



TOPIC: ASSESSING THE INFLUENCE OF LIVELIHOOD ASSETS ON LIVELIHOOD STRATEGIES AND HOUSEHOLD FOOD SECURITY AMONG SMALLHOLDER MAIZE FARMERS THE CASE OF BOLE DISTRICT OF GHANA.

A RESEARCH PROJECT SUBMITTED TO VAN HALL LARENSTEIN UNIVERSITY OF APPLIED SCIENCES IN PARTIAL FULFILMENT OF THE REQUIREMENT OF MASTER DEGREE IN MANAGEMENT OF DEVELOPMENT SPECIALIZATION RURAL DEVELOPMENT AND FOOD SECURITY

BY

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Dedication

I dedicate this dissertation first of all to Almighty Allah for His blessings and the strength He gave me to complete this dissertation.

I also dedicate this work to my brother Soburu Banchang Gausu and Dr. Pleun van Arensbergen for their support and encouragement. And finally I dedicate this work to my dear daughter Salma Kugbenmatu Abu, I love you.

Abbreviations

GSS	- Ghana Statistical Service
AEA	- Agricultural Extension Agent
MOFA	- Ministry of Food and Agriculture
FAO	- Food and Agricultural Organizations
GDP	- Gross Domestic Product
FASDEP	- Food and Agricultural Sector Development Policy
METASIP	- Medium Term Agriculture Sector Investment Plan
DFID	- Department For International Development
NGO	- Non- governmental Organization
WFP	- World Food Program
OFP	- Orange Flesh Potato
UNDP	- United Nations Development Programme

ABSTRACT

The livelihood strategies of farm households depend on the conditions of their assets and farm households cope with risk and shocks through portfolios consisting of different types of assets. Thus discussing the influence assets have on livelihood strategies of farm households helps in understanding their livelihood conditions and in formulating appropriate livelihoods improvement policies.

In this study, the influence of farm household livelihood assets on livelihood strategies was first theoretically analyzed, then a qualitative study on livelihood assets available to these households, the influence of these assets on livelihood strategies, the influence of the strategies on food access and availability and then the challenges these households face was conducted. These were analyzed by first transcribing and reading to identify meanings, then coded systematically. Once all the meanings were identified, themes and statements were generated. Evaluation of each meaning was done to ensure that the theme accurately and adequately captured its meaning and addressed the research problem. The specific conclusions that are made are that;

Natural capital and physical capital have a significant influence on household livelihood strategy, the more natural and physical assets they have the more they choose to engage in farming only.

Also the more human capital and financial capital a household possesses the more they engage in off-farm activities aside from the farming.

Social capital has no important influence on household livelihood strategy, and eventually, the consumption of food will increase with households that participate additional in off-farm activities in addition to farming.

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CHAPTER ONE

1.0 Introduction

Upon the structural modifications that took place over the years, Agriculture still remains the main driver of Ghana's economy. For a sector that employs four-hundredth of the active labour force as discovered recently and a significant source of revenue for the government, a considerable growth is probably going to have a large impact on the economy (Hernández, 2001). In 2015, Ghana's total revenue from non-traditional exports such as sheanut, pineapple, cashew etc. alone was about US\$2.522 billion (GHs 9.210 billion) from GHs 6.8 billion in 2012. Though the sector's contribution has been enormous in the past, recent growth and performance statistics has not matched up to expectations. The contribution of the sector to Ghana's GDP has dwindled from 31.8% in 2009 to 19% in 2015. From a number one contributory sector for many years with a percentage contribution of 56 as of 1980, the sector presently trails behind the Service sector with a contribution rate of 21st as of December 2016. The annual rate of growth within the sector has additionally been lower than 8 may 1945 compared to the service sector whereas production levels of key crops have greatly varied. Lack of effective post-crop management schemes to handle the number created among varied factors has forced the nation to be a net importer of assorted basic foods and its associated pressure on the local currency.

