result on the relationship between the types of agricultural information accessed and the agronomic practices of the cassava farmers can also be found in this chapter. Finally the relationship between the cassava farmers' farm practices and their livelihood outcomes is explained in here.

#### 4.1 Socio-economic characteristics of farmers

The section discusses the socio-economic characteristics of the respondents.

##### *Gender Distribution of Respondents*

The majority (60.5%) of the respondents sampled were males whiles (39.5%) were females as shown in Table 4.1. Although both men and women are engaged in the production, processing and marketing of cassava, Butterworth, Abdulsalam-Saghir and Martin (2008) from their study in Nigeria mentioned that men are mainly engaged in production whiles women engage in the processing and marketing of the crop.

### ***Age of respondents***

The age of an individual is an important factor that determines his or her ability to work. According to the Oxford dictionary age group refers to a number of people or things classified together as being of similar age. The productive age in Ghana is considered to be between 15-59 years (GSS, 2013). Therefore this study considered respondents within the above age group. Table 4.1, shows the age distribution of the respondents. From the table majority of the respondents were in the middle age group of 36-55 years and they constituted 60.5% of the sampled respondents. The youth in the age bracket of 18-35 represented 25.0% of the total farmers interviewed. Very few of the respondents were above 55 years. This category of respondents accounted for only 14.5% of the total farmers interviewed. Similar results were found by Adofu, Shaibu and Yakubu (2011) in Nigeria where majority (60%) of cassava farmers were within the middle age group of 20 – 40 years with very few being above 51years. This means that the youth and the middle aged are most actively engaged in cassava farming in the study area. However the youth who are energetic to undertake cassava farming are few. This is alarming considering the gradual decline of the youth's participation in agriculture.

### ***Educational level***

The majority of the farmers (69%) had basic education. This is followed by (15%) who had secondary education whiles very few (14.0%) had no formal education (Table 4.1). It can therefore be noted that majority of the farmers have some level of formal education although very low. This could have some positive influence on adoption of innovations because education enhances access to and utilisation of agricultural information (Tadasse, 2008) which is essential for technology adoption. Education is

also said to positively impact the agricultural productivity of small scale farmers (Okpachu, Okpachu, and Obijesi, 2014). The findings of this study however contradicts that of Anaglo (2011) and Tijjani, Akpoko, Abdullahi, (2015) where majority of cassava and cowpea farmers interviewed respectively had no formal education.

**Table 4.1: Social-economic characteristics of respondents**

Variable	Categories	(n = 200)	%
Gender			
	Male	121	60.5
	Female	79	39.5
Age			
	18-35 (Youth)	50	25.0
	36-55(middle age)	121	60.5
	>55 (old)	29	14.5
Education level			
	No formal education	28	14.0
	Basic education	138	69.0
	Secondary	30	15.0
	Tertiary	4	2.0
Farmer Group Membership			
	Yes	42	21.0
	No	158	79.0
Land tenure arrangement			
	Self-owned	98	49.0
	Share cropping	38	19.0
	Rented	64	32.0

*Source: Field Data, 2015.*

### ***Farmer Group Membership***

From the data in Table 4.1, (21.0%) of respondents were members of a farmer group with (79.0%) not belonging to any farmer group. The results revealed that membership of farmer group were very low. This is similar to the findings of Mwuara (2014) in Uganda where membership to farmer groups was low with only 16% of the respondents belonging

to a farmer group. However it contradicts the findings of Koskei, Langat, Koskei and Oyugi (2013) who revealed that majority of small holder tea farmers (93%) belonged to a group. From the research although most of the farmers studied were not in groups it was realized that, farmers are reached with information or any other service such as inputs, financial assistance through groups. The groups served as a conduit through which agricultural information were channelled before subsequent delivery of agro-inputs. Belonging to a group also served as a platform for the exchange of ideas, knowledge and experiences among farmers. Therefore most of the farmers are likely to be negatively affected with regards to accessing production resources such as agricultural information since they do not belong to farmer groups.

***Land tenure arrangement/ownership type***

The data in Table 4.1 shows that majority (49%) of the farmers owned their farming lands, 32% worked on rented lands while the remaining 19% operated on a sharecropping basis. This is in line with the earlier studies of Tarawali et al. (2012) who revealed that majority of the cassava farmers (60%) farm on their own lands. The above finding was obtained in the district because majority of the farmers are natives of the town hence farm on their own family lands. However because family land is shared between members of that family the land holding sizes are small. Also there are migrants who have settled in the town. These migrants farm on share cropping basis such as the “abunu” (harvest is divided into two, farmer takes half and land owner takes the other half) and “abusa” system (harvest is divided into three, farmers takes two portions and the land owner takes one portion). Having (51%) of the respondents not farming on their own land is however worrying. This

is because land ownership serves as an opportunity for farmers to invest in innovative practices.

### *Farm size*

Farm size is one of the most common measure used in farmer categorization. Thapa (2009) define small holders as farmers with less than 2 hectares of land area who depend mostly on house hold members for labour. MoFA (2011) maintains that smallholders have less than 2 hectares of land size. Based on the above definitions most of the farmers interviewed were small holders. Tarawali et al. (2012) also identified majority of cassava farmers (59%) to be small holders with farm sizes of less than 2.5 hectares. However for easy description of respondents the farm sizes were further categorized into 0.04-0.51 hectare as ‘small farm size’, 0.52-1.0 as ‘medium farm size’, > 1.0 as large farm size. From Table 4.2 it can be observed that majority of the cassava farmers have medium farm sizes which represented (42.5%) of the total respondents. The farmers with small farm sizes accounted for (36.0%) of the sample size. The analysis showed that a sizeable number of the respondents had farm sizes greater than 1.0 hectare. This last category formed (21.5%) of the sample size. This implies that majority of the cassava farmers in the district do not own farm size greater than a hectare. The analysis confirms the constraints faced by smallholders in cultivating significant land sizes. Larger land holding serve as an incentive to access resources like credit. Since most of these farmers are small holders accessing productive resources maybe challenging which can negatively affect their livelihood outcomes.

### ***Farming experience***

The data in Table 4.2 shows that 49% of farmers had farmed between 0-15 years, 39% had experience between 16-30 years while only 12% had been in cassava farming for more than 31 years. This implies that majority (51%) of the farmers had experience above 16 years. This is likely to negatively affect farmers' information access from the various sources because longer years in farming come with increasing expertise therefore reduces farmers' desire to access information (Schnitkey et al., 1992) as cited by Jenkins et al. (2011). Adomi, Ogbomo and Inoni (2003) also mentioned that farmer's personal experience or previous knowledge of agricultural practice serve as an essential source of information for food cultivation. On the contrary Ndagi et al. (2013) indicated that farming experience has no significant influence on farmers' attitude towards the information sources.

### ***Additional source of income***

The majority (61%) of the respondents did not have any source of income apart from farming while (39%) of them engaged in additional income generating activities. The data also revealed that out of the 78 respondents who were engaged in additional income generating activities, (80.5%) of them were engaged in artisanal work while only (8.9 %) engages in teaching. It is important to note that some of the farmers were involved in secondary occupations to help boost their household income. The seasonality of farming activities is such that farmers are not assured of regular income throughout the year; therefore a secondary occupation will help the farmers to cope with uncertainties in farming and household activities.

**Table 4.2: Socio-economic characteristics of farmers continued**

Variable	Categories	(n = 200)	%
Farm size	0.04-0.51 (Small)	72	36.0
	0.52-1.0 (medium)	85	42.5
	>1.0(large)	43	21.5
Farming experience	0 - 15	98	49
	16 - 30	78	39
	>30	24	12
Additional source of income	Yes	78	39
	No	122	61
Type of non – farm income activity	Trading	8	10.1
	Teaching	7	5.4
	Artisanal	63	80.7

*Source: Field Data, 2015.*

## 4.2 Objective one: Sources of agricultural information available to the cassava farmers

### 4.2.1 Sources of agricultural information

Cassava farmers in the Upper West Akim District see agricultural information as an important input for their day to day farm operations. It was identified that these farmers seek agricultural information from their fellow farmers, Agricultural Extension Agents (AEAs), input dealers, traders, radio, television, mobile phone and newspapers/agriculture bulletins (Table 4.3). Information received through these sources included; agronomic, market and credit information.



