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DEPARTMENT OF AGRICULTURAL EXTENSION

**SMALLHOLDER ACCESS TO AGRICULTURAL PRODUCTIVE RESOURCES
IN THE DANGME EAST AND WEST DISTRICTS OF GHANA.**

BY

TETTEH, JONATHAN NARTEY

10397182



**THIS DISSERTATION IS SUBMITTED TO THE UNIVERSITY OF GHANA,
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DECLARATION

I, TETTEH, JONATHAN NARTEY do hereby declare that, except for the references made to other people's work which have been duly cited, this dissertation is the result of my own research. I hereby declare that this dissertation has neither been presented in whole or in part for the award of another degree elsewhere.

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TETTEH, JONATHAN NARTEY

(STUDENT)

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DATE

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DR. COMFORT FREEMAN

(SUPERVISOR)



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DATE

DEDICATION

This work is dedicated to Joyce and Batsa Nartey for their prayers and support, and to my Father Christopher Tetteh Kpodji.



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I sincerely thank Dr. Comfort Freeman for her invaluable support, guidance and encouragement throughout all the stages of this work which has resulted in the completion of this dissertation. But for her, I am sure I could not have completed this work.

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Special thanks to my wife for her continued support, encouragement and prayers throughout my studies.



LIST OF ABBREVIATIONS

FAO –	Food and Agriculture Organisation
FASDEP –	Food and Agriculture Sector Development Policy
GLSS –	Ghana Living Standard Survey
GSS –	Ghana Statistical Service
IFAD –	International Fund for Agricultural Development
IFPRI –	International Food Policy Research Institute
MOFA –	Ministry of Food and Agriculture
SRID –	Statistics, Research and Information Directorate
WFP -	World Food Programme



ABSTRACT

Smallholder farmers in Ghana are confronted with the problem of low crop yields as a result of their lack of access to agricultural productive resources. Smallholder farmers within the Dangme East and Dangme West districts are no exception. The objective of this study was to examine the socio-economic and institutional factors that influence smallholder farmers' access to productive resources. Data was collected from 150 respondents who were selected from the Dangme East and Dangme West districts of Ghana, using simple random sampling technique and analysed with the Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics such as frequencies, percentages, cross tabulations and chi-square tests, were used to analyze the data. Results of chi-square test at 95% confidence level indicates that socio-economic factors such as age influence access to land, credit, inputs and labour; with level of education influencing only labour while size of household had influence on access to extension services. There were no gender differentials in accessing productive resources in the study area. Size of land holding had influence on inputs, credit, land and labour, while farmer group membership was found to influence access to credit and inputs but did not influence access to extension services, land, labour, and technology. The studies recommends that, the government fertilizer subsidy programme should be continued while the government subsidy policy should include other productive resources like herbicides, insecticides and improved seeds. The Ministry of Food and Agriculture should continue to encourage farmer group formation for easy access to extension services and credit.

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CHAPTER ONE

INTRODUCTION

1.1 Background

Agriculture has been the backbone of Ghana's economy in the entire post-independence history (McKay and Aryeetey, 2004). Ghana's economy has over the years relied on the agricultural sector. The sector employs about 51 percent of the labour force and is the largest foreign exchange earner (MoFA, 2010a). Agriculture in Ghana is dominated (90%) by smallholder farmers whose total farm holdings are less than 2 hectares in size (MoFA, 2010b).

In Ghana, a myriad of challenges confront the agricultural sector made up of small-holder farmers. Among the challenges is the access to agricultural resources by farmers. Agricultural resources are resources used to produce agricultural outputs and to support production as well as manage agricultural products. Agricultural resources have been defined to include input, credit, fertilizer, land, labour, improved seeds, livestock and extension services. The concept of accessibility means, the ability to get resources and accrue benefiting from them. Accessibility can be conceptualized as the extent to which beneficiaries get resources from the source.

Extension service is expected to play a significant role by providing adequate and relevant agricultural information to farmers to facilitate their access to and use of agricultural resources. However, small holder farmers have not been able to do so due to a number of technical and institutional factors that confront it. Farmer's access to agricultural extension services is also limited because of the small number of extension agent relative to the number of farmers.

The Food and Agricultural Sector Development Policy is (FASDEP) second objective which focuses on increased growth in income and reduced income variability, noted that earnings in the agricultural sector is generally lower in comparison to other sectors due to the fact that, farmers had limited access to key productive resources like land, credit, information and technology as one of the main issues of low productivity in the agricultural sector (MOFA, 2009).

The Dangme East and West Districts of Ghana covers a large area of the Greater Accra Region and produces major crops like cereals, example Rice and Maize, Vegetables like Tomato, Okra, Onions and Chili Pepper, Fruits like Mango, Watermelon and Banana among others. Most of the farmers in the districts have low incomes characterized by high incidence of poverty and food insecurity. Although, they have the potential of becoming a major agricultural hub and has been designated as one of the breadbaskets of Ghana (MOFA, 2010b). The rapid increases in human population and exploitative use of productive resources like land have lead to low crop production thereby intensifying food insecurity.

It is estimated that the annual rice production yield in the Dangme West district, the highest in the Region is 5.5tons per hectare falling short of an expected yield of 7.0 tons per hectare and as low as 3.5 tons per hectare in the Ga West district. Expected yield for vegetables like chili pepper and okra is 10-20 tons per hectare but yields are as low as 3.5-4.0 tons in the Tema Municipal with Dangme East recording between 5.5-8.0 tons per hectare as illustrated in the table 1 below.

Some studies with Ghana, noted that the country's agriculture is characterized by low crop and animal production. Yields of most crops are generally low and have remained almost

constant for the past six years with most yields being about 60% of achievable yield (IFPRI, 2007; MOFA, 2009).

Table 1: Estimated and actual yields of some major crops in the Greater Accra Region.

DISTRICTS	CROPS	ESTIMATED YIELD (Mt /Ha)	ACTUAL YIELD (Mt/Ha)
Dangme West	Rice	7.0	5.5
Dangme East	Pepper /Okra	10-20	5.5-8.0
Tema Metropolitan	Pepper /Okra	10-20	3.5-4.0
Ga West	Rice	7.0	3.5

Source: MOFA, SRID 2010.

A major reason for the non-attainment of achievable yields is low use of resources which is partly due to the fact that, the average food crop producer is resource poor and therefore uses little or no resources, like fertilizer, insecticides, high yielding varieties or irrigation based cultivation (MOFA, 2009).

Farmer groups and cooperatives have been known to facilitate access to credit, pull resources together to purchase in bulk, acquire production and processing equipments, bargain higher pricing for their commodities through collective processing, bargaining and marketing (World Bank Report, 1995).

Other socio economic characteristics of farmers, such as education, age and gender also influence a farmer's ability to access and control agricultural resources. A number of researches have also indicated that in many places there is differential access to agricultural resources by men and women, of which the bulk of female farmers remain without adequate access to productive resources (Saito and Weidemann, 1990; Freeman

and Richardson, 2005). It had also been found that the same situation exist in Ghana (Duncan and Brunt, 2004).

Recent food price increases and high levels of inflation have provided an opportunity to increase farmers' profitability by increasing their Production. However, to realize the benefits, farmers need to access a wider range of information, related not only to production technologies but also to productive resources and access to remunerative markets. (Adhiguru et al., 2009). For example, technology information needs to be supported with information about reliable sources for that technology, and where credit and other resources can be accessed.

Farmer organizations also have the advantage of facilitating or assisting members to obtain credit, input and supplies, market their produce, share information and to educate themselves on their farming activities as well as access to agricultural resources by a large number of farmers (MOFA, 2007).

Consequently FASDEP II also recognizes the need to promoting the formation of viable farmer groups with gender equity to enhance the knowledge, skills and access to resources along the value chain, and for stronger bargaining power in marketing (MOFA, 2009).

However, both empirical evidence and experience from the field suggest that farmer access to resources are generally weak, unsustainable and therefore ineffective to enhance production and improve standards of living (Breisinger et al., 2008). It is also noted that, the rural small scale farmers are isolated, undereducated and lack the means to win greater access to resources and markets (FAO, 1997).

It is therefore important to pay particular attention to the factors affecting the small scale farmer's access to and use of agricultural resources in Ghana as they are found in the Dangme East and West Districts of the Greater Accra Region of Ghana.

1.2 Problem Statement

In Ghana, low productivity in the agricultural sector raises much concern for every farming population that relies heavily on agriculture.

Although the Dangme East and Dangme West Districts are known to have the potential of higher crop production, yields of most crops are generally low with most yields being about 60% of achievable yield (MOFA, 2009). A major reason for the non-attainment of achievable yields according to IFPRI, (2007) is low use of resources.

The main aim of farmers accessing agricultural resources is basically to meet their social and economic needs. Studies have also shown that farmers could improve upon their general livelihoods if they are able to have increased access to agricultural productive resources (Ojo et al., 2010). However, farmers differ in their access to and utilization of agricultural resources. Such diversity among farmers could be related to various social, economical, or institutional factors. Understanding the factors that affect farmer's access to agricultural resources in the Dangme East and West Districts is important for making useful policy recommendation and enhancing productivity and production in Ghana's agricultural sector and especially in low performance areas such as the Dangme East and Dangme West Districts.

1.3 Research questions

The research study seeks to find answers to the following questions:

- (1) What socio-economic factors affect farmer's access to productive resources in the Dangme East and Dangme West Districts of Ghana?
- (2) What institutional factors affect farmer's access to productive resources the Dangme East and Dangme West Districts of Ghana?

1.4 Objectives

- (1) To determine the socio-economic factors that affects farmer's access to productive resources.
- (2) To identify the institutional factors affecting farmer's access to productive resources.

1.5. Significance of the study

Several factors have been cited in literature as to why farmers would like to access agricultural productive resources, like credit, agricultural inputs like fertilizer and seeds, extension services, technology, information etc. Farmers all manage resources (e.g. knowledge, labour, money, livestock, water, crops, tools, information) but they all differ in their access to, and use of these resources. Understanding reasons behind such diversity and farmers current level of access and utilization of agricultural resources is of paramount importance to enhance the production and productivity of agriculture. Although the contribution of the small holder farmer in the Dangme East and Dangme West District to agricultural production over the years has been acknowledged, there is a need to make available to the smallholder farmer appropriate information to enhance their access to productive resources to improve productivity.

The findings of the study will be relevant to the Ministry of Food and Agriculture and other organizations involved in agricultural extension service delivery. It would also assist farmers to address the factors inhibiting access to resources in order to improve productivity. Finally, it will add to existing knowledge and literature.

1.6 Limitation of the study

The researcher was unable to investigate the relationship of the smallholder farmer's access to resources and agricultural productivity. This was due the fact that data on crop yields and farm sizes were largely inaccurate and not readily forthcoming from respondents.

CHAPTER TWO

CONCEPTUAL FRAMEWORK AND RELATED LITERATURE

2.0 Introduction

This chapter focuses on the theoretical reflections on the problem under investigation. It explains the conceptual framework and reviews literature with regards to the importance of agricultural productive resources, access to productive resources and socio-economic factors influencing access to productive resources, among others.