The majority of individuals in Northern Ghana for that matter Bole District depend upon agriculture for his or her livelihoods. there's one rainy season, beginning in April–May and ending in September–October, followed by a dry season that stays for the of the year. The dominant farming system is thus supported the rainfed cultivation of crops such as sorghum, millet, groundnuts, maize, rice, soybeans and vegetables (Dietz et al., 2004; Shepherd et al., 2005). Crop production for sustenance is commonly combined with farming on small farms and maintained through more labour agricultural ways (Naylor, 1999). According to the 2010 population and housing census, about 65.4% of households and 75% of the people in the district are engaged in agriculture. The gap between farmers and those engaged in other occupations is wide and farmers are considered the poorest group in the district (GSS, 2010). Increasing effect of climate variability have exacerbated the situation and further depleted farmers livelihood assets Some farmers either stay and do nothing or move away to other places or stay and mitigate the situation. Land, soil, water and animals are basic resources needed to make ends meet yet these resources in the district are being depleted through various forms of human activities.

Livelihoods and survival of persons, households and communities in the Bole District are vulnerable to shocks and stresses such as decreasing labor, decreasing yields on soil, decreasing rainfall, population pressures on resources leading to declining farm size and declining returns to labour. In general, Ellis (2001), summarized that farm primarily based livelihoods are not any longer able to offer a secure long-run livelihood for the variety of reasons. A number of these include land fragmentation at inheritance making plots to decrease viable for family food security, adverse environmental fluctuations that increase the risks related to natural resource-based livelihood activities and declines in agricultural markets relative to non-farm wage levels. Such issues push small holder farmers to diversify their financial gain in non-farm livelihood alternatives. Solely very little attention has been given in characteristic the challenges and prospects of farm and non-farm livelihood methods in sub-Saharan Africa generally and in Ghana especially.

1.1 Problem statement

The majority of the people of Bole District are smallholder farmers and their livelihood is based on subsistence farming. Agriculture in the district is rain fed, food availability depends on production levels, influenced by the weather, land, capital and labour. The lean season corresponds with the dry season that long about (4) months. Though over 75% of the population is engaged in agriculture, farm labour is slowly aging. Agriculture does not entice the youth because of the low earnings in the sector. High cost of farm input, poor marketing, inadequate farm mechanization services, destruction of crops by alien herds, careless bush burning, poor soil fertility, high pests infestation, lack of credit, lack of appropriate storage facilities and poor post-harvest handling has resulted in high cost of living in the district (MoFA annual report, 2012)

Successive governments through the Ministry of Food and Agriculture have rolled out interventions to improve livelihood outcomes such as improved income, food security, sustainable agriculture and well-being of these farmers in Bole District. For instance, the fertilizer subsidy program was introduced in 2008 as a tool to incentivize fertilizer use to increase production, from 2014-2017, Food and Agriculture Sector Development Policy (FASDEP 1 & 2) and Medium Term Agriculture Sector Investment Plan (METASIP 1 & 2) and projects such as Northern Rural Growth Project, Rice Sector Support Project have all been implemented. From 2017 to date, The Planting for Food and Jobs Program is also on going. These interventions have either fail or have very limited effect. As Scott (1998) has argued, one important reason projects fail is probably that development partners simply misperceive the way people get by and get things done. The Ministry of Food and Agriculture lack information about the diverse ways that farmers employ to meet their food needs, particularly what livelihood assets are available to them and how such assets influence their livelihood strategy to achieve their desired food security.

1.2 Objective

This study is purposely set out to assess the influence of livelihood assets on the strategies of smallholder farmers and recommend appropriate policies to the Ministry of Food and Agriculture as well as other appropriate agencies, intervention that will in the development of agriculture and improve livelihoods of rural households

1.3 Main research question

What is the influence of livelihood assets on livelihood strategies and food security among smallholder maize farmers in Mandari and Bogdaa communities in the Bole District?