### **Farmer to Farmer extension as information source**

The study revealed that majority of the farmers accounting for 82.0% contact their fellow farmers to exchange information regarding their farming activities. This source was ranked highest among the other sources of information. Only 18.0% of the respondents do not seek information using farmer networks as observed in Table 4.3. Farmers exchange experiences on their years of farming. Also as the social network theory depicts farmers observe the activities and practices of other farmers and implement the same when beneficial to them. This result is similar to the findings of Sharma, Jha, Kumar, Sachan and Kumar (2008) who reported personal sources like, progressive farmers, neighbours, friends and opinion leaders as important sources in the transfer of rapeseed-mustard technologies. Likewise Rehman et al. (2013) reported fellow farmers as the major source of information to farmers. In the Kogi State of Nigeria, Nenna (2014) revealed that majority of farmers (85%) learned of inorganic farming practices from their personal networks other than extension agents. These explain the important roles that farmer networks play in information transfer with which Upper West Akim is not an exception.

### **Agricultural extension officers as sources of information**

The study revealed that less than half of the respondents representing 46.0% obtained agricultural information from AEAs. It can be deduced that about half of these farmers constituting 54.0% do not have contact with AEAs in the district. This source ranked third to the other sources of information. The inadequacy of extension personnel in the district accounts for this disparity. Some of the farmers mentioned that the AEA's visited only the cocoa farmers. Issues of logistics also hinder their transport to communities as most of the roads are unmotorable. The finding is consistent with that of Tijjani, Abdullahi and

Akpoko (2015) where AEA's ranked third to radio and fellow farmers as a source of information although Anaglo, Boateng and Boateng (2014) observed agricultural extension agents as the most preferred source of information by crop farmers.

### **Input suppliers as sources of information**

Another source of information available to farmers is the input supplier. The input supplier sells inputs to farmers. They also advise the farmer on the use of inputs especially the agrochemicals. The study revealed that only few (38%) of the respondents get information from input suppliers as observed in Table 4.3. Likewise Anaglo, Boateng and Boateng (2014) observed only 20.6% of farmers to access information from the input supplier.

Clark (2012) indicates the input supplier as effective means where farmers can access information. This is by providing them with technical advice on farming techniques and the correct use of inputs. However Etyang, Okello, Zingore, Okoth, Mairura, Mureithi and Waswa (2014) opines that the role of agro input suppliers have not been fully exploited in the provision of agricultural development technologies such as the provision of information on Integrated Soil Fertility Management (ISFM). The above result was observed because most of the farmers do not apply agrochemicals on their farms hence hardly contacted input suppliers for information. Besides, some of those who do apply sometimes send their fellow farmers/children.

### **Traders as source of information**

Traders are also an important source of information to farmers. Farmers mostly consult traders for information on prices of produce aside their fellow farmers. According to the study 31% of the respondents indicated to have contacted some traders for information

whiles the remaining 69% indicated never to have contacted traders for any kind of information. This is because all the farmers interviewed are small holders and did not require much information from traders as compared to large scale producers.

### **ICTs as source of agricultural information**

Information and communication technologies (ICT's) such as radio, television and the mobile phone are important contributors of information to farmers in the rural areas. From the study 66% of the respondents indicated to access information from the radio which was mostly weather information. This implies that the traditional radio rarely provided any agronomic information to the farmers in the study. The finding is consistent with that of Olagide (2011) who observed that the radio rarely provided farmers with agricultural information. It was ranked as the second source of information to fellow farmers. Also 33.5% and 29.5% indicated the television and mobile phone respectively as their source of information (Table 4.3). The mobile phone was used to obtain other social information aside discussions with other farmers. Although the mobile phone provides an easy, fast and convenient way for farmers to get answers to their problems its usage for agricultural purpose by farmers' in the district was low. The results implies that majority of the respondents do no access any agricultural information using ICT's despite the effect of the mobile phone in enhancing market participation through access to information (Muto, 2008). The low patronage of ICT's could be attributed to issues of connectivity and cost.

### **Newspapers/Agriculture bulletins as source of information**

Newspapers/agriculture bulletins were the least source of information to the farmers thus ranked as 8<sup>th</sup>. Majority (93.5%) of the respondents indicated never to have accessed information from this source. The findings are in line with Bawa, Ani, Bzugu (2014) who

indicated magazines, newsletters, pamphlet and posters as the least source of information utilized by farmers. This could be attributed to the low educational levels of the farmers which served as a hindrance on their use of this source of information. Contrary to the above Rehman et al. (2013) ranked the print media as the most frequently information source used followed by fellow farmers and the television in Pakistan.

**Table 4.3: Sources of agricultural information**

Source of agricultural information	Farmers responses n = 200				
	NO		YES		Ranking
	N	%	N	%	Order
Fellow farmers	36	18.0	164	82.0	1
Radio	68	34.0	132	66.0	2
Agricultural Extension Agent	108	54	92	46.0	3
Input dealers	124	62.0	76	38.0	4
Television	133	66.5	67	33.5	5
Traders	138	69.0	62	31.0	6
Mobile phones	141	70.5	59	29.5	7
Newspapers/agricultural bulletin	187	93.5	13	6.5	8

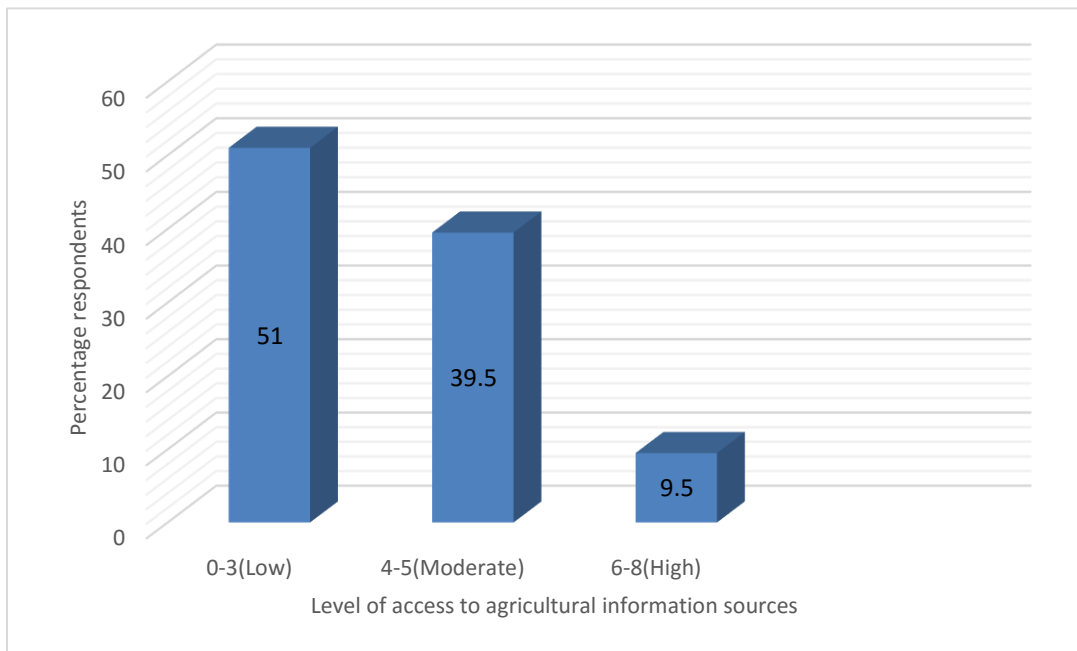
**Source: Field data, 2015.**

#### **4.3 Objective two: Influence of farmer characteristics on sources of agricultural information**

This section present results on the relationship between farmer socio-economic characteristics and sources of agricultural information. The section begins with farmers' level of access to the agricultural information sources. The relationship between farmers' socio-economic characteristics and their sources of agricultural information was established using chi-square independent test.

### 4.3.1 Level of access to agricultural information sources

Approximately half (51%) of the respondents access agricultural information from one to three sources, 39.5% receive information from four to five sources who have been labelled as 'moderate' and only 9.5% of the farmers interviewed receive information from six to eight sources in this study (Figure 1). It can be deduced that majority of the farmers seek for agricultural information although the sources accessed from is low.



**Figure 4.1: Level of access to agricultural information sources**

### **4.3.2 Relationship between farmers' socio-economic characteristics and sources of agricultural information**

To determine which personal characteristics of the farmers influence sources of agricultural information a chi-square test of independence was conducted. Table 4.4 and 4.5 presents the results on the influence of farmers' socio-economic characteristics such as (gender, age and educational level) on their number of sources of agricultural information

#### ***Gender and number of sources of agricultural information***

It can be observed that majority (51%) of the farmers seek agricultural information from low sources while only 9.5% have high access to information from the various sources. Out of the 51% indicated 28.5% of them were males with the remaining being females. The analysis also indicates no significant relationship between gender ( $\chi^2 = 2.550$ ,  $df = 2$ ,  $p = 0.279$ ) and the number of sources used for accessing agricultural information. This implies that gender is not related to accessing agricultural information from multiple sources. This confirms Tetteh (2013) that gender is not related to access to agricultural information from extension service. Likewise Surendra and Mahesha (2015) indicated no significant relationship between a farmer's gender and his attitude towards the various information sources.