2.1 Description of Conceptual framework

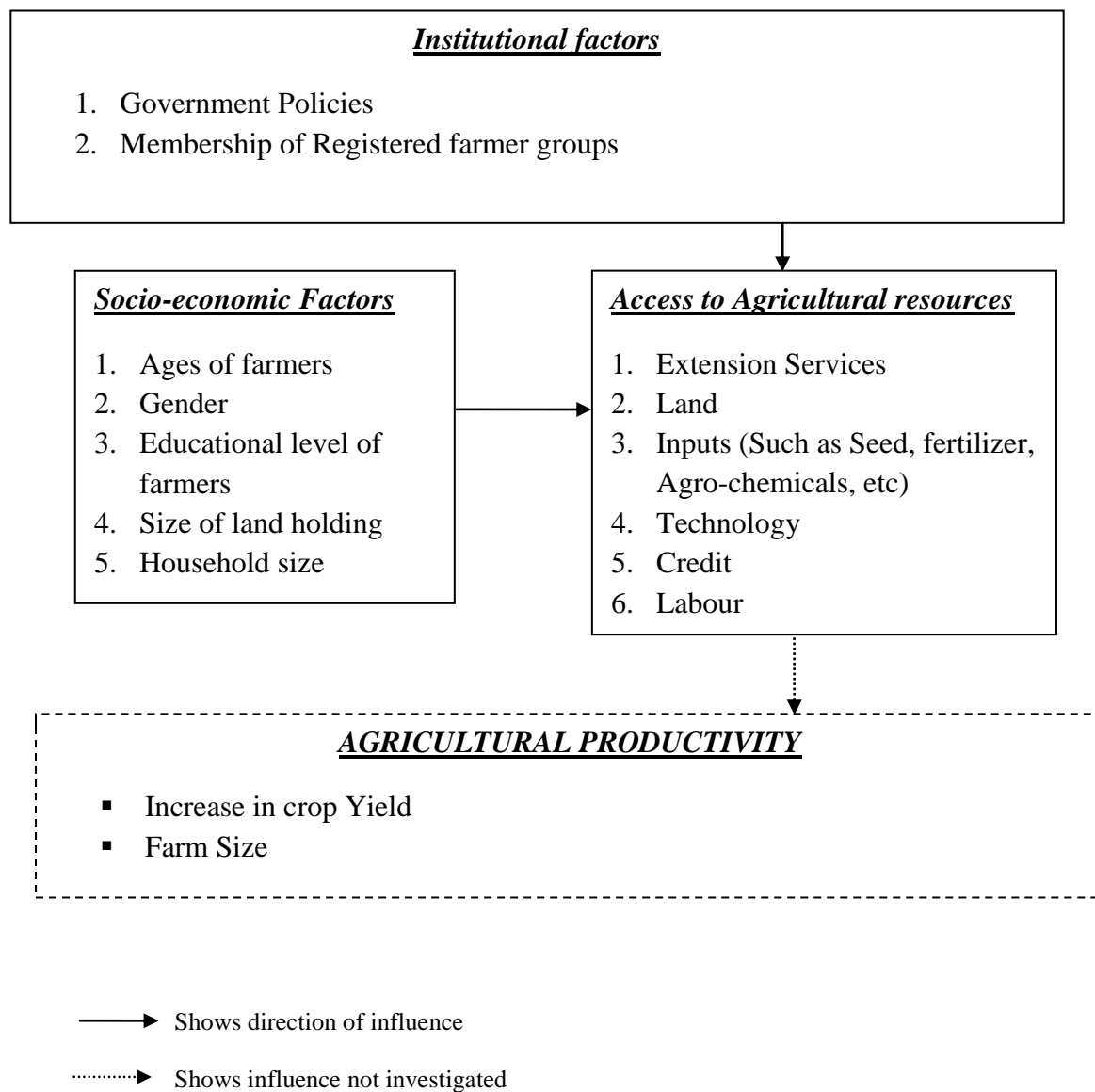
A conceptual framework is used in research to present a preferred approach to an idea or thought. It shows the structure of idea or thought of the study and how they interact to explain the relationship among the concepts.

The conceptual frame work explains graphically, the main issues being studied. The frame work (see figure 2), explains that access to productive resources plays a significant role in enhancing agricultural production, however several socio-economic factors like age, gender, education and many others, as well as institutional factors such as membership of registered farmer groups and government policies among many others are likely to affect access to productive resources by small holder farmers (Okunade, 2007; Kohansal et al., 2008). For instance educational background of a farmer is likely to influence his or her access to extension as the improvement of agricultural production requires a change in knowledge, attitude and practice, while age may determine the working ability of a person (Okunade, 2007).

Access to labour, land, credit or inputs may influence or determine farm size which certainly would influence agricultural production (Abedullah et al., 2009). Also certain

institutional factors such as policies and registered farmer groups may influence the access to productive resources by small holder farmers.

Figure 1. The Conceptual Framework



2.2 Agricultural productive resources and their influence on productivity

In the agricultural context, the primary inputs of production include land, labour, capital and material inputs, while outputs include crop and livestock products (Mallawaarachchi et al., 2009). These productive resources are needed by the small holder farmers to help them improve their productivity.

2.2.1 The influence of land on productivity

Land is one of the most important agricultural productive resources for the small holder farmer whose entire livelihood depends on agriculture. While productivity of crop production is associated with the intensive use of input, yield can be increased through better land management and farming practices, (IFPRI, 2010).

Agriculture in Ghana is dominated (90%) by smallholder farmers whose total farm holdings are less than 2 hectares in size (MoFA, 2010b). The relatively small size of most farm holdings in the country due to lack of access and use of land, provides a resource base far too small for use of most technologies in the more advanced countries of the world therefore affecting productivity. Competition for land is an increasing challenge for many farmers in the Greater Accra Region of Ghana. As farmland is sought after for new housing and other development, land values prices farmers out of the market, (IFPRI, 2010). This makes land very expensive for the small holder farmer who therefore has no access to land. Ownership of land can influence agriculture productivity, because farmers who do not own land can be reluctant to develop and maintain the land (Randela, 2005). Furthermore, such farmers may have trouble in obtaining loans for agricultural purposes because they cannot use the land as collateral, since they do not have title deeds for it.

Secure land tenure provides the proper incentive to use land efficiently and to invest in land conservation and improvements that are closely linked both to productivity and sustainability (Kabutha, 1999).

2.2.2 The influence of labour on productivity

Labour is a resource that is needed to produce goods and services necessary to satisfy human needs. Labour, particularly manual labour, is a very important factor of production among the smallholder farmers. This is mainly because smallholder agricultural activity is

labour-intensive rather than capital intensive and therefore may affect productivity as farmers may employ a large number of expensive hired labours. Labour as a productive resource is required for clearing, weeding, planting, harvesting and post-harvest activities. For a higher productivity, labour is required for proper farm maintenance. Agricultural labour is categorized as unpaid like family labour, paid -in-kind like labour exchange or barter, and self-employed or wage labour (World Bank, 2009).

Labour for weeding which is being replaced with herbicides in crop production is known to be very important for improving yields or preventing yield losses (GLSS, 2007)

2.2.3 The influence of inputs on productivity

Productivity of crop production is associated with the intensive use of inputs, such as fertilizer, improved seeds, herbicides, insecticides, etc. while yield can be increased through better farm management practices, like weed and pest control, fertilizer application and the use of improved seeds (FAO, 2008). Low agricultural input use is often associated with declining soil fertility, declining yields, and low farmer incomes. Increased use of fertilizer and improved seeds are partially credited with the large increases in agricultural productivity growth in Asia during the Green Revolution. It is evident that agricultural input use must increase in Africa if the continent is to see significant productivity growth (IFPRI, 2010).

According to the Ministry of Food and Agriculture, yields for most crops in Ghana are 20%-60% below their achievable level; this is due to the low use of existing technologies and modern inputs such as fertilizers and improved seeds (MOFA, 2007).

Farmers cannot afford inputs because they are too expensive. Many agricultural inputs have been subject to dramatic price increases as a result of the removal of subsidies, price controls and currency depreciation. Gordon (2000) reports that under structural adjustment

in Ghana, fertilizer and pesticide price rise exceeded inflation by a factor of five or six. In some cases, the price structure and yield response is such that the use of certain inputs may no longer be justified on crops produced for the domestic market.

The appropriate ways to apply tools and modern inputs, with knowledge for chemical inputs have significant impact on yields had also been confirmed by Banful *et al.* (2009)

2.2.4 The influence of Extension Service on productivity

Extension Services provide information and support to the small holder farmer to enable him or her adopt improved technologies for a better yield. It is sufficient to note here that without a revamp of extension services, African countries including Ghana will be missing a key link in the chain to boost agricultural productivity (Gordon, 2000). Lack of access to extension services and information prevents yield maximization, so extension organizations need to ensure that farmers are informed on availability and use of productive resources to enhance productivity. Kabutha (1999) noted that agricultural extension provides exposure to the general knowledge and advice on agricultural production. The influence of these benefits can be translated into increased agricultural production if implemented. It is therefore clear that the main barrier to adoption of technology and subsequent increase in production is agricultural extension through which so many innovations are channeled.

2.2.5 The influence of Credit on productivity

Access to credit is one way to improve farmer access to new production technology and to increase productivity. Farmers' ability to purchase inputs such as improved seed and fertilizer is particularly important for higher productivity but needs access to credit for such activity. World Bank (1994) noted that, if appropriate technology is available but not being used by farmers due to lack of credit, then productivity may be affected. The lack of

access to credit in Ghana is also highly important as almost 80% of the small holder farmers own less than a hectare of land and are resource poor, thereby leading to lower yields (MOFA, 2007).

The availability of credit allows the small holder farmers to be protected from the inflated costs faced in agriculture and also, improve the quality of productive resources and hence their output.

Should the distribution of credit improve, the small holder farmer would also find it easy to meet production targets. The lack of credit coupled with improper government intervention resulted in the low productivity of most farmers (Archarya, 2011). Also, the availability of credit helps to finance purchased inputs, especially fertilizer, which has positive effect on the productivity of farmers (Amaza et al., 2006).

2.2.6 The influence of Technology on productivity

In the past, increases in productivity were achieved through expansion of planted area, but as population pressure increases with degraded lands, there is markedly less scope for further expansion, it becomes obvious to increase productivity by the use of appropriate agricultural inputs and technologies. According to World Bank (2009) improved technologies can increase labour productivity in farming.

2.3 Socio-economic factors influencing access to productive resources

Socio economic characteristics of farmers, such as education, age, gender, marital status, and size of household also predispose a farmer's ability to accessing productive resources. Hassan et al., (2008) noted that, these characteristics exert their pressure on the attitude and behavior of an individual. These factors are internal to the farmer, they vary from farmer to farmer hence the need to examine them to determine which of them are likely to influence access to productive resources. Farmers socio-economic characteristics

considered under this are age of farmer, gender, household size and educational level of farmers.

2.3.1 Age of farmer and access to selected productive resources

Age of farmer and access to extension services

Gockowski and Ndoumbe (2004) in their study of the decision to implement intensive mono-crop horticulture in Southern Cameroon found that the age of the household head had a significant negative effect on the access and use of extension services. Gamba et al. (2002) also confirmed these findings when they studied wheat farmers' seed management and varietal adoption in Kenya. This implies that the more aged a farmer, the lower his or her access to extension services.

Age of farmer and access to land

Okunade (2007) in a study on accessibility of agricultural credit and input to women farmers in Osun State of Nigeria found a positive and significant relationship between access to factors of production and age of a farmer. This shows that a farmer's access to factors of production like land tends to increase with increase in age and income. Also studies in Nigeria shows that age is related to the small holder farmer's access and use of land. It noted that elderly farmers have access to livestock and therefore can barter it for land (Oyodela et al., 2012).

Age of farmer and access to technology

Younger farmers are likely to be more progressive than their older counterpart and, hence more willing to adapt new practices, thus leading to higher efficiencies in food crop production. Ojo et al., (2012) in a survey with over 80% of respondents aged between 25 and 48 years noted a significant relationship between age and farmers' access to technology.

Age of farmer and access to credit

According to Zeller (1993) and Omonona et al., (2008), older farmers are more likely to be credit constrained. This might be because the younger farmers are still agile and more receptive to new technologies and activities that will generate income for them. Aside this, most financial institutions will not like to lend out money to old people for the fear that they may not live long enough to pay back the money.

Studies by (Muhammad et al., 2002) also indicate that there was significant negative relationship between timely availability of loan and the age of respondents. Therefore, younger farmers were more likely to get to access and use of productive resources on time than old farmers. A study done in South Africa noted that farmers' age in years and numbers of years of formal education among others, have significant negative impact on the likelihood that the farmer may use credit (Ortmann and King, 2006).