1.4 Sub- questions

1. What farm livelihood assets are available to smallholder maize farmers in the Bole District?
2. What are the main livelihood strategies of smallholder maize farmers in the Bole District?
3. What is the influence of livelihood strategies on food security?
4. What are the challenges of smallholder maize farmers in the Bole District?

Significance of the study

This study is important in numerous ways, findings of the study will reveal the livelihood assets rural households in Bole District possess and how these assets influence their strategies in the midst of the numerous challenges they are faced with. These findings will inform and influence policy makers on the kind of interventions that will make real impact in the rural agricultural sector.

CHAPTER TWO

2.0 Literature review

In this chapter the study will define the concept of food security, a household, smallholder farmers and livelihood and explain the DFID sustainable livelihood framework, operationalize the concepts and show the influence or linkage between livelihood assets, livelihood strategies and food security.

2.1 Sustainable Livelihood Framework

Sustainable Livelihood Framework shows stakeholders as working in a context of vulnerability, within which they have access to certain assets. Assets gain weight and value through the existing social, institutional and organizational environment (policies, institutions and processes). This context decisively shapes the livelihood strategies that are available to people in pursuit of their determined beneficial livelihood outcome such as food security (Kollmair et al, 2002). The sustainable livelihood framework is adapted because it is people centred livelihoods and typical. It can be used either in planning new development interventions or assessing the contribution to livelihoods sustainability by existing interventions. In particular the framework provides a checklist of important issues and sketches out the way these link to each other, it draws attention to core influences and process and emphasis the multiple interaction between the various factors which affect livelihoods. The framework is centred on people, its aim is to help stakeholders with different perspectives to engage in structured and coherent debate about the many factors that affect livelihoods, their relative importance and the way in which the interact, this is in line with what this study seeks to do.