#### ***Age and number of sources of agricultural information***

From Table 4.4 the Chi-square statistics ( $\chi^2 = 12.694$ ,  $df = 4$ ,  $p = 0.013$ ) indicate a significant relationship between the age categories of farmers and the number of agricultural information sources used. This implies that the age of a farmer influences the number of sources from which he seeks for agricultural information. Solano et al. (2003)

noted significant influence between farmers' age and preference towards the use of different information sources. This observation is also similar to that of Ayoade (2010); Mittal and Mehar (2015) who noted age to have significant influence on the different information sources utilised by farmers'. It can further be observed from the table that only 1% of the youth access information from 6-8 sources with 6% from the middle age category. Although it is believed that the youth are more active in this information age and likely to access information from multiple sources that is not the case in the Upper West Akim District.

#### ***Educational level and number of sources of agricultural information***

The results in Table 4.4 indicates no significant relationship ( $r = 0.041$ ,  $p = 0.556$ ) between the level of education and the sources of agricultural information used. This means that the level of education attained by a farmer does not influence the number of information sources used by him. The findings are in line with Ayoade (2010); Kapoor and Kumar (2015) who noted no significant relationship between farmers' educational level and the number of sources where they get agricultural information. Ndagi et al. (2013) also indicated no significant relationship between cashew farmer's educational level and the sources of agricultural information utilised by them.

The finding however contradicts the idea that educated farmers have the capacity to access information from multiple sources. Mtega (2012); Mittal and Mehar (2015) observed that level of education have significant influence on the sources from which farmers accessed agricultural information. This is because it is believed that educated farmers may be able to

make production decisions and resolve issues using different types of information that may require the use of multiple sources but this study contradicts that notion.

**Table 4.4: Influence of socio-economic characteristics on number of agricultural information sources**

Personal characteristics	Source of agricultural information						Total		Chi-square /Spearman's rho
	0-3(Low)		4-5(moderate)		6-8(High)		n	%	
	N	%	N	%	N	%			
Gender									
Male	57	28.5	50	25.0	14	7.0	121	60.5	$\chi^2 = 2.550$ df = 2 p = 0.279 NS
Female	45	22.5	29	14.5	5	2.5	79	39.5	
Total	102	51.0	79	39.5	19	9.5	200	100	
Age									
18-35(Youth)	32	16.0	16	8.0	2	1.0	50	25.0	$\chi^2 = 12.694^*$ df = 4 p = 0.013 Significant
36-55(M. A.)	63	31.5	46	23.0	12	6.0	121	60.5	
>55(Old)	7	3.5	17	8.5	5	2.5	29	14.5	
Total	102	51.0	79	39.5	19	9.5	200	100	
Level Education									
Nil	16	8.0	11	5.5	1	0.5	28	14.0	r = 0.041 p = 0.566 NS
Basic	68	34.0	56	28.0	14	7.0	138	69.0	
Secondary	17	8.5	10	5.0	3	1.5	30	15.0	
Tertiary	1	0.5	2	1.0	1	0.5	4	2.0	
Total	102	51	79	39.5	19	9.5	200	100	

Source: Field data

#### ***Land tenure arrangement and number of sources of agricultural information***

The Chi-square test of independence presented in table 4.5 indicates a statistical significance ( $\chi^2 = 11.21$ , df = 4, p = 0.025) between the land tenure arrangement of the farmer's and their number of sources of agricultural information. This implies that the tenure arrangement of farmers influences the number of sources used when seeking for agricultural information. The finding is similar to that of Gitonga (2015) who found a statistical significant relationship between farmers land tenure arrangement and their sources of agro forestry information.



***Membership of farmer group and sources of agricultural information***

The analysis further revealed that being a member of a farmer group was not significantly related ( $\chi^2 = 5.819$ ,  $df = 2$ ,  $p = 0.054$ ) to the agricultural information sources used. Although farmer groups serve as conduit to access production resources such as input, credit and information, being a member of a farmer group did not influence the number of sources used for accessing information according to this study. Similarly, Tetteh (2013) found that being a member of a farmer group did not influence access to extension service. Addai, Owusu and Danso-Abbeam (2015) confirmed this when they showed that there was no significant impact of farmer based organisation and easing access to productive inputs such as information. However, it is necessary for farmers to join or form groups since they serve as channels to receive external support.

***Farming experience and number of sources of agricultural information***

The analysis in Table 4.5 showed a significant relationship ( $\chi^2 = 10.61$ ,  $df = 4$ ,  $p = 0.031$ ) between farming experience and the number of sources of agricultural information utilised by the farmers. This results means that the number of years a farmer has spent in farming determines the number of sources from which he accesses agricultural information. Farmer networks are normally formed by people with the same characteristics; hence these farmers with similar experience on the field consult each other for advice in times of challenges.

However Ndagi et al. (2013) revealed that farming experience was not significant in influencing cashew farmers' attitude towards information sources use. Similarly, Rehman et al. (2013) established that the number of years spent in farming does not influence the farmers' agricultural information access.

***Alternative income source and number of sources of agricultural information***

From Table 4.5 no significant relationship ( $\chi^2 = 5.90$ ,  $df = 2$ ,  $p = 0.052$ ) was found between alternative income source and the number of agricultural information sources used by the cassava farmers. This implies that other income earning activities undertaken by farmers have no influence on whether they access information from a single source or multiple sources. Contradictorily Koskei et al, (2013) indicated off farm income to significantly influence farmers' access to information from varied sources.

***Farm size and number of sources of agricultural information***

The results further reveal no significant relationship ( $\chi^2 = 5.696$ ,  $df = 4$ ,  $p = 0.223$ ) between farm size and the number of sources of agricultural information used. This implies that a farmer's farm holding size does not influence his sources of agricultural information. Tetteh (2013) equally observed no significant relationship between a farmer's farm holding size and his access to agricultural information through extension service. Surendra and Mahesha (2015) also indicated no significant relationship between a farmers land holding size and his sources of agricultural information. The study however contradicts the findings of Mittal and Mehar (2015); Kapoor and Kumar (2015) who reported farmers' farm holding size to have a positive significant relationship with the sources of agricultural information used.

**Table 4.5: Influence of farmers' socio-economic characteristics on number of sources of agricultural information continued**

Farmer characteristics	Number of Sources of agricultural information								Chi-square
	0-3(Low)		4-5(mod)		6 - 8 (High)		Total		
	N	%	N	%	N	%	n	%	
Farmer group membership									
NO	84	42.0	63	31.5	11	5.5	158	79.0	$\chi^2 = 5.819$ df = 2 p = 0.054 NS
YES	18	9.0	16	8.0	8	4.0	42	21.0	
Total	102	51.0	79	39.5	19	9.5	200	100	
Land tenure system									
Self -owned	50	25	41	20.5	7	3.5	98	49.0	$\chi^2 = 11.21$ df = 4 p = 0.025 S
Rented	40	20.0	19	9.5	5	2.5	64	32.0	
Share Cropping	12	6.0	19	9.5	7	3.5	38	19.0	
Farming experience									
0 – 15 ( small)	61	59.8	30	38.0	7	36.8	98	49.0	$\chi = 10.61$ df = 4 p = 0.031 S
16 – 30	32	31.4	38	48.1	8	42.1	78	39.0	
Above 30	9	8.8	11	13.9	4	21.1	24	12.0	
Total	102	51.0	79	39.5	19	9.5	200	100	
Alternative Income source									
No	40	20	26	13	12	6	78	39	$\chi^2 = 5.90$ df = 2 p = 0.052 NS
Yes	62	31	53	26.5	7	3.5	122	61.0	
Total	102	51.0	79	13.5	19	9.5	200	100	
Farm Size(ha)									
0.04-0.51 (Small)	37	18.5	30	15.0	5	2.5	72	36.0	$\chi^2 = 5.696$ df = 4 p = 0.223 NS
0.52-1.0 (Medium)	49	24.5	28	14.0	8	4.0	85	42.5	
>1.0 (Large)	16	8.0	21	10.5	6	3.0	43	21.5	
Total	102	51.0	79	39.5	19	9.5	200	100	Total

**Source: Field data**

#### **4.4 Objective three: Relationship between types of agricultural information accessed and farm practices of the cassava farmers**

This section presents results on the relationship between types of agricultural information accessed and farm practices of cassava farmers in the Upper West Akim District of Ghana. The section begins with types of agricultural information accessed, followed by a description of the farm practices of the cassava farmers. The relationship between types of agricultural information accessed and farm practices were established using chi-square independent test.

##### **4.4.1 Types of agricultural information accessed**

As discussed in the preceding section majority of the respondents seek agricultural information to enhance their daily farm activities. Agricultural information sought by these farmers included; agronomic (information on improved cassava varieties, planting method/spacing, weed control measures, fertilizer use, disease control/prevention, information on storage, record keeping, weather information), market information and credit information.