Age of farmer and access to inputs

According to Dlova, Fraser and Belete (2004), age is one of the factors that can affect the probability of a farmer being successful in farming. Results from their study concluded that older farmers are less capable of carrying out physical activities while younger ones are capable. In this study, Dlova *et al* (2004) concluded that younger farmers are more ready to adopt modern technology which goes with agricultural inputs. Thus because younger people may be more adaptive and more willing than older people to try new methods which needs inputs, age is expected to be an influencing factor.

2.3.2 Gender and access to selected productive resources

Gender and access to extension service

Women are the primary agricultural labor force throughout the world and perform agricultural tasks with fewer resources, less access to technology and the added

responsibility of child and family oversight (IFPRI, 2010). The vast majorities of extension agents are male, and are not trained in how to work with women farmers. Few do not recognize the contributions that women make to agriculture, nor are they aware of how best to serve this population's needs and therefore agricultural extension is skewed in favor of men (MOFA, 2007). As extension remains a significant resource of information for limited resourced farmers, (the majority who are women), FAO, (2012) noted that female farmers are less likely to get extension services through various channels and are less likely to access quality services than their male counterparts.

Gender and access to land

Women farmers need access to land and other productive resources in order to secure livelihoods and food production for their families. However, women have access to only about 20% of all land worldwide, with their allotments generally of smaller size and lower quality (FAO, 2010).

Customary systems govern the access to and the use of large sections of unregistered land in developing countries like Ghana. Under such systems, rights to access and use are assigned by the traditional authorities without any written documentation, which tend not to grant gender equality in access to land (FAO, 2010). This affects women mostly which also affects their productivity. Women usually control very little or no amount of land, which is very important in determining farm productivity (Ojo et al., 2012).

Gender and access to technology

Production involves access to technology for farming practices like plowing, planting and harvesting. However, because women do not have material assets, they have a more difficult time gaining access to credit for productive resources. The ability to afford seed and fertilizer is a central component of technology adoption which leads to productivity (Wakhungu, 2010). In the production stage of the agricultural production chain, the key

challenges facing women are access to land, to production technology and to energy (for land preparation and planting).

In addition, access to technology can be problematic because the type of equipment promoted is often incompatible with women's needs, and underestimates the value of diversified production practices and the many farming tasks for which women are responsible.

Gender and access to credit

In agricultural production, women are more constrained than their male counterparts as a result of which most women have less access to and higher effective costs for information technology, inputs and credit (Shultz, 2007). Adesina and Djato (1997) buttressed that gender inequalities reduce productivity in farm and enterprises. These lead to inefficiencies that arise from excluding women from access to productive resources.

Rural women farmers face more difficulties than men in gaining access to credit for agricultural purposes. In Africa, the percentage of rural credit directly benefiting women ranges from 5 percent to 32 percent (FAO, 2012). This limited access to credit affects their production, as they need credit for their farm activities.

Although empirical literature on finance suggests that women perform better on repayment, they face higher entry barriers and are more often considered "credit unworthy" on the basis of prevailing gender roles and perceptions which may affect their access and use of credit for efficient productivity (World Bank, 2008).

Gender and access to inputs

Gender inequalities play an important role in the access to and use of productive resources. In agriculture, gender differences in productivity almost always disappear when access to land and productive inputs are taken into account. Similarly, productivity differences between female owned and male-owned businesses are often explained by differences in

access to and use of productive resources, where these differences are primarily a function of the business size and sector of operation rather than a gender-specific factor (Sabarwal et al., 2009) & (Hallward-Driemeier, 2011). This evidence suggests that women are as efficient as men in production when given access to the same inputs—and that, when provided with the same amount of resources, female farmers and entrepreneurs can be as productive as their male counterparts. In Ghana, where evidence of gender differences in farming practices initially suggested that women were worse farmers than men in productivity, closer examination showed the practices to be optimal given the land tenure insecurity for women. (Goldstein and Udry 2008).

2.3.3 Educational level and access to productive resources

Education is one of the significant factors affecting the participation of the small holder farmer in agricultural development. Rad et al., (2010) agree that education is one of the important factors that help development to be realized. The purpose of education (formal and informal) as stated by Rad et al., (2010) is to communicate accumulated wisdom and knowledge from one generation to the next. Secondly, education enhances active participation in innovation and the development of new knowledge. They further argue that education enhances the ability to derive, decode and evaluate useful information for agricultural production.

Ojo et al., (2012) supports the latter sentiment by arguing that, education has a relationship with farming progressiveness. The reason is that there is a positive correlation between education and farming. Through education, farmers are able to acquire new improved and effective written material. Educated farmers are able to acquire more information in the form of written material such as magazines, newsletters and farming instruction pamphlets, booklets and on packaged hybrid seeds, pesticides, fertilizers and many more (Ojo et al., 2012).

Uneducated small holder farmers are not exposed to ever revolving agricultural techniques, most of them still make use of techniques that were used by their fore-bearers. The educated or more exposed or rather more enlightened farmers' are more productive than the uneducated small holder farmers. This is because they have information on how to care for their land and their crops so that the land produces better food for them (Dlova et al., 2004).

2.3.4 Household size and access to productive resources

Studies by Adekola et al., (2013), noted that the size of household was significant in determining farmer's access to family labour and extension services. The larger the family size, the more the people available to work on the farm, but less receptive to extension services. Marriage is one of the most common causes of fluctuations in rural household size, especially women mostly move from their community to their husbands' communities. In contrast, husbands rarely change residence upon marriage, nor does their marriage affect their access to land (Ojo et al., 2012)

2.3.5 Size of land holding and access to productive resources

Size of land holding can affect land management in many ways, large holders are often more able than small holders to maintain traditional fallowing practices. They also can set aside a large portion of their holdings for non-food uses such as pasture or woodlot and other land-use practices that help control soil loss and fertility depletion. Conversely, small holders in densely-populated regions of the world have a relative abundance of labor to maintain soil conservation measures. Those with small holdings often need more careful management with the related improvements in productivity (Yigremew, 2008). It was also noted that, the size of land holding is not the key determinant of productivity but rather access to intensifying farm inputs (Carr, 2013).

According to Nega et al., (2006) the size of land holding shows the level of security, which also affects a household's income, and their incentive to work and to invest. Studies in India noted that, farmers operating on very large landholdings above 10 hectares were found to have very low productivity (Carr, 2013).

2.4 Agricultural Productivity

Productivity measures how well farmers combine inputs to produce output. Growth in productivity reflects increases in the efficiency of production processes which, in turn, occur as a result of improvements in technology or knowledge.

Productivity, as the rate of output per unit of input, may be influenced by a wide range of factors. In the agricultural context, the primary inputs of production include land, labour, capital and material inputs, while outputs include crop and livestock products (Mallawaarachchi et al., 2009)

Higher productivity of agricultural resources lowers production costs, increases output (often involving less land), and releases some resources (such as labour) from agriculture to other sectors of the economy. However, higher agricultural production tends to lead to lower commodity prices, passing some of the benefits of innovation on to the food industry and consumers (Mallawaarachchi et al., 2009).

2.4.1 The influence of Crop yield on productivity

Yields of most crops in Ghana are generally low and have remained almost constant for the past six years with most yields being about 60% of achievable yield (IFPRI, 2007).

The modest impact of fertilizer on maize yields is also confirmed by Banful et al., (2009), who assess the recent government's fertilizer subsidy program in Ghana. These results caution against overemphasizing the importance of fertilizer as a silver bullet. Rather they

confirm the findings from other studies that stress the importance of a comprehensive approach for raising agricultural productivity.

2.4.2 The influence of farm size on productivity

Farm size appears to be solely determined by the total number of access to and use of productive resources, which in turn determines business size.

Historically, expansion in farm production has been derived from an increase in the area of production (horizontal expansion) and an increase in productivity per unit area (vertical expansion). Although area expansion may contribute to economies of size, the increasing financial and environmental costs of new land developments limit the opportunities for area expansion (Mallawaarachchi et al., 2009)

It was also observed in India that, contact with extension workers for medium-size and large-scale farmers was almost double that of smallholder farmers (Adhiguru et al., 2009). It was noted that marginal and smallholder farmers do not access information more frequently. Whether it is because the information is not available or not relevant or there is no incentive to access information is still unknown. Another possibility is that these farmers do not have the means to use the information (IFPRI, 2010).

2.5 Institutional factors and access to productive resources

According to World Development Report (2008), institutions are rules, enforcement, mechanism and organization put in place in an economy. Institutions are defined by North, (1990) as rules of the game that facilitate coordination or govern relationships between individuals or groups and can be divided into formal and informal institutions.

Institutional factors considered for this study includes, membership of farmer groups, Government policies and rules and regulations.

2.5.1 Membership of farmer groups and access to productive resources

The obvious challenge in servicing smallholders is reaching large numbers of geographically dispersed small units. In Ghana, MOFA's strategy is to encourage smallholders to organize themselves into larger units in the form of farmer-based organizations. This would make it more feasible to offer them the range of services they need (MOFA, 2009). This organizational development could also be an opportunity to give smallholder enterprises the necessary business orientation to enhance productivity.

Jeri and Fraser (2010) observed that there is evidence to show that when households market their produce in groups, there is a higher chance of participating in either formal or informal markets. Thus, group participation encourages market penetration among smallholder farmers who find it difficult individually to gain market access. They further noted that, farmers still have to play a role in order to ensure that these facilities are provided for them. They have to form an association and choose a lobby that has to represent them (Jeri and Fraser, 2010). It also increases their access and use of fertilizers and seeds for higher production.

Farmer organizations will be expected to empower farmers by pooling them together so that they are able to benefit from economies of scale. Often these groups are linked to one another by way of associations or networks, thus creating circles or webs of influence and persuasion that have a bearing on policy formulation and implementation (IFAD, 2008).

Membership of farmer groups and access to Extension

Agricultural extension personnel working in a group member's farm, perhaps teaching spraying with a chemical substance against insects or controlling weed, can be quickly observed or better informed by other neighboring farmers. Thus, observing the agricultural extension personnel in a group member's farm may increase the probability of some other

farmer's access and use of extension. (Karli et al., 2006). They also noted that, the level of communication with agricultural extension personnel may play a key determining factor for productivity. The higher the interaction with extension personnel or managers of cooperatives, the better understanding of the agricultural cooperatives operations.

Membership of farmer groups and access to land

Ojo et al., (2012) also noted that membership of cooperatives contributed to exposing members to the relevance and means of access and use of productive resources. Example, membership of cooperatives greatly increased the likelihood of owning farmland, due to the awareness of the limitation of farm land ownership when they associate with other farmers.

Membership of farmer groups and access to technology

Farmers who are members of agricultural cooperatives may be supplied with new innovations by extension agencies (Karli et al., 2006). They also noted that, high technology use at farms is negatively related to the probability of entering agricultural cooperatives relative to the low technological levels. Farmers who do not use technology at farms are more likely to participate in agricultural cooperatives than those farmers who use technology.

Membership of farmer groups and access to credit

Nzomoi et al., (2007) noted that credit enables farmers, even those in low-income groups, to overcome their financial constraint and adopt innovations involving some cost for higher productivity. Most financial institutions do not lend to farmers because of the risky nature of farming, and even those who do, will demand for collaterals which the farmers cannot afford individually. They however prefer to lend to farmers in groups. Hence,

access to credit is expected to have a positive effect on farmers' decision to join Farmer Based Organisations.

The implication is that farmers are financially empowered if they have access to credit or loan and they are able to improve their productivity levels as well as their income via access to credit through the Farmer Based Organisation which tends to increase the likelihood of becoming a member of a Farmer Based Organisation (Asante et al., 2011).

Membership of farmer groups and access to Input

Farmer groups are considered potentially effective mechanisms to increase farmer productivity by reducing information asymmetries and transaction costs (IFPRI, 2012).

Distributing fertilizer through farmer groups affected an intervention's ability to increase farmer access to agricultural inputs. To receive a fertilizer voucher in a pilot targeted subsidy program in Nigeria, all farmers' were required to be members of an organized group. However, the outcome suggests that groups facilitated the process of farmer identification and coordination, which helped in providing equal access to inputs for increased productivity (IFPRI, 2012).