2.2 CONCEPTUAL FRAMEWORK

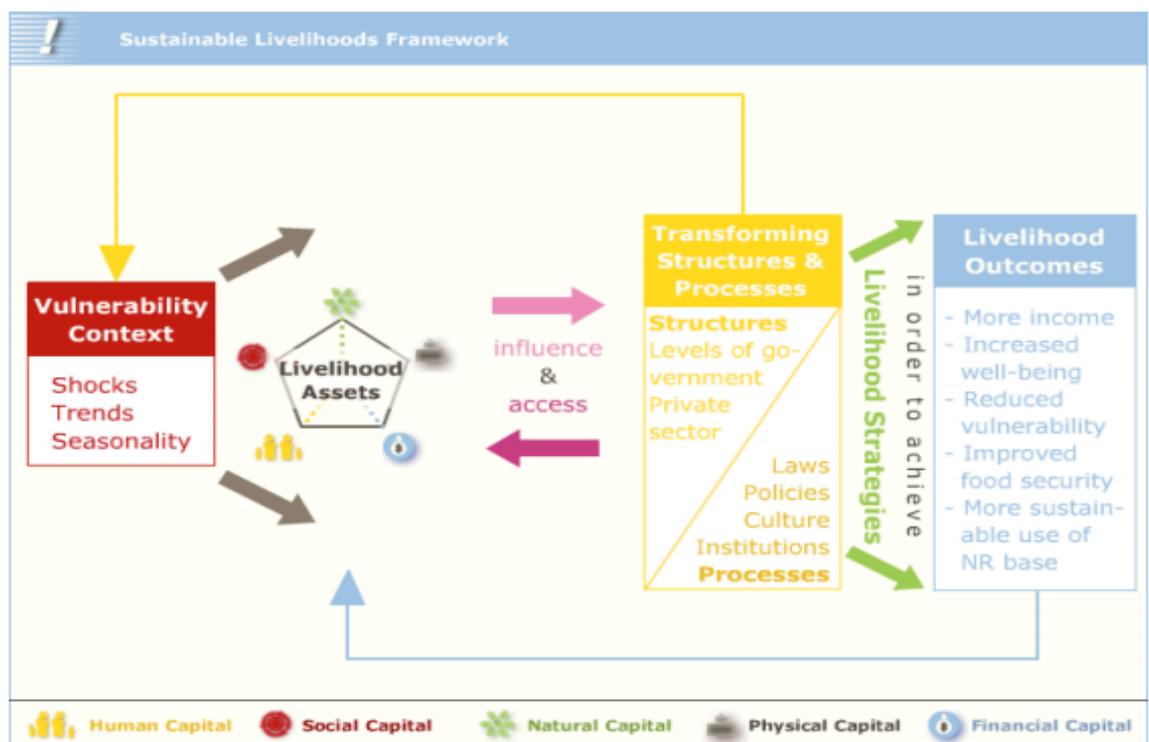


Figure 1: DFID sustainable livelihood framework Source: adopted from DFID (2000)

2.3.1 Vulnerability context

Vulnerability context according to (Kollmair et al, 2002) refers to how people's livelihoods are being threatened as a result of climatic extreme conditions such as droughts and floods which they can either be seasonal, or have certain trends in terms of their occurrences. As a result of that, people deplete their assets as a means of trying to cope which further exposes them to future dangers.

In a vulnerability situation, generally, is usually beyond the control of people. According to Collier et al (2008), declining rainfall and global warming, rising population, floods and drought episodes remain the major limiting factor to agriculture growth in developing countries. Despite worldwide coverage of climate change impact, there are intra-sectoral and inter-sectoral variations in vulnerability depending on location, adaptive capacity and other socio-economic and environmental factors (Senbetta, 2009). In Europe for example, the agricultural sector has benefited from global warming while on the other hand agriculture in Africa has been affected negatively. This is attributable to the fact that global warming has resulted in reducing average rainfall in Africa while average rainfalls in Europe have marginally increased over the years (Collier et al, 2008; McCarthy et al 2001). The effects of climate change have already contributed a lot in making the livelihoods of smallholder farmers more vulnerable in Sub-Saharan countries as seen in the recent increases in floods, drought and shifts in marginal agriculture systems.

2.3.2 Livelihood assets

As the livelihoods approach is about people, it seeks to gain an accurate and real understanding of people's strengths called assets or capitals. It is important to analyse how people try to change these capitals into positive livelihood outcomes. The approach is founded on a belief that people require a number of assets to achieve positive livelihood results. Therefore the SLF identifies five types of capitals upon which livelihoods are founded, namely human capital, social capital, natural capital, physical capital and financial capital.

2.3.3 Natural capital:

This is the form of capital that refers to the use and availability of natural resources such as land/soil, flora and fauna, water, environmental resources like forest services from which people derive livelihood. The existence of different kinds of natural resources does not matter but having access to them. Household not having natural capital means either the household does not have access and control to land or they have access and control but does not use it for agricultural purpose (Mailu, 2002). Households in rural settings depend on natural resources like the forest for firewood, charcoal, and construction materials, food and medicine. It is estimated worldwide that between 1.095 billion and 1.75 billion people rely on the forest in various degrees for their livelihoods (Langat *et al.*, 2016). About 20-25% of rural people income is estimated to come from the natural or environmental resources in developing world (Vedeld *et al.*, 2007) and also serves as safety nets during seasonal food shortages (Shackleton and Shackleton, 2004).

2.3.4 Financial capital:

The resources available to people in the form of cash income, stocks, access to credit and the use of such credit and remittances is referred to as financial capital, it provides people with several different livelihood options (Coff *et al.*, 2015). They discovered in their study that low income households in rural areas is associated with low livestock holding, small farm, too much reliance on food crops farming and low monetization of the rural economy (Israr *et al.*, 2014)

In Northern Ghana however, maize and groundnut constitute the important sources of cash to smallholder farmers (Ghana Statistical Service, 2008), other sources are sale of livestock. Inadequate financial capital in smallholder livelihoods limits their seasonal liquidity needs to invest in Agriculture which is an important barrier to agriculture development.