The descriptive analysis in Table 4.6 has shown that majority of the farmers representing 87.0% of the respondent's accessed agronomic information with only 13.0% who did not access any agronomic information as listed below. This is similar to the findings of Banmeke and Ajayi (2008) who revealed that the most frequently sought information by farmers were agronomic (fertilizer application, harvesting methods) and market information. Although most of the farmers had access to this type of information their practices were different. For instance some of the farmers who had obtained information

on planting in rows at correct spacing had planted randomly. The same can be said for fertilizer use, this was because although some of them were aware of fertilizer application only a few (18%) did apply fertilizer on their farms. They attributed the less use of fertilizer to the lack of funds to purchase it. Others were also ignorant of the use of fertilizer for cassava production while some farmers also said it spoils the taste of the cassava. It can therefore be said that although these farmers obtain agronomic information, the application of this type of information to improve cassava production is hindered by other factors beyond the scope of this study.

It was also noted that market and credit information were sought by majority of these farmers. From Table 4.6 below it can be observed that a sizeable number representing 36.0% and 39.5% of the respondents do not seek market and credit information respectively. Majority of the farmers who seek market information voiced that their pricing depended on the information they obtain. It can be deduced that market information obtained by these farmers influence their marketing decision since this category of information is actually used but this type of information is mostly received from the traders who sometimes take advantage of the farmers.

**Table 4.6: Types of agricultural information accessed**

Type of agricultural information	NO		YES	
	N	%	N	%
Agronomic information	26	13.0	174	87.0
Market information	72	36.0	128	64.0
Credit information	79	39.5	121	60.5

**Source: Field data, 2015.**

#### **4.4.2 Farm practices of the cassava farmers**

Farm practices which enhance cassava production were identified and used in this study. These include; use of improved varieties, planting in rows at correcting spacing, crop rotation, use of fertilizers (both organic and inorganic), proper field sanitation, record keeping, weed control and timely harvest of cassava.

##### ***Improved Variety (Planting Material)***

Planting materials are very important in cassava production. It can be in the form of seeds or stem cuttings. Stem cutting is the main planting material used in the Upper West Akim district. The analysis of the above indicator showed that a sizeable number of the respondents accounting 27.0% never cultivate improved varieties of cassava. They explained that the local variety was indigenous from their fathers therefore do not see the need for change. Others also said the improved variety was not tasty when used for fufu hence prefer the local variety. Nineteen and thirty eight point five percent of the respondents rarely or sometimes cultivate the improved varieties respectively. Only 15.5 % of the farmers interviewed cultivate improved varieties always. This limited number was mostly those who processed the cassava into gari or cassava dough (agbelima). Most of the farmers in the district are aware of improved varieties but do not always cultivate them. Some explained that they went into improved variety cultivation during the Presidential Special Initiative on cassava (PSI). This was because they had ready market for the tubers as purchasing officers came around to buy them but stopped the cultivation when purchasing officers stopped coming for the tubers. Other factors could be attributed to their lack of knowledge on the benefits of cultivating the improved cassava varieties.

### ***Planting in lines***

Planting in lines at correct spacing is one of the most common recommendations made by extension personnel's to farmers. This is to enable them obtain maximum plant population and to increase yield. From Table 4.7 it can be observed that only 14.5% of the respondents plant their cassava in rows at correct spacing always while 22.5% and 26% of the farmers rarely or sometimes plant in rows at correct spacing. All together 48.5% of the farmers rarely or sometimes plant in rows while 37% never plant in rows but rather randomly. They said that planting in lines was tedious and also costly to undertake because they have to hire labour which was expensive hence could not afford.

### ***Fertilizer Application***

As discussed earlier majority of the farmers do not apply fertilizers on their farms. Only few rarely or sometimes apply fertilizers. From the analysis, the researcher noted that only 6% of the respondents apply fertilizers on their farms always. An overwhelming majority of the farmers totalling 82.0% never apply fertilizers on their cassava farms. They attributed this to the cost of fertilizers. Others also gave reasons that it spoils the cassava and render it tasteless while some few expressed their ignorance on the need to apply fertilizer to their cassava farm.

### ***Crop rotation***

Crop rotation is a practice which is widely known to have beneficial effect on the soil biosphere. This practice is not taken seriously by the cassava farmers in the study area. Only 4 of the farmers said they always practice crop rotation. Majority i.e. 65.5% rarely or

sometimes practice crop rotation. Quite an appreciable number of the farmers representing 32.5% never practice crop rotation on their farm lands.

### ***Proper farm sanitation***

Cassava farmers in Ghana hardly use agrochemicals in the control of diseases and pest. This is because they consider it as uneconomical and also the probability of the chemicals increasing pest population in future. Hence aside the use of improved resistant varieties, proper farm sanitation is also highly encouraged. From the study majority (11.5% and 53%) always or sometimes carry out proper field sanitation. The farmers explained that they destroy and burn left over leaves and stems after harvest including infested leaves and stems. This is to prevent the transmission of infective structures to the next generation of plants.

### ***Record Keeping***

Record keeping is an important farm management practice encouraged among all farmers. Record keeping enables farmers to match their cost with benefits which is very important in making farming decisions. Interestingly from the analysis, record keeping as a management tool has been ignored by these farmers. Only 3 of the respondents always keep farm records whilst as many as 60.0% of them rarely or sometimes keep farm records. The remaining 38.0% of the sampled farmers do not keep farm records. Although most of these farmers do not keep documented records they explained that they do the calculations in their head to know if they made profit or a loss.



***Timely harvesting of cassava***

Cassava should be harvested as soon as the tubers are matured. But timely harvesting of cassava varies depending on the variety, climate and soil. However, late harvesting also results in reduced quality as the roots become fibrous or rot. The analysis in Table 4.7 revealed that timely harvest of cassava is rarely or never done. Only 27.0% of the respondents sometimes or always harvest their cassava within the recommended time of 6 to 18 months after planting. Of this category only 5 farmers said they harvest on time always. Their reasons were that they harvest when they have buyers for the tubers since cassava deteriorates just within 48 hours after harvest.

**Table 4.7: Farm practices of the farmers**

Farm practices	Frequency of practice				
	Never	Rarely	Sometimes	always	Total
Improved varieties	54(27.0)	38(19.0)	77(38.5)	31(15.5)	200(100)
Row planting	74(37.0)	45(22.5)	52(26.0)	29(14.5)	200(100)
Crop rotation	65(32.5)	93(46.5)	38(19.0)	4(2.0)	200(100)
Use of fertilizers	164(82.0)	16(8.0)	8(4.0)	12(6.0)	200(100)
Farm sanitation	24(12.0)	47(23.5)	106(53.0)	23(11.5)	200(100)
Record keeping	76(38.0)	75(37.5)	46(23.0)	3(1.5)	200(100)
Weed control	10(5.0)	34(17.0)	91(45.5)	65(32.5)	200(100)
Timely harvest	47(23.5)	99(49.5)	49(24.5)	5(2.5)	200(100)

**Source: Field Data, 2015.****NB: Percentages are in parenthesis.*****Weed Control***

Weed control is critically essential for cassava cultivation. Weeds can reduce the yield of cassava by competing with the plant for food, space and sunlight. The researcher noted that weed control measured as a farm practice is not overlooked by the farmers. Only 5.0% of the farmers ignore weed control as a serious farm practice. It means these farmers see weed

control as an important practice. According to the respondents weeding was done either manually or by the use of herbicides.

Using the indicators in Table 4.7 above total scores was computed for each farm practice. A maximum total score of 32 was expected for these indicators by one respondent. The total score on practice was then transformed into three categories of 8-15 points as ‘low practice’, 16-22 points as ‘moderate practice’ and 23-32 points as ‘high practice’. The analysis has shown that on the whole 61.0% of farmers interviewed employ improve agricultural practices moderately on their farm. A considerable number of the respondents constituting 32.5% were found to be low practice farmers. Only 6.5% of the respondents were in the high category of improved agricultural practice. The result is shown in Table 4.8. This implies that majority 93.5% (low and moderate) of the farmers do not undertake all the necessary improved management practices needed for cassava cultivation. This result is however worrying since adoption of good agricultural practices leads to an improvement in yield.