2.6 Policy

A survey carried out by IFPRI in 2009 in Ghana shows that policy reforms, institutional changes, and supporting investments that can make agricultural input production and distribution more profitable and attractive are required in order to induce access and use of productive resources by farmers'. In Ghana, the fertilizer subsidy policy saw the proportion of smallholder farmers using fertilizers increased to 70 percent in 2007, up from 56 percent in 1996, an increase in small holder fertilizer use yielded desirable results

in broad-based productivity increases with poverty reduction implications (Ariga and Jayne, 2009).

Agri-business institutions should promote value addition through processing of agricultural products and providing employment opportunities. Financial institutions will be expected to expand and deepen their outreach to provide farmers and other rural people with financial services at reasonably low interest rates. Civil society will enhance farmers' capacity to organize, generate and utilize resources more effectively. Other roles for civil society groups include providing education, health, and extension services in areas they are best placed; advocacy for improved governance, human rights and environmental.

Saffu (2007) has indirectly suggested, decentralizing greater economic and political power to District assemblies, which would require a Constitutional amendment, would help farmers in accessing and using productive resources to enhance productivity.

Access to affordable credit is one of the most important factors affecting production and therefore income of the poor. The poor access to agrarian and support services are attributed to socio-economic factors of the farmers as well as constraints encountered by these farmers in institutions. Constraints encountered by the financial institutions in serving the small-scale farmers and the poor involve high risk and high transaction costs (Okurut *et al.*, 2004 & Spio, 2002).

Reform of land tenure systems under customary tenure is a sensitive issue and poses a severe long term challenge to the access and use of land. There is much change occurring in land tenure systems currently, under the impetus of new interests and market pressures, and the Government has initiated a new Land Policy and a Land Administration project that seeks to address land issues comprehensively (Kasanga *et al.*, 2001).

2.7 SUMMARY

The chapter reviewed literature on the socio- economic and institutional factors influencing access to productive resources by smallholder farmers. The chapter has described the various components of the conceptual frame work. It highlighted the agricultural productive resources and their influence on productivity, the socio- economic factors influencing access to productive resources and how socio- economic factors influence productive resources like land, inputs, extension services, credit and technology.

The literature reveals that access to productive resources by smallholder farmers is influenced by socio- economic factors. The socio-economic factors reviewed for this study includes age of farmer, gender, educational level of farmers and household size of farmers. The literature also reveals that agricultural productive resources are important for agricultural production and leads to higher productivity.

The institutional factors that influence productive resources like land, inputs, extension services, credit and technology among smallholder were discussed. Institutional factors like government policies, and membership of registered farmer groups either give opportunities or hinder small holder farmers' access to productive resources.

CHAPTER THREE

METHODOLOGY

3.0 Introduction

The methodology consist of the research design, a profile of the study area, the population and sample size used and the sampling method to be used as well as development of instruments for data collection. It also includes tools employed for analysis and problems faced during data collection.

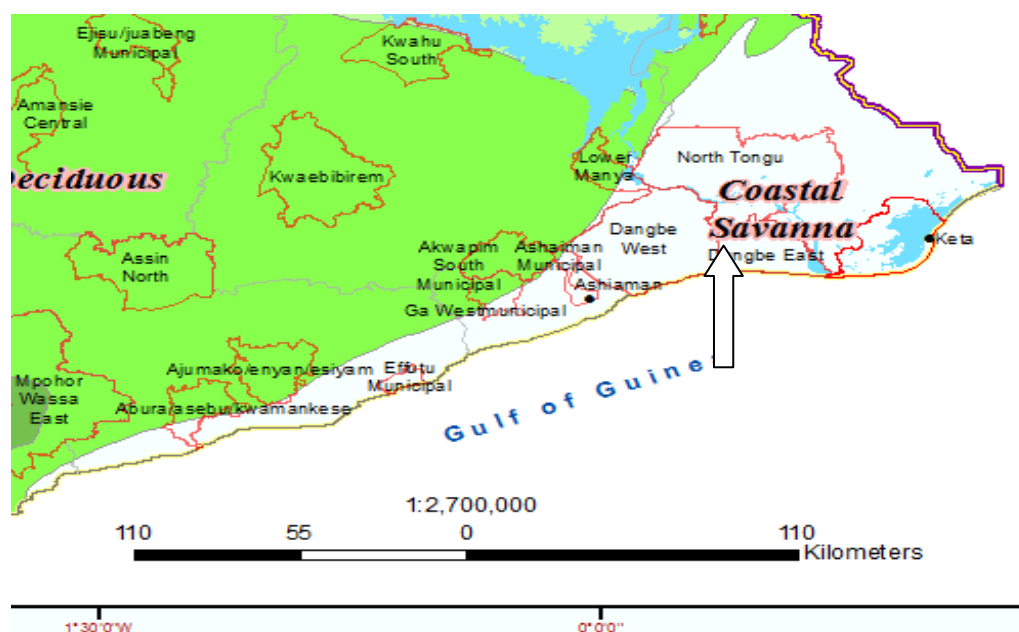
3.1 The Study Area

The Dangme East and Dangme West Districts is in the southern Ghana. It is located in the Eastern part of Greater Accra Region within latitude 5° 45'South and 6° 00'North and from longitude 0° 20'West to 0° 35'East. It shares boundaries with North Tongu District, Yilo and Manya krobo and North Akwapim Districts in the north, Tema Municipal at the South-West with South Tongu District in the East. The Districts covers a total land area of about 3,351 km² which is about 69.5% of the total area of the Greater Accra Region. The main climatic factor is rainfall, which comes in two peaks. March-July is the main season and September-October, the minor rainy season. The annual total rainfall is about 700 to 1200 mm in the two Districts, but slightly higher in the western part of the Dangme West District (District profile, 2009b). Agriculture forms the leading sector in the economy of the Districts. It provides employment for about sixty per cent (60%) of the adult population. It also provides livelihood for the people through direct farming, distribution and marketing of farm produce and other services to the agricultural sector.

The main Agricultural activities considered here include crop production, livestock production, fishing and Agro-forestry. The Districts are noted for the cultivation of maize, cassava, legumes and a range of vegetables. The two districts accounts for more than fifty

per cent (50%) of the Regional output of these crops. Population projections for the year 2010 using a growth rate of two per cent (2%) put the population of the two Districts at 244,370. With regard to ethnicity, the districts are a heterogeneous society with eighty-five per cent (85%) Dangmes, and other ethnic groups across the country (District profile, 2009a).

Figure 2: Map of study area showed by arrow.



Source: Google map accessed March, 2013.

3.2 The research design

The research design used for the study was the Survey method. Survey research is the administration of questionnaires to a sample of respondents selected from the same population (Bell, 1993). Survey may be used for descriptive or explanatory purposes. In this study, it was used to explain the accessing of agricultural productive resources based on selected factors which affect them and suggest ways of improving them.

Surveys are mostly used in studies that have individual people or groups as unit of analysis. Here the units of analysis are farmers. Questionnaires were administered in two ways. Self administered questionnaires were completed by respondents themselves, as in the case of the educated farmers in this study, or interviewers administered questionnaires, reading the items to respondents and recording the answers, as in the case of illiterate farmers in this study.

3.3 Population of the study

The population of the study refers to the whole group or category of individuals selected for the research (Bell, 1993). The population of the study must be identified and its sizes stated to enable the selection process for individuals possible as in surveys. The size of the farmer population was thirty thousand (30,000) and for the purpose of this study, the population is made up of all categories of farmers in the Dangme East and Dangme West Districts. The Districts are divided into eight (8) zones with thirty-two (32) operational areas consisting of ninety-six (96) communities.

3.4 Sampling technique and sampling size

Sampling enables the researcher to study a relatively smaller number of units of the population and to obtain data representative of the whole target population. Sampling is thus, the process of choosing the research units of the target population which are to be included in the study. (Sarantakos, 1993).

A researchable number of farmers were randomly selected as a representative of all the farmers in each operational area by giving each of them an equal chance to be selected (Sarantakos, 1993).

Non-probability sample in survey is chosen based on convenience and availability which is also a less desirable sampling procedure (Babbie, 2005). Randomization allows a representative sample from a population to provide the ability to generalize to a population. Sample technique also refers to the research's method of appropriately selecting the type, size and representative of the sample. A simple random sampling technique was used in selecting the communities. Ninety-six (96) communities were involved, however, for the purpose of this study, sixteen (16) communities from the two (2) Districts, that is eight (8) per district were randomly selected from the survey communities using the lottery method of simple random sampling. All the ninety-six (96) communities were listed and numbered accordingly. One community per zone in each district was selected with draws made one at a time without replacement.

Sample size is influenced by the purpose of the study, population size, the risk of selecting a 'bad' sample and the allowable error (Israel, 1994). A total sample size of 150 respondents was involved in the research. They include a number of seventy-three (73) women respondents and seventy-five (77) men respondents in all.

3.5 Data collection

Types of data collected for each variable of the study, method of data collection and sources of information are shown in Table 2 below. This was used as a guide for the identification of the data to be collected as well as the tools to be used. The questionnaire consists of structured questions on the socio-economic factors and other specific factors influencing access to agricultural productive resources. Both open and close-ended questions were used, therefore allowing valid and reliable pattern of relationship to be drawn between the variables concerned. Close ended questions allows for quick and short responses and also limits the responses by providing options thereby saving time for

interviewing and coding. The instrument prepared was pretested with the necessary corrections made.

Table 2: Objectives, Information required, Source of information and Data

Collection tools.

Objectives	Information required	Source of information	Data collection Tools
To determine the socio-economic factors that influence farmer's access to productive resources	Age, Gender, level of education, house hold size etc.	Men and women farmers	Questionnaire
To identify the institutional factors influencing farmers access to productive resources.	Government policies and membership of registered farmer groups	Men and women farmers	Questionnaire

Source: Field survey, 2013

3.6 Data processing and analysis

The questionnaires and interview schedule received was screened. A coding manual was developed to facilitate assigning values to the various items and the items in the completed questionnaires were entered into the software.

Data from the interview schedule was analyzed using the statistical Package for the Social Sciences (SPSS) software. Descriptive statistics was used, frequencies, percentages, cross tabulations and chi-square tests were used to analyze the data. Sarantakos (1993) indicated that, chi-square informs the researcher whether the collected data are close to the value considered to be typical and generally expected and also if two variables are related.

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

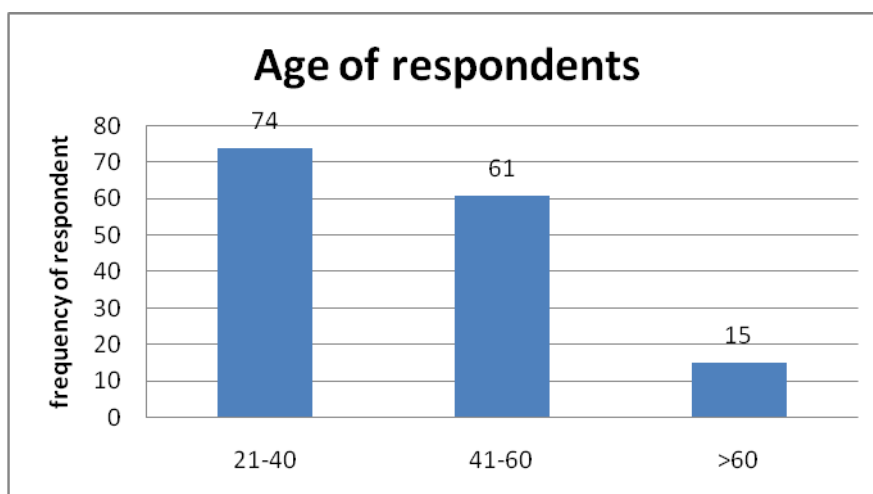
This chapter presents the findings of the study. It discusses the socio-economic and institutional factors and how they influence access to productive resources in the study area. Socio-economic factors discussed include; age, gender, level of education, marital status, size of land holding, household size and economic activities while selected institutional factors are government policies and membership of farmer groups.