**Table 4.8: Level of Farmers agricultural practice**

Level of agricultural practice	Frequency	Percentage
8-15 (Low)	65	32.5
16-22 (Moderate)	122	61.0
23-32 (High)	13	6.5
Total	200	100

**Source: Field data, 2015.**

#### **4.4.3 Relationship between the types of agricultural information accessed and the farm practices of the farmers**

The types of agricultural information accessed by the farmers namely, agronomic information; market information and credit information were cross-tabulated with level of farmers' practice as shown in (Table 4.9). The results have shown that only credit information ( $\chi^2 = 14.882$ ,  $df = 2$ ,  $p = 0.001$ ) had a significant influence on the farm practices of the cassava farmers. Intuitively it is logical to say that use of agricultural information obtained by farmers comes with cost. Meaning credit information and eventual access to the credit could possibly improve the farmers' level of practice. Access to credit may improve the practices of farmers such as fertilizer application, use of improved varieties and pest and disease management as these activities comes with cost. Similar to this study, Akudugu, Guo and Dadzie (2012) observed access to credit information to have a significant positive relationship with farmer's utilisation of improved agricultural technologies. This is because it is believed that access to credit information could enhance a farmer's eventual access to credit. Nenna (2014) also indicated that limited access to credit serves as a major constraint to small scale farmer's application of inorganic farming practices.

Agronomic information ( $\chi^2 = 0.366$ ,  $df = 2$ ,  $p = 0.833$ ) and market information ( $\chi^2 = 4.379$ ,  $df = 2$ ,  $p = 0.112$ ) were found not to have significant influence on the farm practice of the cassava farmers in the study area as in (Table 4.9). This implies that the agronomic and market information received by the cassava farmers do not influence their farming decisions to undertake a particular practice. Therefore a farmer may receive information on planting in lines at correct spacing but may not necessary plant in lines. For instance it is

expected that a farmer with access to market information will make judicious use of the information by harvesting his crops at the right time to meet market demand. Also continuous access to market information can help a farmer to study trends to know when to plant to meet high sales of produce. Although the findings are disappointing, the results are similar to that of Fafchamps and Minen (2012) who found market information not to have any statistically significant effect on the cultural practices of farmers. The outcome can be because, even though some of the farmers have access to market information, the information received did not have effect on the price received.

It can be deduced that the mere availability of agronomic information for example may not necessarily guarantee use by farmers but rather other factors will influence putting the information into practice.

**Table 4.9: Cross-tabulation of types of information accessed on practice of farmers**

Type of agricultural information	Agricultural practice						Total		Chi-square
	18-15(Low)		16-22(moderate)		23-32(High)		N	%	
	N	%	n	%	n	%			
<b>Agronomic information</b>									
NO	9	4.5	16	8.0	1	0.5	26	13.0	$\chi^2 = 0.366$ df = 2 p = 0.833 NS
YES	56	28.0	106	53.0	12	6.0	174	87.0	
Total	65	32.5	122	61.0	13	6.5	200	100	
<b>Market information</b>									
NO	29	14.5	37	18.5	6	3.0	72	36.0	$\chi^2 = 4.379$ df = 2 p = 0.112 NS
YES	36	18.0	85	42.5	7	3.5	128	64.0	
Total	65	32.5	122	61.0	13	6.5	200	100	
<b>Credit information</b>									
NO	38	19.0	36	18.0	5	2.5	79	39.5	$\chi^2 = 14.882$ df = 2 p = 0.001 S
YES	27	13.5	86	43.0	8	4.0	121	60.5	
Total	65	32.5	122	61.0	13	6.5	200	100	

**Source: Field data, 2015.**

#### **4.5 Objective four: Relationship between farmers' farm practices and their livelihood outcomes**

In this section, is presented the findings of the relationship between the cassava farmers' farm practices and their livelihood outcomes. As discussed earlier, eight indicators were used in measuring farm practices which includes; use of improved variety, planting in rows at correct spacing, practice of crop rotation, use of fertilizers, proper farm sanitation, record keeping, weed control, and timely harvest of cassava. The farm practices were transformed into low, moderate and high practice based on the farmers' level of practice. The livelihood outcomes of the cassava farmers are briefly described in the subsection that follows.

##### **4.5.1 Livelihood outcomes of cassava farmers**

The livelihood outcome indicators considered in the study were; farm yield, farm income, farmers' wellbeing and food security.

##### ***Level of yield per acre***

The mean yield of cassava per acre for the period 2012 and 2014 growing season was 5356kg (13.4t/ha). The minimum yield was 2184kg (5.46t/ha) and the maximum was 13680kg. The average yield recorded was 13.4mt/ha. This recording agrees with Osei-Adu (2011) who indicated 12.6mt/ha as the average yield of cassava in the eastern region although both figures are lower than the national average of 16.8mt/ha (MOFA, 2013). Majority of the respondents (66.5%) were within the low level of cassava yield while the remaining (33.5%) were within the high level of yield category. The researcher accedes this results were obtained because most of the farmers do not have frequent access to

information on improved management practices from extension officers. As indicated earlier most of the farmers were ignorant of the application of fertilizer on cassava. Also only a few of the farmers interviewed always cultivated improved varieties which could be another factor. The summary is presented in Table 4.10

**Table 4.10: Level of farmers' average annual yield/acre**

Category	Frequency	Percentage
Low (< 5500kg)	161	80.5
High (>5500kg )	39	19.5

Note: Minimum = 2184Kg, Maximum = 13680kg, Mean =5356kg and N= 200

#### **4.5.2 Relationship between farmers level of farm practices and average yield**

The results from the cross tabulation in table 4.11 indicates a significant relationship ( $\chi^2 = 39.0114$  df= 2 p= 0.000) between the farmer's level of farm practice against their yield. This implies that a farmers level of improve management practices has an influence on his yield. The findings are in line with Agbage et al. (2008) who reported that improve agronomic practices causes an increase in the yields of kenaf fibre. Likewise, Asuming-Brempong (2009) observed difference in crop yields as a result of different management practices undertaken by farmers. Aikins, (2014) also found from his study of cocoa farmers that access to agricultural information and subsequent use of the information by practicing influenced the yield of cocoa.

**Table 4.11: Cross tabulation of farmers level of farm practices and average yield**

Level of agricultural practice	Level of yield				Total	
	Low (< 5500)		High (>5501)			
	N	%	N	%	N	%
Low (8 – 15)	63	96.9	2	3.1	65	100
Moderate (16 – 22)	95	77.9	27	22.1	122	100
High (23 – 32)	3	23.1	10	76.9	13	100
Total	161	80.5	39	19.5	200	100

*Source: Field Data, 2015.*

$$\chi^2 = 39.014 \quad df= 2 \quad p= 0.000 < 0.05$$

#### 4.5.3 Farmers' average annual income

Table 4.12 shows a summary of farmers' average annual income from the sale of cassava. The mean average annual income of farmers was GH¢ 2097. The minimum income level was GH¢ 150 per year and the maximum was GH¢ 9000 per year. From the results most of the respondents (80.0%) were in the low level income category and 20.0% were in the high level income category. This result is however alarming as income influence a farmer's use of improved agricultural practices. With improved income, the farmer will be able to spend more on recommended farm practices which can further increase his earnings (Opara, 2010). Since majority of the respondent from the district are in the low income level category, there is the need for measures to be undertaken that will help raise their annual earnings. This is because low income level influences the farmer's well-being.

**Table 4.12: Level of farmers' average annual income**

Category	Frequency	Percentage
Low ( $\leq$ 3000)	160	80.0
High ( $>$ 3001)	40	20.0
Total	200	100

Note: Minimum = GH¢150, Maximum = GH¢9000, Mean = GH¢2097 and N= 200

**Source: Field Data, 2015.**

#### **4.5.4 Relationship between farmers level of farm practice and average annual income**

From the results, the chi-square test ( $\chi^2 = 10.898$  df= 2 p= 0.00) indicates a significant relationship between the cassava farmers level of farm practices and their average annual income. This implies that the farmer's level of practice has an influence on their income level. It is believed that when farmers accept and apply improve management practices it will lead to an improvement in their yield which can also transcend to income from the sales of the produce. In agreement with the above, Hailu, Abrha, and Weldegiorgis (2014) revealed that agricultural technology acceptance has a positive significant effect on farm income. Likewise Aikins (2014) observed a statistically significant relationship between farmers use of agricultural information and their income. It can be further deduced from Table 4.13 that some farmers (3.5%) who under took high level of practice were within the high income ( $>$  Ghc ¢3000) level category whiles other (3%) who also undertook high level of practice were within the low income level category. This variation in income can be attributed to several factors such as the variety used and planting density. This is because planting in lines allows for more plant population compared to random planting. Variety is also an important factor since the improved varieties yield more per land area compared to the local varieties thus farmers likely to earn more. The finding is confirmed



by Afolami, Obayelu and Vaughan (2015) who revealed that the use of improved cassava varieties increases the annual income of farmers' in Nigeria and subsequently their well-being. The table further shows that (77%) of the respondents who undertook low and moderate level of practice were within the low income level category. This is in line with the findings of Anyiro and Onyemachi (2014) who showed that farmers who accepted the used of cassava value added innovations had higher income levels compared to the others who did not adopt. Adofu, Shaibu and Yakubu (2011) also found that the revenue of farmers increased after their acceptance to apply improved agricultural technologies.

**Table 4.13: Farmers level of agricultural practice and average annual income**

Level of agricultural practice	Level of Income				Total	
	Low (< 3000)		High (> 3000)			
	N	%	N	%	N	%
Low (8 – 15)	51	25.5	14	7.0	65	100
Moderate (16 – 22)	103	51.5	19	9.5	122	100
High (23 – 32)	6	3.0	7	3.5	13	100
Total	160	80.0	40	20.0	200	100

**Source: Field Data, 2015.**  $\chi^2 = 10.898$   $df= 2$   $p= 0.00 < 0.05$

#### 4.5.5 Farmers' wellbeing

The results in Table 4.14 indicates that majority of the cassava farmers' 54% and 35.5% often or sometimes have access to health care. Only 8% of the respondent's mentioned did not have access to health care. Majority had access to health care because they had registered with the National Health Insurance Scheme (NHIS). The last categories were those who had not registered with the NHIS so were unable to access healthcare sometimes because of the need to pay when they visit the hospital.

Also only 8% of the respondents always had access to good drinking water. These were the people who said they drink only sachet water and pipe borne water when available. Majority 86.5% sometimes or often had access to good drinking water. This is because most of the inhabitants drink from the river because pipe borne water is scarce. Others also drink from bore holes but some of these bore holes are broken down hence not functional, the few functional ones are sometimes located far from where they stay hence not able to fetch from it every day.

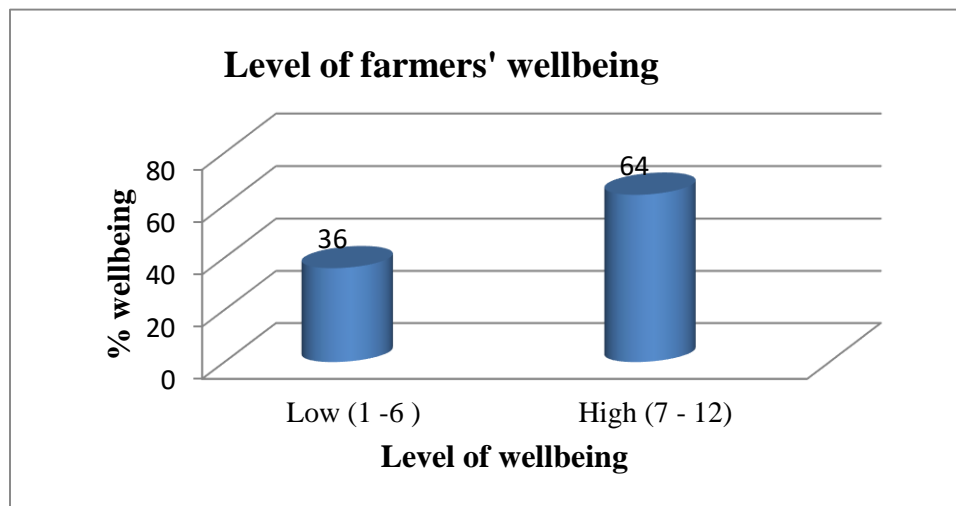
Furthermore, great sum of the respondents 53.5% and 40% are often or sometimes able to afford their childrens' education. Only 3.5% mentioned their inability to afford their childrens education. Ghana has introduced the Free Compulsory Universal Basic Education (FCUBE), free feeding programme and free school uniform distribution where children up to the basic level can attend public schools for free and also have access to these social interventions. This explains why many of the respondents are often able to afford their childrens education irrespective of their low income levels. The few 3.5% who mentioned their inability to afford their childrens' education is because some of their children are at the secondary and tertiary level hence payment of fees and other school items are difficult.

**Table 4.14: Farmer’ wellbeing**

Indicators		Response (%)				Total
		Never (1)	Sometimes (2)	Often (3)	Always (4)	
1	Access to health care	8	35.5	54	2.5	100
2	Access to good drinking water	5.5	47.5	39	8.0	100
3	Affordability of childrens’ education	3.5	40	53.5	3	100

**4.5.6 Level of Farmers’ wellbeing**

Results from Figure 4.2 shows that majority of the farmers (64.0%) had a high level of wellbeing (7 – 12) whiles the remaining 34% had low level of wellbeing. The high percentage of farmers within the high level of wellbeing could be attributed to the provision of free basic education, provision of boreholes and the existence of the NHIS in Ghana. Since majority are in the high level category, a conclusion could be reached that farmers are able to satisfy the basic necessities that make life bearable.



**Figure 4.2: Level of farmers’ wellbeing**  
*Source: Field Data, 2015.*

#### 4.5.7 Farmer's agricultural practice and level of well-being

The results from the cross tabulation indicates no significant relationship ( $\chi^2 = 5.715$  df= 2 p=0.57) between the farmers level of agricultural practice and their well-being as observed in Table 4.15. This implies that farmer's well- being (food, water, health) is not dependent on their level of agricultural practice.

Contrary to this Ayoade (2013) showed that the use of improved cassava variety impacted the social life of cassava famers. This was by an improvement in their housing conditions, health care, water consumption and their mobility status. Amao and Awoyemi (2008) also observed that poverty was high among households which refused the use of improved cassava varieties.

**Table4.15: Cross tabulation of farmer's farm practices and level of well-being**

Level of Farm practices	Level of well-being				Total	
	Low (1-6)		High (7-12)			
	N	%	N	%	N	%
Low (8 – 15)	31	47.7	34	52.3	65	100
Moderate (16 – 22)	37	30.3	85	69.7	122	100
High (23 – 32)	4	30.8	9	69.2	13	100
Total	72	36.0	128	64.0	200	100

$\chi^2 = 5.715$  df= 2 p=0.57 > 0.05( NS)

#### 4.5.8 Farmers' food security

Food security has become an important issue in the country due to the widespread and in depth of poverty. From the study households food availability and affordability was used to connote the households' food access. A household's access to food concerns the ability to regularly acquire adequate amounts of food, through a combination of its own home production and stock, purchase or gift. From the study most of the farmers' interviewed 48.5% and 42.5% often or sometimes have food available in the household. Only 3%

always had food in the household. The later represents the categories who indicated always having food at home and therefore consistently eat three meals a day (breakfast, lunch and supper). Only 6% claim they never have food available. They explained that they cultivate a small land area and also have to share the proceeds of the harvest with the land owner hence it was difficult to always have food in the house. With regard to affordability of non-cultivated food items 33.5% of the respondents were always able to make provision for their household's food items that are not cultivated, for instance vegetables and rice. Only 5% of the respondents were incapable of affording non cultivated food items for the household as observed in Table 4.16. The above results imply that majority of the farmers' were food insecure considering the definition of food insecurity by World Food Summit, (1996) as cited by FAO (2006) which states that "when all people, at all times, do not have physical and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active healthy life, then indeed, the people are going through food insecurity".

Contrary, Muller-Kuckelberg (2012) indicated that majority of farmers (66.9%) in Ghana were food secured because they depended mostly on their cultivated crops. However the low incomes of farmers which is deterring the youth from agriculture coupled with soaring food prices is a cause for concern. Nyanteng and Asuming-Brempong (2003) opines that major food security issues are incomes, food and non-food prices (inflation), which impact on access to adequate quantities of the available food.