4.1 Socio-economic characteristics of respondents

This section presents the background characteristics of respondents on production. Personal characteristics considered were age, gender, educational background, marital status and economic activities engaged in by respondents. In addition to the personal characteristics considered were size of land holding and house hold size.

4.1.1 Age of respondents on production

The age of farmers interviewed were categorized into (21-40 years), (41-60 years), (above 60 years). The frequency distribution of farmer's age is shown in Figure 3. Majority of respondents were aged between 21-40 years. This is the economically active age group as defined by the 2011 population and housing census. The result therefore shows that majority of the farmers in the study area are economically active.

Figure 3: Age of respondents

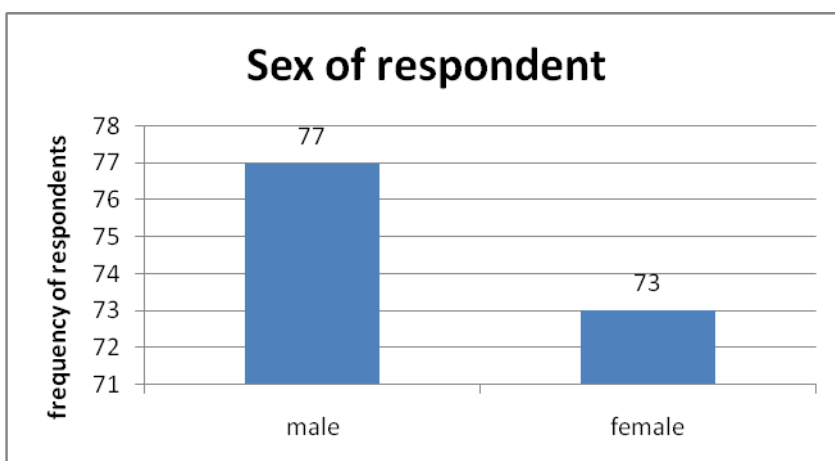
Source: Field study, 2013

4.1.2 Sex of respondents on production

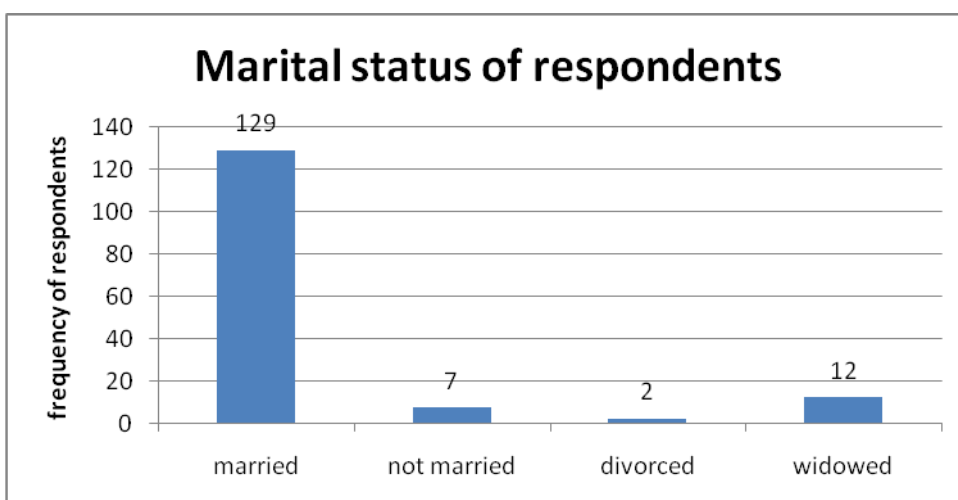
For the gender of respondents, the age of farmers interviewed were also categorized into (21-40 years), (41-60 years), (above 60 years). The frequency distribution of farmer's sex is shown in Figure 4. Majority of respondents in the economic active age group were men which implies that more men are economically active than women in the study area.

4.1.3 Marital status of respondents

Marital status of respondents is shown in figure 5 below; marital status of respondents was categorized into married and not married, divorce and widowed. Majority of the respondents were married and falls within the economically active age group of 21-40 years as defined by the 2011 population and housing census. The results imply that there are more married men and women in the study area who are economically active.

Figure 4: Sex of respondents

Source: Field Survey, 2013

Figure 5: Distribution of respondents by marital status

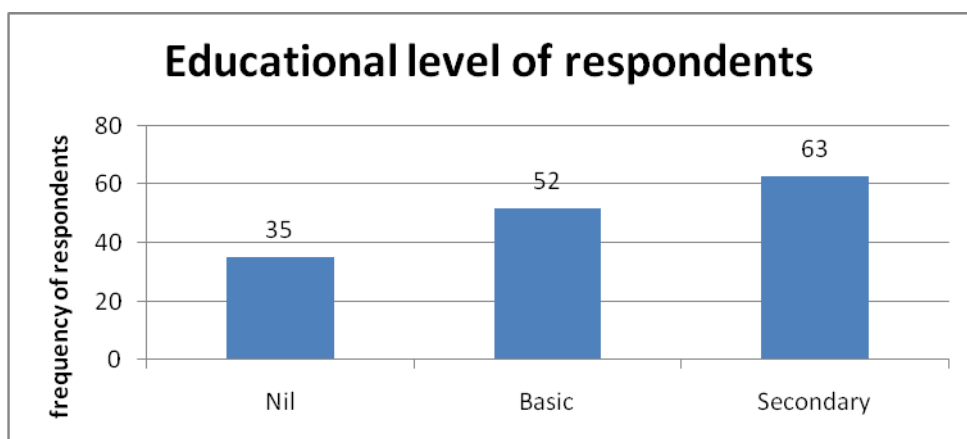
Source: Field study, 2013

4.1.4 Educational level of respondents

Information on the level of formal education was categorized as no formal education, basic education, secondary education and tertiary education. The findings presented on Figure 6. Indicate that 86% of respondents had no education or had education below the basic level. The findings observed the high literacy rate in the study area. This may limit

farmer's access to agricultural information as confirmed by Ojo et al., (2012) that a person's educational status influences his/her ability to make use of written technical information, this may help improve yields.

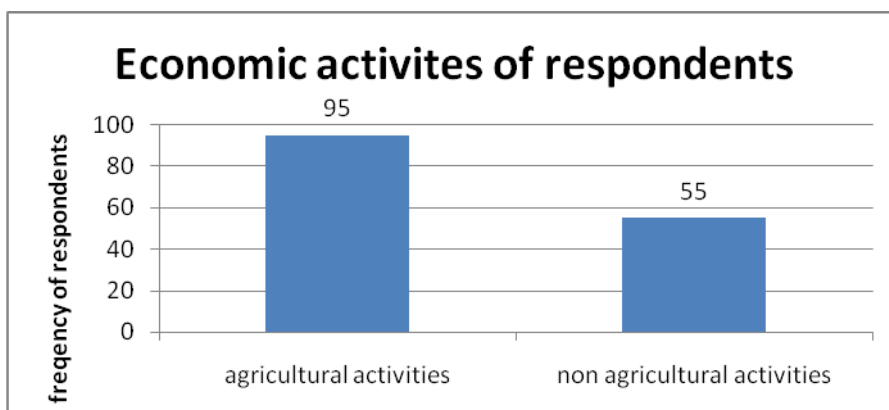
Figure 6: Educational level of respondents



Source: Field study, 2013

4.1.5 Economic activities of respondents

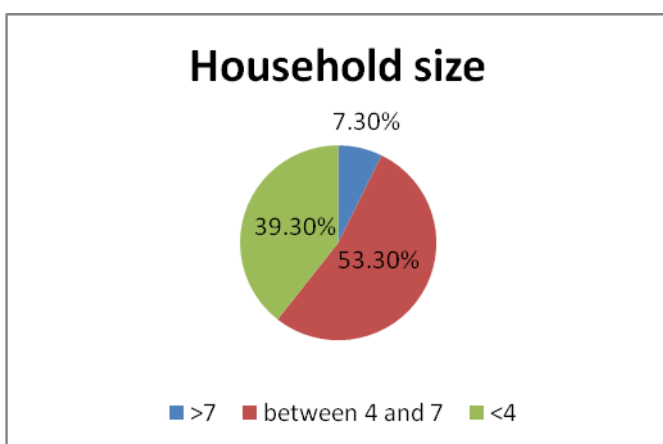
The economic activities engaged in by respondent other than farming were classified into agricultural activities and non-agricultural activities. The agricultural activities include crop production, cassava processing into dough and gari and farm labour work. Those classified as non- agricultural activities include petty trading, driving and artisanship. Majority of the respondents, as shown in figure 7 were involved in agricultural activities while a few were engaged in other economic activities. This shows that although respondents are engaged in agricultural activities, they are also engaged in other economic activities apart from farming for additional income in the study area.

Figure 7: Economic activities of respondents

Source: Field study, 2013

4.1.6 Household size of respondents

The size of household for this study is classified into large, medium and small household. Large household have more than 7 dependents, medium household with between 4 and 7 dependents and the small household with less than 4 dependents. Figure 8 show that a high proportion of respondents in the study area had medium household size of between 4 and 7 dependents.

Figure 8: Household size of respondents

Source: Field Studies, 2013.

4.1.7 Size of land holding of respondents

Land is considered as a main factor in agricultural production and for the purpose of this study, the distribution of respondent under acreage of cultivation was categorized into acreages. The mean land size of respondents was 15 acres with a minimum of 1acre and maximum of 300 acres. The result shows that majority of the respondents were small holder farmers with cultivated land size below 3 acres in the study area.

4.2 Socio-economic factors and access to productive resources

This section discusses how selected socio-economic factors influence access to productive resources. The resources discussed are extension services, land, labour, technology, credit, and inputs.

4.2.1 The influence of socio-economic characteristics and access to extension

Table 4 provides a summary of the chi-square results of the relationship between socio-economic factors and access to extension services.

Table 3: Summary of the chi-square results for the relationship between socio-economic factors and access to extension services

Variable		Access to extension services		Total (N=150)	Test	Interpretation
Age		Yes	No		$\chi^2=3.61$	Not significant
	21-40	70	3	73	df=2	
	41-60	60	2	62	P =0.83	
	Above 60	14	1	15		
Gender	Male	72	5	77	$\chi^2=2.562$	Not significant
	Female	72	1	73	df=1 P=0.109	
Level of Education	Nil	1	34	35	$\chi^2=3.347$	Not significant
	Basic	4	48	52	df=5	
	Above Basic	1	62	63	P =0.647	
Household Size	Small	56	3	59	$\chi^2=19.650$	Significant
	Medium	78	2	80	df=11	
	Large	10	1	11	P=0.050	
Size of land holding	Small	8	0	8	$\chi^2=0.355$	Not significant
	Medium	45	2	47	df=2	
	Large	90	4	94	P=0.837	

Source: Field Studies, 2013.

Age of farmer and access to extension services

Table 3 shows the age of respondents and access to extension services. The results indicate that the relationship between age and access to extension services through extension agents is not significant. Most of the respondents of all the age categories had no access to agricultural extension services. This implies that age of respondent is not related to access to agricultural extension services. This confirms Gockowski and Ndoumbe

(2004) studies that age of respondent does not influence access to agricultural information through agricultural extension.

Gender and access to extension services

Results from table 3 shows that the relationship between sex and access to agricultural extension services through extension agents is not significant. About 48% of men and an equal 48% of women respondents indicated they had access to extension services with 4% without access, thus sex has no relationship on access to agricultural extension services through extension services. This implies that sex of respondent is not related to access to agricultural information through agricultural extension services. This is in contrast to (FAO, 1999) claims that majority of efforts are directed to commercial farmers and commodity producers who are mostly men who receive an average of 58% of all extension.

Level of education and access to extension services

The level of education of respondents in the study area has no relationship with access to agricultural information through agricultural extension services, as indicated in Table 3. This means that respondents' level of education in the study area is not related to his access to agricultural information through agricultural extension services, and therefore disagrees with Ojo et al., (2012) that educated farmers are able to acquire more information than the uneducated farmer.

Household size and access to extension services

Household size is determined by the total number of people staying and depending on the respondent in the same house. Household size of respondent was classified into small household, medium household and large household. Small households are those with less than 4 people, the medium household had between 4 to 7 people while the large household

had more than 7 people per household. Table 3 shows that majority of respondent who had access to agricultural information through agricultural extension services were from the large households, and the relationship between household size and access to information through agricultural extension services was significant. This means that household size has a significant relationship with access to information through agricultural extension services in the study area, which may imply that larger households with more people can easily have contact with extension personnel than small households with few people. This is in contrast with Adekola et al., (2013) that larger families are less receptive to extension services.

Size of land holding and access to extension services

Size of land holding was also classified into small, medium and large land holdings. The small land holdings comprise respondents with lands which are 1 acre or less with the medium land holdings between 1- 4 acres while the large holdings are those with more than 4 acres as defined by MOFA, (2007) land classification. Table 3 indicates that there is no statistical significant difference between size of land holding of a respondent and access to agricultural information through agricultural extension services. This means that, size of land holding does not affect access to agricultural information through agricultural extension services. This confirms Carr, (2013) that size of land holding does not determine productivity since adoption of agricultural innovation leads to productivity.

4.2.2 The influence of socio-economic characteristics and access to land

Age of farmer and access to land

Table 4 below indicates respondent's age and access to land, and indicates that the relationship between age and access to agricultural land for farming is significant. This implies that the age of respondent is related to one's access to agricultural land for

farming. This corroborates Okunade (2007)'s observation that although access to land increases with age, the youth have access to own land due to their off farm income from other non farming activities. Ojo et al., (2012) also indicated that off farm income and age significantly increased the likelihood of farmers owning their own farm land.

Table 4: Summary of chi-square results of the relationship between socio-economic factors and access to land.

Variable		Access to land		Total (N=150)	Test	Interpretation
Age		Yes	No		$\chi^2= 28.8$	Significant
	21-40	50	23	75	df= 2	
	41-60	21	41	62	P =0.0	
	Above 60	2	13	15		
Gender	Male	35	42	77	$\chi^2 = 0.653$	Not significant
	Female	38	35	73	df= 1 P= 0.419	
Level of Education	Nil	16	19	35	$\chi^2=7.625$	Not significant
	Basic	25	27	52	df=5	
	Above Basic	32	31	63	P=0.178	
Household Size	Small	32	45	77	$\chi^2=18.51$	Not significant
	Medium	34	46	80	df= 11	
	Large	4	11	15	P=0.071	
Size of land holding	Small	2	11	13	$\chi^2=41.82$	Significant
	Medium	56	70	126	df= 23	
	Large	3	2	5	P= 0.01	

Source: Field Studies, 2013.

Gender and access to land

From the results shown on Table 4, it was noted that majority of the respondents with access to land were females. This indicates that the relationship between sex and access to land is not significant. This may be due to the customs and traditions in the study area which allows families ownership of land and therefore land is accessible to family members. This does not conform to FAO (2010) findings that the rights to access land in Ghana, are assigned by the traditional authorities with priority to men, which tend not to grant gender equality in access to land.

Level of education and access to land

The level of education of respondents in the study area has no significant relationship with access to land. Table 4 shows that there is no statistical significant difference between respondents' who had access to land and those who do not with regards to educational level. This means access to land in the study area does not depend on the level of education of respondent. This means that respondents' level of education in the study area is not related to his or her access to land.

Household size and access to land

Table 4 also shows the household size of respondent and access to land. The size of the household is determined by the total number of people staying and depending on the respondent in the same house. Household size of respondent was classified into small household, medium household and large household. Small households are those with less than 4 people, the medium household had between 4 to 7 people while the large household had more than 7 people per household. Table 4 shows that the relationship between the household size of respondent and access to land is not statistically significant. This means that there is no relationship between household size of respondent and access to land. Also majority of the respondents in the medium household size category had access to land in

the study area, which may mean that those in the medium household size category either owns land or can afford to hire land for farming. This finding also disagrees with Ojo et al., (2012) that the bigger households have more access to land.

Size of land holding and access to land

Size of land holding was also classified into small, medium and large land holdings. The small land holdings comprise respondents with lands which are 1 acre or less with the medium land holdings between 1- 4 acres while the large holdings are those with more than 4 acres. Table 4 indicates that there is a statistical significance between size of land holding and access to land that is, the size of land holding had a relationship with respondents' access to land. Majority of respondents with access to land are in the medium land holdings category which implies that farmers with average land holdings have more access to land in the study area which confirms MOFA, (2010b) that 90% of smallholder farmers have less than 5 acres land holdings.

4.2.3 Socio-economic characteristics and access to technology

Age of farmer and access to Technology

Table 5 indicates respondent's age and access to technology. The use of tractor with plough was the technology considered in the study. The chi-square test of 95% confidence level indicates that the relationship between age and access to agricultural technology for farming is not significant. This implies that age of respondent does not affect their access to technology. From the table it can be observed that more respondents in the economically active age group of 21-40 recorded access to technology than the other age groups as confirm by Ojo et al., (2012).

Table 5: Summary of chi-square results for the relationship between socio-economic factors and access to Technology.

Variable		Access to Technology		Total (N=150)	Test	Interpretation
Age		Yes	No		$\chi^2=1.172$ df= 2 P = 0.56	Not significant
	21-40	71	2	73		
	41-60	61	1	62		
	Above 60	14	1	15		
Gender	Male	75	2	77	$X^2 =0.003$ df= 1 P=0.951	Not significant
	Female	71	2	73		
Level of Education	Nil	0	35	35	$\chi^2 =8.827$ df= 5 P=0.116	Not significant
	Basic	0	52	52		
	Above Basic	4	59	63		
Household Size	Small	2	57	59	$\chi^2 =6.646$ df= 11 P=0.827	Not significant
	Medium	78	2	80		
	Large	11	0	11		
Size of land holding	Small	8	0	8	$\chi^2 =3.627$ df=2 P=0.163	Not significant
	Medium	44	3	47		
	Large	93	1	94		

Source: Field Studies, 2013

Gender and access to Technology

Production involves access to technology (improved seeds, herbicides and fertilizers), farming practices like plowing, planting and harvesting. As shown in Table 5 the chi-square test of 95% confidence level indicates that the relationship between gender and access to technology is not significant. This implies that there is no relationship between gender and access to agricultural technology. Use of tractor with plough was the technology considered in the study. This is in disagreement with the finding of (FAO, 2010) that women had no access and use of technology because they are not the primary decision-makers in the household.

Level of education and access to Technology

The level of education of respondents in the study area is not related to access to technology as confirmed by the chi-square test, which shows that there is no statistical significant difference between respondents who had access to technology and those who do not with regards to educational level. This means access to technology in the study area does not depend on the level of education of respondent, which implies that respondents' level of education in the study area does not relate to access to technology. This does not support Rad et al., (2010) that education enhances active participation in innovation.

Household size and access to Technology

Table 5 shows household size of respondent and access to technology. Household size of respondent was classified into small household, medium household and large household. Small households are those with less than 4 people, the medium household had between 4 to 7 people while the large household had more than 7 people per household. Majority of respondent who had access to technology were from the medium household, but the relationship between household size and access to technology was not significant. This means that respondents within the different categories of household size have equal access to technology in the study area and refutes Adekola et al., (2013) that larger the household size, the lower the access to extension services and therefore access to technology.

Size of land holding and access to Technology

Size of land holding had been classified into small, medium and large land holdings. The small land holdings comprise respondents with lands which are 1 acre or less with the medium land holdings between 1- 4 acres while the large holdings are those with more than 4 acres. Table 5 indicates that there is no statistical significant relationship between

size of land holding and access to technology that is respondents within the different categories of size of land holding have equal access to technology in the study area. This disagrees with Yigremew, (2008) that those with small to medium land holdings carefully manage their farms because they access extension technology.

4.2.4 Socio-economic characteristics and access to credit

Age of farmer and access to credit

The chi-square test with 95% confidence level indicates that the relationship between age and access to agricultural credit for farming is significant. This mean access to credit does depend on one's age. The age of respondents was categorized into 40 years and above below 40 years and above 60 years. The study shows that majority of respondents aged 40 years and below had access to agricultural credit for farming. This disagrees with Ortmann and King, (2006) that age has significant negative impact on the likelihood that the farmer may have access to credit.

Table 6: Summary of chi-square results for the relationship between socio-economic factors and access to credit

Variable	Access to credit		Total (N=150)	Test	Interpretation	
	Yes	No				
Age		Yes	No		$\chi^2= 5.2$ df= 2 P = 0.74	Not significant
	21-40	17	56	73		
	41-60	11	51	62		
	Above 60	0	15	15		
Gender	Male	13	64	77	$\chi^2=0.332$ df= 1 P= 0.565	Not significant
	Female	15	58	73		
Level of Education	Nil	6	29	35	$\chi^2=3.199$ df=5 P=0.669	Not significant
	Basic	12	40	52		
	Above Basic	10	53	63		
Household Size	Small	0	8	8	$\chi^2 =5.883$ df=2 P=0.053	Not significant
	Medium	5	42	47		
	Large	23	71	94		
Size of land holding	Small	0	8	8	$\chi^2=5.883$ df=2 P=0.050	Significant
	Medium	5	42	47		
	Large	23	71	94		

Source: Field Studies, 2013.

Gender and access to credit

Agriculture as a sector depends more on credit than any sector of the economy due to the seasonal variations in the farmers returns and a changing trend from subsistence to commercial agriculture. Farmers therefore have limited access to credit as shown on Table 6 the chi-square test with 95% confidence level indicate that the relationship between sex and access to credit is not significant. This implies that there is no difference between male respondents and female respondents with regards to their access to credit. Majority of male respondents with few female respondents did not easily access credit. This may be due to the fact that women in the study area get access to credit from their fellow women traders who demand repayment with their produce. This finding contradicts Shultz (2007)

observation that women are more constrained than their male counterparts as a result of which most women have less access to and higher effective costs for information technology, inputs and credit.

Level of education and access to credit

The level of education of respondents in the study area has no significant relationship with access to credit. Table 6 shows that there is no statistical difference between a respondent's access to credit and his or her level of education. This means the respondent's access to credit does not depend on their level of education in the study area. This is not in agreement with Rad et al., (2010) view that education enhances the farmers ability to access productive resources.

Household size and access to credit

Table 6 also shows the household size of respondent and his or her access to credit in the study area. The chi-square test of 95% confidence level indicates that the relationship between household size of respondents and access to credit is not significant. Household size of respondent was classified into small household, medium household and large household. Small households are those with less than 4 people, the medium household had between 4 to 7 people while the large household had more than 7 people per household. This means that respondents within the different categories of household size had equal access to credit in the study area. This explains why a large proportion of the small and medium households lack credit and confirms with Hassan, (2008) that small to medium households predisposes a farmer's ability to access agricultural productive resources.

Size of land holding and access to credit

The size of land holding and access to credit is shown on Table 6. The size of land holding had been classified into small, medium and large land holdings. The small land holdings comprise respondents with lands which are 1 acre or less with the medium land

holdings between 1- 4 acres while the large holdings are those with more than 4 acres. The chi-square test of 95% confidence level indicates that there is a significant relationship between size of land holding and access to credit, that is the size of land holding had a relationship on one's access to credit in the study area. This confirms Nega et al., (2006) view that the level of land holdings affects household income, investment and credit.

4.2.5 The influence of socio-economic characteristics and access to inputs

The Tables 7, 8, and 9 below shows a summary of the relationship between socio economic factors and access to inputs (fertilizer, improved seeds and herbicides).

Age of farmer and access to inputs

The Table 7 shows the age of respondents and access to inputs. Inputs considered under the study were fertilizer, herbicides and improved seeds. The chi-square test of 95% confidence level indicates that the relationship between majority of respondents who are above 40 years and access to fertilizer (inputs) is significant. This mean access to fertilizer does relate to ones age. Table 8 also shows access to herbicides, the chi-square test of 95% confidence level indicates that the relationship between age of respondents and access to herbicides (inputs) is significant. This mean access to herbicides relates to one's age. Table 9 shows access to improved seeds, the chi-square test of 95% confidence level indicates that the relationship between respondent's age and access to improved seeds (inputs) is significant. This mean access to improved seeds is related to one's age. This is confirmed by Dlova et. al, (2004) findings that age is one of the factors that can affect the access to inputs. Bembridge (1987) in a study also found that farmer's age influences access and use of productive inputs.