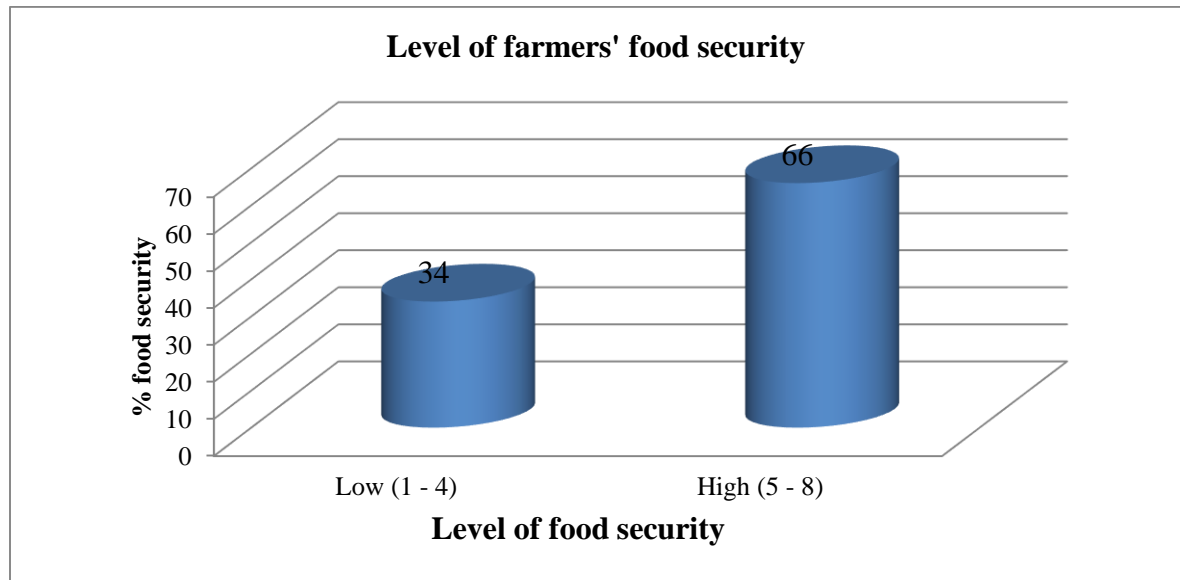
**Table 4.16: Farmers’ food security**

Indicators		Response (%)				Total
		Never (1)	Sometimes (2)	Often (3)	Always (4)	
1	Availability of food to household	6	42.5	48.5	3	100
2	Affordability of non-cultivated food	5	48.5	13.0	33.5	100

**Source: Field data 2015**

**4.5.9 Farmers level of food security**

The results show that majority of the respondents representing 66% were highly food secured while 34% of the respondents were in the low level category (Figure 4.3). This implies that majority of the farmers have access to food and are also able to afford the non-cultivated food items needed by the household.



**Figure 4. 3: Level of farmers' food security**

#### 4.5.10 Relationship between farmers' level of farm practices and level of food security

It can be inferred from Table 4.17 that no significant relationship existed between the farmer's level of farm practices and their food security. This implies that the level of good agricultural practices undertaken by the respondents does not influence their food security level. However this is contradicting to Nata, Mjelde and Boadu (2014) who opined that the adoption of improved agricultural practices and technologies may help improve production and reduce food insecurity. Although no significant relationship existed between the farmer's level of agricultural practice and their food security, majority of the respondents (76.9) within the high level of agricultural practice were also highly food secured.

**Table 4.17: Cross tabulation of farmer's level of farm practices and level of food security**

Level of farm practices	Level of food security				Total	
	Low (1-6)		High (7-12)			
	N	%	N	%	N	%
Low (8 – 15)	28	43.1	37	56.9	65	100
Moderate (16 – 22)	37	30.3	85	69.7	122	100
High (23 – 32)	3	23.1	10	76.9	13	100

$$\chi^2 = 3.811 \quad df = 2 \quad p = 0.149 > 0.05$$

#### 4.6 Summary

This chapter was used in presenting the results of the study according to the objectives stated. It was noted that majority of the farmers seek for agricultural information from their fellow farmers but their main source of weather information was from the radio. The analysis also showed that only age, farming experience and land tenure arrangement has significant influence on sources of agricultural information. Sex, level of education, group membership and farm holding size were found to have no significant influence on farmers' sources of agricultural information. Further analysis revealed that, although, majority of

the farmers sourced for agronomic, market and credit information, it was only credit information which was found to have a significant influence on the farmers practices in the study area. Finally, there was direct significant relationship between the farmers' level of farm practices and their yield and income but no significant relationship were found between well-being and food security.



## **CHAPTER FIVE**

### **SUMMARY, CONCLUSION AND RECOMMENDATIONS**

#### **5.0 Introduction**

This chapter presents the summary of the study, more precisely major findings of the study, conclusion and recommendations for policy makers.

#### **5.1 Summary**

Upper West Akim is one of the districts in the Eastern Region predominantly known for the cultivation of cassava. Cassava offers employment, food and income for farmers, processors and distributors along the value chain. Cassava production in the district is dominated by smallholders who are usually limited by a variety of constraints such as lack of access to credit and input, imperfect markets, inability to bear risk and mostly information and skills gap that prevents the adoption of available technologies and management practices.

Cassava farmers in the district have a variety of information needs; constant information is needed on agronomic practices, disease and pest control, postharvest practices and credit accessibility. However, these information requirements are unmet by the public extension agents who are mandated to deliver agricultural information to the farmers. The inadequate access to information and the relevance of the agricultural information have resulted in poor farm practices which affect yield, income and wellbeing of the farmers. In view of these, it was necessary to investigate the sources used by cassava farmers in the Upper West Akim District in accessing agricultural information and the usefulness of the information received from the various sources to ascertain its influence on their farm

practices as well as their livelihood outcomes. The following research questions therefore formed the basis of the study.

- i. What are the sources of agricultural information available to the cassava farmers?
- ii. Do the personal characteristics of the cassava farmers influence their sources of agricultural information?
- iii. How does the type of agricultural information accessed contribute to an improvement in the farm practices of the cassava farmers?
- iv. To what extent do the farm practices of the cassava farmers contribute to an improvement in their livelihood outcomes?

To answer the research questions posed above, the following objectives were pursued by the researcher.

- i. To determine the sources of agricultural information available to the cassava farmers in the district.
- ii. To determine the relationship between the personal characteristics of the cassava farmers and their sources of agricultural information.
- iii. To determine the relationship between the types of agricultural information accessed and the farm practices of the cassava farmers
- iv. To examine the relationship between the cassava farmers agricultural practices and their livelihood outcomes

The survey method was used in carrying out the study. Multi-stage sampling procedure was employed in the selection of communities and respondents. In the first stage, simple random sampling was used to select five operational areas out of ten in the district. In the

second stage, 16 communities were randomly selected from the five operational areas. Finally systematic sampling approach was used to reach the cassava farmers from the 16 communities. In all 200 cassava farmers were sampled for the survey. Data collected was stored and analyzed using SPSS Version 21 Software. Both descriptive and inferential statistical tools were used in analyzing the data. The descriptive statistical tools include frequency tables and bar graphs. Chi-square test of independence was the main inferential statistical tool employed in the analysis of the data because most of the variables of interest were measured on nominal and ordinal scale.

### ***Objective one***

It was noted that majority of the farmers accounting for 82.0% of the sample size seek agricultural information from their fellow farmers, 46% from AEA's, 38% from input dealers 29.5% from mobile phones and 6.5% from newspapers or agricultural bulletin. The descriptive analysis also revealed that majority of the farmers interviewed do not seek information using television, mobile phones and newspapers/agricultural bulletin. It was however found that 66.0% of the respondents receive agricultural information through the use of radio.

### ***Objective two***

The analysis has shown that age ( $\chi^2 = 12.694$ ,  $df = 4$ ,  $p = 0.013$ ), farming experience ( $\chi^2 = 10.61$ ,  $df = 4$ ,  $p = 0.031$ ) and the land tenure arrangement ( $\chi^2 = 11.21$ ,  $df = 4$ ,  $p = 0.025$ ) of the farmers had significant influence on sources of agricultural information used. Sex of respondents ( $\chi^2 = 2.550$ ,  $df = 2$ ,  $p = 0.279$ ), level of education ( $r = 0.041$ ,  $p = 0.556$ ),

membership in farmer organisation ( $\chi^2 = 5.819$ ,  $df = 2$ ,  $p = 0.054$ ) and farm size ( $\chi^2 = 5.696$ ,  $df = 4$ ,  $p = 0.223$ ) were found to have no significant influence on the sources of agricultural information.

### ***Objective three***

Further analysis revealed that, although, majority of the farmers source for agronomic, market and credit information, it was only credit information ( $\chi^2 = 14.882$ ,  $df = 2$ ,  $p = 0.001$ ) which was found to have a significant influence on the farm practices of the farmers in this study. Which implies credit information and eventual access to the credit could possibly increase level of improvement in farmers' practices by farmers.

### ***Objective four***

Finally, the study establishes that the farming practices undertaken by the farmers have statistically significant relationship with their level of yield and income but not well-being and food security. This may imply that attaining a high state of well-being and food security by cassava farmers lies beyond just adopting good agricultural practices.

## **5.2 Conclusion**

The study found that age, farming experience and land tenure arrangement of farmers has significant influence on sources of agricultural information. Sex of respondents, level of education, membership in farmer organisation and farm size were found to have no significant influence on sources of agricultural information.

It was also revealed in this study that, although, majority of the farmers source for agronomic, market and credit information, it was only credit information which was found to have a significant influence on agricultural practices of the farmers. Which implies

credit information and eventual access to the credit could possibly increase level of agricultural practices of these farmers.

Finally the study established that farm practices of the farmers have no direct significant influence on livelihood outcomes (well-being and food security) but yield and income. Meaning, what eventually influences the livelihood outcome of cassava farmers lies beyond improve agricultural practices alone. The study also revealed that the yield of the cassava farmers were far below the national average. This implies that extension officers have to do more by making farmers aware of the benefits of cultivating the improved varieties as well as undertaking the recommended agronomic practices. This will enable them increase their yield and subsequently improve their income and standard of living.

### **5.3 Recommendations**

Credit information was found to have a significant influence on agricultural practices of the farmers. It is hereby recommended that extension officers in the district should extend credit information to these farmers and assist them to access the credit. This may ensure that agricultural information obtained by the cassava farmers can be put into practice. Small holder farmers should also be encouraged to subscribe to groups in other to enhance their market participation and also access to productive resources.

Finally, aside agricultural practice, future studies should explore other variables to determine what actually influences the livelihood outcomes of farmers.

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**APPENDIX**

**DEPARTMENT OF AGRICULTURAL EXTENSION  
COLLEGE OF AGRICULTURE AND CONSUMER SCIENCES  
UNIVERSITY OF GHANA**

Survey questionnaire for cassava farmers to solicit data on the topic **“The influence of agricultural information sources on the practices and livelihood outcomes of cassava farmers in the Upper West Akim District of Ghana”**

The study is purely for academic purposes. All information provided would be treated as private and confidential.

Questionnaire number .....

Date...../...../2015

Telephone number .....

Town.....

**SECTION A FARMER CHARACTERISTICS**

1. Name of respondent: .....
2. Gender 1. Male [ ] 2. female [ ]
3. Age in years .....
4. Highest educational level, (*Tick indicating the highest level of education*)
  1. No formal education [ ] 2. Basic education [ ] 3. Secondary [ ]
  4. Tertiary [ ]
5. What is the number of years spent in school? .....
6. How long have you been farming? ..... years
7. Do you belong to any farmer base organization? 1. No [ ] 2. Yes [ ]
8. How has your household’s average annual income from farming been?
  1. Increased [ ] 2. Reduced [ ] 3. Stable [ ]

9. Is farming the only source of income for your household? 1. No [ ] 2. Yes [ ]

9a. If no, which other sources do you get income from? .....

**SECTION B AGRICULTURAL INFORMATION SOURCES AND TYPE**

10. What are your sources of agricultural information? Tick as applicable

a. Agricultural Information Source	Tick as applicable	b. Rank in order of preference	c. Frequency of access to information from source 1. always 2. Some times 3. Rarely 4. Never	d. Frequency of information utilization from source? 1. always 2. Some times 3. Rarely 4. Never
Fellow farmers				
Agricultural Officer				
Input Dealers				
Traders				
Radio				
Television				
Mobile Phone				
newspaper or agric bulletin				

11. What is your reason for the most and least preferred choice?

Most.....

Least.....

12. What is your most important agricultural information need? Rank in order of need.

INFORMATION NEED	RANKING
Agronomic information	
market information	
Credit information	
weather information	
Post- harvest management	

13. What type of agricultural information do you access?

a. Type of agricultural information	Tick as applicable	b. From which source did you obtain the information? <b>1. Interpersonal</b> Input dealer, trader Fellow Farmer, Extension agent <b>2. Mass media</b> Radio, TV, Mobile Posters Newspaper Extens.bulleting	c. How relevant was the information accessed? 1. Very relevant 2. Relevant 3. Somewhat relevant 4. Not relevant
New varieties or planting material			
Planting in lines at correct spacing			
Weed Control			
Fertilizer use			
Disease prevention and control			
Storage			
Record keeping			
Credit availability			
Market opportunities			
Weather information			

**SECTION C INFORMATION USE ON AGRICULTURAL PRACTICES**

**Planting method/variety**

14. What variety of cassava do you cultivate?

1. Improved variety [ ]    2. Local variety [ ]    3. Both [ ]

15. What is your reason for cultivating the said variety?

.....  
 .....

16. Where do you get your planting materials?

1. Personal [ ]    2. Other farmers [ ]    3. Agric office [ ]    4. Other, specify [ ]

17. What planting method do you use in cultivating?

1. Random [ ]      2. In row at correct spacing [ ] (if 2 go to 18)

18. What is the spacing used if planted in lines? .....

**Weed control.**

19. How many times did you weed your cassava farm last year? .....

19a. what method did you use in weeding?

1. Manual weeding [ ]    2. Weedicide [ ]    3. Both [ ]

**Fertilizer use**

20. Do you apply fertilizer to your cassava farm? 1. No [ ]    2. Yes [ ] (yes go to 24, no go to 25)

24. What type of fertilizer do you apply? 1. Organic [ ]    2. Inorganic [ ]

25. If no?

Why.....  
.....  
.....

26. Apart from the use of fertilizer do you undertake any soil management practices?

1. No [ ]    2. Yes [ ] (If yes go to 26a)

26a. Indicate any of the soil management practices undertaken?

1. Crop rotation [ ]    2. Land farrowing [ ]    3. Green manuring [ ]    4. Intercropping [ ]  
5. Other.....

**Pest and disease control.**

27. Do you experience pest on your farm? 1. No [ ]    2. Yes [ ]

(if yes go to 27a&28 if no go to 29)

27a. what kinds of pest do you experience?

.....  
.....

28. What pest management practices do you undertake when pest are observed?

.....  
 .....

29. Do you experience disease infestation on your cassava farm? 1. No [ ] 2. Yes [ ]

30. What diseases do you often observe on your cassava farm?

.....  
 .....

31. How do you manage or control the disease? .....

.....

**Harvesting and storage**

32. How do you store/keep your cassava after harvest?

.....

33. For each of the farm practices below tick appropriately according to the frequency with which you undertake them. *Where 1 = never, 2 = rarely, 3 = sometimes, 4 = always*

Agronomic practices	Frequency of use			
	Never	Rarely	Sometimes	Always
I use improved variety				
I use diseased-free planting materials				
I plant in rows using recommended planting distances				
I practice crop rotation				
I use both organic and inorganic fertilizers in balanced proportions for improvement of soil fertility				
I practice proper field sanitation by removal and pruning infested plant parts				
I keep records of all farm operations				
I weed at least thrice before cassava matures				
I harvest my cassava during 6 to 18 months of age				

**Marketing**

34. Where do you sell your cassava commodities?

1. Local market [ ] 2. Urban market [ ] 3. Industries [ ] 4. Other [ ]

specify.....

35. To whom do you sell your commodities to?

1. Local retailers [ ] 2. Urban Traders [ ] 3. Local wholesalers [ ] 4. Other [ ]

specify.....

36. Do you access price information before selling commodities?

1. No [ ] 2. Yes [ ] (if yes go to 38a)

36a. Does the information obtained influence the price at which you sell?

- 1.No [ ] 2. Yes [ ]

**Weather information**

37. Do you receive weather information from the sources? 1. No [ ] 2. Yes [ ]

37a. how do you predict weather conditions?

.....

.....

37b. Does the weather information obtain influence the performance of your above listed management practices such as weeding, planting, fertilizer application, harvesting and chemical spraying? 1. No [ ] 2. Yes [ ]

**Records keeping**

38. Do you keep records of your farming activities? 1. No [ ] 2. Yes [ ]

38a. If no, are you able to account for the expenditure on the farm? 1. No [ ] 2. Yes [ ] (if yes go to 38b)

38b. If yes how?

.....

.....

**SECTION D LIVELIHOOD OUTCOME**

39. What is the total land area under cassava cultivation? ..... acres

40. What has been your yield for cassava in the past three years?

Years	Acres	Tonnage/Bags
2011/2012		
2012/2013		
2013/2014		

41. How many bags of cassava makes 1 rope (10 \*10).....

42. What is the average weight of 1bag of cassava.....

43. What is the land tenure arrangement for the land under cassava cultivation?

a. Owner [ ] b. Rented [ ] c. sharecropping [ ] e. other.....

44. Apart from Cassava which other crops do you cultivate?

.....  
 .....

45. How much do you earn from the sales of the crops?

Crops	Bags	Amount (GHC)
Cassava		

46. What is your average annual income from the sales of cassava? GHC.....

47. What is your average annual income from the sales of the other crops? GHC.....

48. **Well-being** Indicator. Indicate how accessible these are to your household?

Indicators		Response (%)				Total
		Never (1)	Sometimes (2)	Often (3)	Always (4)	
1	Access to health care					
2	Access to good drinking water					

3	Affordability of childrens' education					
---	---------------------------------------	--	--	--	--	--

49. **Food security** Indicate how food is to your household?

	Indicators	Response (%)				Total
		Never (1)	Sometimes (2)	Often (3)	Always (4)	
1	Availability of food to household					
2	Affordability of non-cultivated food					

50. What are the Components of the food? Breakfast.....

ii. Lunch..... iii Supper.....

**THANK YOU**