Table 7: Summary of chi-square results for the relationship between socio-economic factors and access to fertilizer.

Variable		Access to inputs (fertilizer)		Total (N=150)	Test	Interpretation
Age		Yes	No		$\chi^2=25.2$	Significant
	21-40	48	25	73	df= 2	
	41-60	19	43	62	P = 0.0	
	Above 60	2	13	15		
Gender	Male	0	47	77	$\chi^2=3.16$	Not significant
	Female	39	34	73	df= 1 P= 0.76	
Level of Education	Nil	15	20	35	$\chi^2=9.701$	Not significant
	Basic	25	27	52	df= 5	
	Above Basic	29	34	63	P= 0.084	
Household Size	Small	32	25	59	$\chi^2=17.435$	Not significant
	Medium	32	48	80	df= 11	
	Large	3	8	11	P= 0.096	
Size of land holding	Small	0	8	8	$\chi^2=7.420$	Significant
	Medium	22	25	47	df= 2	
	Large	47	47	94	P= 0.024	

Source: Field Studies, 2013.

Gender and access to inputs

The chi-square test of 95% confidence level indicates that the relationship between sex of respondents and access to fertilizer is not significant. This means access to fertilizer is not related to one's sex. From table 9, the chi-square test of 95% confidence level indicates that the relationship between sex of respondents and access to herbicides is not significant.

From table 8, no significant relationship was found between sex of respondents and access to improved seeds. This means access to improved seeds is not related to one's sex. This confirms Sabarwal et al., (2009) and Hallward-Driemeier, (2011), evidence that access to inputs are primarily a function of the business size and sector of operation rather than a gender specific factor.

Level of education and access to inputs

Fertilizer, herbicides and improved seeds were inputs considered under the study. Table 7 shows the relationship between sex of respondents and access to fertilizer. The chi-square test of 95% confidence level indicates that the relationship between respondent's level of education and access to fertilizer is statistically significant. Table 8 shows the chi-square test result of the relationship between respondent's level of education and access to improved seeds, which was not significant. This mean respondent level of education does not affect their access to improved seeds. In table 9, access to herbicide was shown, and the chi-square test of 95% confidence level indicates that the relationship between respondent's level of education and their access to herbicides was not significant. This means that access to herbicides is not related to one's level of education in the study area.

Table 8: Summary of chi-square results for the relationship between socio-economic factors and access to improved seeds.

Variable		Access to (inputs) Improved seeds		Total (N=150)	Test	Interpretation
Age		Yes	No		$\chi^2=31.5$ df= 2 P = 0.0	Significant
	21-40	50	23	73		
	41-60	19	43	62		
	Above 60	1	14	15		
Gender	Male	31	46	77	$\chi^2=2.609$ df= 1 P= 0.106	Not significant
	Female	39	34	73		
Level of Education	Nil	15	20	35	$\chi^2=11.273$ df= 5 P= 0.046	Significant
	Basic	25	27	52		
	Above Basic	30	33	63		
Household Size	Small	35	24	59	$\chi^2=14.065$ df= 11 P= 0.229	Not significant
	Medium	33	47	80		
	Large	2	9	11		
Size of land holding	Small	0	8	8	$\chi^2=8.188$ df= 2 P= 0.017	Significant
	Medium	21	26	47		
	Large	49	45	94		

Source: Field Studies, 2013.

Household size and access to inputs

Household size of respondent had been classified into small household, medium household and large household. Small households are those with less than 4 people, the medium household had between 4 to 7 people while the large household had more than 7 people per household. Inputs considered under the study were fertilizer, herbicides and improved seeds. The chi-square test of 95% confidence level indicates that the relationship

between respondent household size and access to fertilizer is not significant. This mean respondent within the different categories of household size have equal access to fertilizer. Table 8 also shows the access to improved seeds, the chi-square test of 95% confidence level indicates that the relationship between respondent household size and access to improved seeds is not significant. This means that different categories of household size of respondent have equal access to improved seeds. Table 9 shows access to herbicides, the chi-square test indicates that the relationship between respondent's household size and access to herbicides is significant. This mean one's household size affects his or her access to herbicides in the study area.

Table 9: Summary of chi-square results for the relationship between socio-economic factors and access to Herbicides.

Variable		Access to inputs (Herbicides)		Total N=150	Test	Interpretation
Age		Yes	No		$\chi^2=19.3$ df= 2 P = 0.0 N = 150	Significant
	21-40	42	31	73		
	41-60	17	45	62		
	Above 60	1	14	15		
Gender	Male	28	49	77	$\chi^2=0.872$ df= 1 P= 0.35 N= 150	Not significant
	Female	32	41	73		
Level of Education	Nil	13	22	35	$\chi^2=4.575$ df= 5 P= 0.470	Not significant
	Basic	25	27	52		
	Above Basic	22	41	63		
Household Size	Small	33	26	59	$\chi^2=22.01$ df= 11 P= 0.024	Significant
	Medium	25	55	80		
	Large	2	9	11		
Size of land holding	Small	0	8	8	$\chi^2=6.893$ df= 2 P= 0.032	Significant
	Medium	17	30	47		
	Large	43	51	94		

Source: Field Studies, 2013.

Size of land holding and access to inputs

The size of land holding have been classified into small, medium and large land holdings in accordance with MOFA'S, (2007) land classification. The small land holdings comprise respondents with lands which are 1 acre or less with the medium land holdings between 1- 4 acres while the large holdings are those with 4 acres or more. The chi-square test of 95% confidence level indicates that there is a statistical significant difference between size of land holding and access to fertilizer as shown on table 7. That is the size of land holding has significant relationship with respondent's access to fertilizer. Majority of respondents within the medium land holdings category have access to fertilizer which implies that farmers in the study area with average land holdings can access fertilizer. From table 8 the chi-square test of 95% confidence level indicates that the relationship between respondent size of land holding and access to improved seeds is significant. This means that size of land holding is related to access to improved seeds. In table 9 the chi-square test indicates that the relationship between respondent size of land holding and access to herbicides is significant. This mean that size of land holding in the study area is significantly related to access to herbicides. Size of land holdings in the study area also relates to all the inputs because land is a source of wealth in the study area. This finding confirms that of Nega et al., (2006) that the size of land holding shows the level of security, which also affects a household's income, and their incentive to work and to invest.

4.2.6 Socio-economic factors and access to labour

The Table 10 below shows a summary of chi-square results and the relationship between socio-economic factors and access to labour.

Age of farmer and access to labour

Table 10 shows a significant relationship between respondent's age and access to labour. This mean access to labour is affected by one's age. This supports studies done by Dlova et al., (2004) that age of farmer, farm experience and farm size all increase the likelihood of farmer's access to hired labour.

Table 10: Summary of chi-square results for the relationship between socio-economic factors and access to labour

Variable		Access to labour		Total (N)	Test	Interpretation
		Yes	No			
Age		Yes	No		$\chi^2=28.8$	Significant
	21-40	51	22	73	df=2	
	41-60	20	42	62	P = 0.0	
	Above 60	2	13	15		
Gender	Male	33	44	77	$\chi^2=2.562$	Not significant
	Female	40	33	73	df=1 P=0.109	
Level of Education	Nil	16	19	35	$\chi^2=11.73$	Significant
	Basic	25	27	52	df= 5	
	Above Basic	32	31	63	P= 0.039	
Household Size	Small	36	23	59	$\chi^2=15.61$	Not significant
	Medium	34	46	80	df= 11	
	Large	3	8	11	P= 0.156	
Size of land holding	Small	0	8	8	$\chi^2=8.816$	Significant
	Medium	22	25	45	df= 2	
	Large	51	43	94	P= 0.012	

Source: Field Studies, 2013.

.Gender and access to labour

The chi-square test indicates that the relationship between sex and access to labour is not significant. This implies that sex of respondent does not affect access to labour. From the results of the study as shown on table 10, it was noted that majority of the respondents who had access to labour were females. This may be due to their high access to land as noted in table 4. This does not agree with findings by FAO (2012), that although gender inequality varies considerably between different regions and sectors, there is evidence that globally women benefit less from rural employment.

Level of education and access to labour

Table 10 shows the chi-square test of 95% confidence level which indicates that the relationship between level of education of respondents in the study area and access to labour is significant. This implies that, the level of education affects respondents' access to labour in the study area. This agrees with Rad et al., (2010) findings that education enhances the ability to derive, decode and evaluate useful information for agricultural production. Information on source of labour can be accessed easily by the educated farmer.

Household size and access to labour

The household size of respondent and access to labour in the study area is shown in table 10. The relationship between household size of respondents and access to labour is not significant as indicated by the chi-square test of 95% confidence level. Household size of respondent had been classified into small household, medium household and large household. This means that respondents within the different categories of household size had equal access to labour in the study area and not in agreement with Adekola et al., (2013), that household size had an influence on access to labour.

Size of land holding and access to labour

Table 10 indicates the relationship between size of land holding and access to labour. Size of land holding was also classified into small, medium and large land holdings. The chi-square test of 95% confidence level indicates that there is a statistical significant relationship between size of land holding and access to labour. Majority of respondents without access to labour are in the medium land holdings category which implies that farmers with average land holdings lack access to labour in the study area. This must be due to the high cost of labour in the study area which is unaffordable by the small and medium land holdings category as confirmed by Nega et al., (2006) that the larger the size of land holding, the higher the level of security, which also affects the household's income.

4.3 Institutional factors and access to productive resources

This section discusses institutional factors that influence access to productive resources. Institutional factors considered are Government policies and membership of farmer groups. Membership of farmer groups and access to the productive resources like land, extension services, credit, inputs, technology and labour would be discussed together with Government policies.

4.3.1 Membership of farmer groups and access to extension services

It can be seen from the Table 11 below that majority of respondents had no access to extension services. Extension services represent agricultural information through Extension agents. The chi-square test of 95% confidence level indicates that the relationship between membership of farmer groups and access to extension services is not significant. This may be due to the fact that group members learn from other members as noted by Karli et al., (2006) that observing the agricultural extension personnel in a group member's farm may increase the probability of some other farmer's access and use of extension services.

4.3.2 Membership of farmer groups and access to credit

Table 11 presents membership of farmer groups and group member's access to credit. The chi-square test of 95% confidence level indicates that the relationship between membership of farmer groups and access to credit is significant. This confirms work done by Asante et al., (2011). The implication is that belonging to a farmer group enables a farmer to access credit and other inputs due to use of group savings, collateral and bulk purchases.

4.3.3 Membership of farmer groups and access to technology

As shown in Table 11, the chi-square test of 95% confidence level indicates that the relationship between membership of farmer groups and access to technology is not significant. This implies that belonging to a farmer group does not affect one's access to agricultural technology. Use of tractor with plough was the technology considered in the study. It was noted from the table that only few respondents who are members of farmer groups had access to technology while majority of respondents who are also members of farmer groups had no access to technology. Non members of farmer groups had more access to technology and therefore, farmer group membership of respondent is not related

to access to technology in the study area. This agrees with Karli et al., (2006) findings that farmers who do not use technology at farms are more likely to participate in the agricultural cooperative than those farmers who have access to technology.

Table 11: Summary of chi-square results for the relationship between membership of farmer groups and access to some productive factors

Variable	Access to extension				Test	Interpretation
		Yes	No	Total (N=150)		
Group membership	Yes	3	0	3	$\chi^2 = 0.128$ df=1 P=0.721	Not significant
	No	141	6	147		
	Total	144	6	150		
Access to Land						
Group Membership		Yes	No	Total (N=150)	$\chi^2=3.229$ df=1 P= 0.072	Not significant
	Yes	3	0	3		
	No	70	77	147		
	Total	73	77	150		
Access to Technology						
Group Membership		Yes	No	Total (N=150)	$\chi^2=0.084$ df=1 P=0.772	Not significant
	Yes	3	0	3		
	No	143	4	147		
	Total	146	4	150		
Access to Credit						
Group Membership		Yes	No	Total (N=150)	$\chi^2=4.646$ df=1 P=0.031	Significant
	Yes	2	1	3		
	No	26	121	147		
	Total	28	122	150		
Access to Labour						
Group Membership		Yes	No	Total (N=150)	$\chi^2=3.229$ df=1 P=0.072	Not significant
	Yes	3	0	3		
	No	70	77	147		
	Total	73	77	150		

Source: Field Studies, 2013

4.3.4 Membership of farmer groups and access to land

The chi-square test of 95% confidence level indicates that the relationship between membership of farmer groups and access to land is not significant. This implies that there is no significant difference between farmers who belong to groups and those who do not with regard to their access to agricultural land for farming. This is an alternative view to Nzomoi et al., (2007) who noted that membership of cooperatives contributed to exposing members to the relevance and means of access to productive resources especially land.

4.3.5 Membership of farmer groups and access to labour

Labour constraint should be considered when promoting intensive farming practice in Ghana. Access to labour for weeding is also important for improving yields or preventing yield losses. Table 11 shows the relationship between membership of farmer groups and access to labour. The chi-square test of 95% confidence level indicates that the relationship between membership of farmer groups and access to labour is not significant. This implies that being a farmer group member does not affect ones' access to agricultural labour for farming. Table 11 also shows that majority of respondents who are members of farmer groups had no access to labour therefore, farmer group membership does not affect access to labour. This is an alternative view to IFPRI, (2010) that group labour and mechanization has a long history in Ghana and can address both seasonal and permanent labour constraints.

4.3.6 Membership of farmer groups and access to inputs

Table 12 below shows the relationship between membership of farmer groups of respondents and access to inputs. Inputs considered under the study were fertilizer, herbicides and improved seeds. The chi-square test of 95% confidence level indicates that the relationship between membership of farmer groups and their access to fertilizer (inputs) is significant. This means access to fertilizer is affected by group membership. The chi-square test of 95% confidence level indicates that the relationship between membership of farmer groups and access to herbicides (inputs) is significant. Majority of respondents belonging to farmer groups had access to fertilizer. This agrees with suggestions by IFPRI, (2012) that groups facilitate the process of farmer identification and coordination, which helps in providing equal access to inputs for increased productivity.

In table 12 the chi-square test of 95% confidence level indicates that the relationship between respondents who are members of farmer groups and their access to improved seeds (inputs) is not significant. Table 12 also shows that majority of respondents belonging to farmer groups had no access to improved seeds. This means one's membership of a farmer group does not affect his or her access to improved seeds in the study area. This may be due to the fact that most farmers in the study area borrow seeds from other farmers or recycle their seeds. This finding does not support suggestions by IFPRI, (2012) that groups facilitates the process of farmer identification and coordination, which helped in providing equal access to inputs for increased productivity.

Table 12: Summary of chi-square results for the relationship between membership of farmer groups and access to inputs (fertilizer, herbicides and improved seeds)

Variable	Access to fertilizer					
		Yes	No	Total (N=150)	Test	Interpretation
Group membership	Yes	3	0	3	$\chi^2 = 3.594$	Significant
	No	66	81	147	df=1	
	Total	69	81	150	P=0.05	
Access to herbicides						
Group Membership		Yes	No	Total (N=150)	$\chi^2 = 4.592$	Significant
	Yes	3	0	3	df=1	
	No	57	90	147	P= 0.03	
	Total	60	90	150		
Access to improved seeds						
Group Membership		Yes	No	Total (N=150)	$\chi^2 = 3.449$	Not significant
	Yes	3	0	3	df=1	
	No	67	80	147	P=0.061	
	Total	70	80	150		

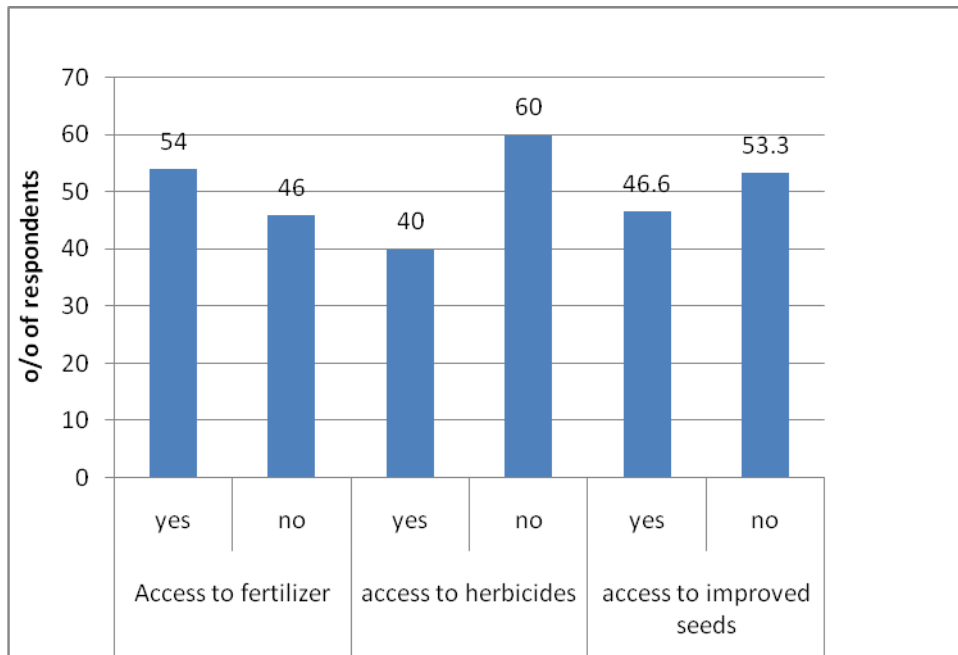
Source: Field Studies, 2013.

4.4.7 Government policy and access to productive resources

Policy reforms, institutional changes, and supporting investments can make agricultural input production and distribution more profitable and attractive in order to induce access and use of productive resources by farmer. This applies to the fertilizer subsidy policy programme in Ghana. The government of Ghana in 2008 instituted a country-wide subsidy on 50Kg bags of four types of fertilizer in an effort to mitigate the effect of rising energy and food prices. Farmers received the subsidy in the form of fertilizer-vouchers distributed by agricultural extension agents which was used to purchase the subsidized fertilizer. It targeted the smallholder farmer to ensure more needy farmers had access to fertilizers and to increase the low fertilizer usage in the country from 8Kg per hectare to 50Kg per hectare by the year 2015.

Fertilizer as an input was considered under the study in relation to other productive inputs like herbicides and improved seeds. Figure 9 shows that majority of respondents in the study area had access to fertilizer as compared to herbicide and improved seeds.

Access to fertilizer, which was about 40% before the fertilizer subsidy programme in the districts increased to 54% and ranked higher among the other productive resources in the study area. This may be due to the government fertilizer subsidy programme in Ghana. This finding is corroborated by WFP (2013), that generally a majority of small holders in Ghana have access to fertilizer for agricultural purposes. It is also in contrast with findings by Yawson et al., (2010) that small holder farmers in the Central Region of Ghana had no access to fertilizer.

Figure 9: Access to fertilizer and other inputs

Source: Field Studies, 2013

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

The major findings and results of the study are summarized in this chapter. It also draws conclusions to the study as well as recommendations. This study set out to examine the factors that affect farmer's access to agricultural resources in the Dangme East and Dangme West Districts of Ghana, and sought to answer the following research questions.

- (1) What socio-economic factors affect the small holder farmer's access to productive resources in the Dangme East and Dangme West Districts of Ghana?
- (2) What institutional factors affect the small holder farmer's access to productive resources in the Dangme East and Dangme West Districts of Ghana?

5.1 Summary

The socio-economic factors investigated were age of farmer, gender, educational level of farmer, size of land holding and household size. Chi-square results revealed a significant relationship between age of respondent and access to land, credit, inputs and labour, however, no significant relationship was found between age and extension services and technology. Contrary to the literature review on gender and access to productive resources no significant difference was found between male and female with regard to access to all the productive resources considered in the study, that is extension services, technology, land, credit, inputs and labour.

The results also showed a significance relationship between level of education of respondent and access to improved seeds and labour while no significant relationship was found between level of education and access to extension services, technology, land, credit, fertilizer and herbicides. There was also a significant relationship between

household size and access to extension services meanwhile no significant relationship was found between household size and access to technology, land, credit, inputs and labour.

The results further revealed a significant relationship between size of land holdings and access to labour, credit, inputs and land while no significant relationship was found between size of land holdings and access to technology and extension services.

The study further examined institutional factors like government policies and membership of farmer groups. The study shows that there was no significant difference between farmers who belong to groups and those who do not with regard to access to extension services, technology, land, inputs and labour. This implies that, apart from credit, no significant relationship was found between access to all the other productive resources considered in the study and being a member of a farmer group.

The study also revealed that although the government policy like the fertilizer subsidy policy programme in Ghana may have increased the small holder farmer's access to fertilizer as an input, about half of the small holder farmer in the Dangme east and west districts still had no access.

5.2 Conclusion

The study concluded based on the research questions posed for the study, with regard to the socio-economic factors investigated, the study concludes that age affects access to land, credit, inputs and labour. Level of education also affects access to improved seeds and labour while household size affects access to extension services. Furthermore size of land holdings significantly affects farmers' access to labour, credit, and inputs in the Dangme east and west districts.

With regard to institutional factors the study concludes that there is a relationship between farmer group membership and small holder farmer's access to credit and inputs (fertilizer, herbicides and improved seeds).

5.3 Recommendations

The following recommendations are being proposed, based on the findings and conclusions drawn from the study. The government fertilizer subsidy programme should be continued and expanded to cover majority of small holders. Also the government subsidy policy should include other productive resources like inputs (herbicides, insecticides and improved seeds), to improve its access. Again, government should formulate policies on loans with low interest rates for the small holder farmer so as to increase their access to credit. Also Agricultural development planners should take into consideration small holder farmer's socio-economic factors such as age, education, size of household when designing an intervention.

It is also recommended that the Ministry of Food and Agriculture should continue to encourage farmer group formation for easy access to extension services, credit and inputs.

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APPENDIX**Questionnaire for Smallholder Farmers**

Region:..... Questionnaire number:.....

District:.....

Village:.....

Background or socio-economic characteristics:

Name:

1. Age of respondent.....
2. Sex: (1) Male (2) Female
3. Educational status: (1) No education (2) Basic (3) Basic Dropout (4) Secondary (5) Post-secondary (6) Tertiary.
4. Marital status: (1) Married (2) Not Married (3) Divorced (4) Widowed
5. Household size:

Farming Activities:

6. Number of years of farming:
7. How many years have you been in crop production?
8. Is farm officially registered? (1) Yes (2) No
9. Land holding in acres:
10. Indicate the four (4) main crops that you grow, acreages, yield and technologies used:

Crops grown	Acreages	Yield/ Acre	Technologies Used

Access to Productive Resources:

11. Do you have access to land for cultivation? Yes or No
If yes, what is the source/ land tenure arrangement? Family land, purchase, rent, command land, stool/skin land
12. Do you have access to labour? Yes or No.
13. Do you have access to extension services? Yes or No
If 'yes' what is/ are the source(s)?
What is the frequency of contact?

- If 'no', state reason(s):
14. Do you have access to inputs? Yes or No
If 'yes' list them and the source(s):
If 'no', state reason(s):
15. Do you have access to improved seeds? Yes or No. If yes, what is your source?
Purchased or Family/friends
16. Do you have access to technology for productive activities? Yes or No
17. Do you have access to credit? Yes or No
If 'yes' state the amount:and the source:
18. Do you have problem accessing credit? Yes or No.
If yes, explain.....

Group Membership:

19. Farming group membership (1) Yes (2) No
20. Social group membership (1) Yes (2) No