2.3.5 Physical capital:

Physical capital, according to livelihoods approach, comprises the basic infrastructure and producer goods needed to support livelihoods (DFID, 1999; Bebbington, 1999; Allison and Muir, 2008). The sub-sectors of physical infrastructure are roads, energy, transport, housing, markets, tools and agricultural equipment and inputs. In developing world, physical infrastructure is key to the development of their economies especially in agriculture, tourism and industry. Physical capital like roads, modernize equipment for farming, irrigation facilities, good housing facilities as a unit of environment have a great impact on efficiency and general welfare of a rural communities (David JIBOYE and Ogunshakin, 2010).

2.3.6 Human capital

Human capital consist of health, education and training (skills), age and household size or labour (Hebinck and Bourdillon, 2002), that play a major part to make households chase different livelihood strategies. The efficiency of labour depends on factors such as education, good health and right age. A household uses traditional labor-using inputs, for example, bullocks (and human power) for ploughing farm land, farmyard manure for fertilizing crop fields, and clearing out diseased or insect infested crops as long as family labor is there to perform these activities. Their use reliance on the number of working class family members - men, women and children - available to the farm household. The availability of working class family members which is used in household production defines the size of the households' farm labor force (FAO, 1986; Low, 1986). Subsistence farming in developing world use a great number of unskilled cheap labor, and to a large extent, the labor needed for performing farm activities comes from within the household (Bhandari et al, 1996-97; Bhandari, 2006; Cain, 1997).

There exist a strong link between level of education and investment in agriculture Lopez (2008), in a study on livelihood strategies in Bolivia and Ecuador identified age, dependency ratio, level of education and training received to be significant determinants of household asset base. Human capital of smallholder farmers in northern Ghana is weak with over 72% of them being illiterates (Ghana Statistical Service, 2008). This affects their ability to adopt innovations.

Age of the household head, another important demographic variable, is thought to have an important effect on livelihood strategy and food security. Elderly people continue farming as long as they can contribute to the farm. Moreover, for elderly farmers there are few chances of off-farm employment and change of livelihood may not be a viable option for them. However, younger individuals are more likely to change occupation more than older individuals (Mahesh, 2002; Moore, 1996; Ogena and De Jong, 1999).

2.3.7 Social capital

Social capital implies ways of getting various forms of resources and support by means of connections and networks. According to (Mizanur Rahman, 2014), in rural areas that are gifted with social capital will facilitate rural development and also their well-being in terms of food security, improved income and good attitudes. (Baron *et al.*, 2004) insist that social capital is an important resource which reinforces the livelihood strategies of rural households as it allows them to act together in chase of common goal. Social capital therefore plays a key role in enabling and sustaining varied income folders and access to preveleges and assets to peoples households (Berry, 1993)

2.4 Livelihood Strategies

Livelihood strategies according to (Wamalwa, Ondieki-mwaura and Ayuke, 2018) are a range of activities, capitals and access which mutually determines the living condition obtained by rural households, and (Kassie, 2017) defines livelihood activity as means of obtaining a living. Mostly households are engaged in diverse livelihood strategies to guarantee survival in the event of failure in one or the other, it is a form of self-insurance

Four livelihood strategies is common with rural households in developing world(Harman *et al.*, 2015); on farm or farm alone, off-farm combine with farm, non-farm with farm and the mixed method or a combination of all. The components of rural livelihood are classified by sector as on farm or non-farm, by function as wage employment or self-employment and by location as on-farm or off-farm. Rural households are involved in 3 to 4 different activities on the average. The major ones are usually livestock rearing, marketing, casual labor, firewood, charcoal, pito brewing and gari processing. Farm alone activities are mainly crop and livestock, off-farm are forest based activities like firewood, charcoal burning, casual labour on farm and non-farm activities are pito brewing, gari processing, business, kiosk and hotel work, mining activities, mason and carpentry work.

Forest resources are vital resources where majority of people depend on for their livelihoods. Some use it for subsistence like fire wood, charcoal, food yet others use for timber, medicine or grazing for animals. Literature shows that as much as 20-25% of rural people are deriving their income from these natural capital, and that poor households typically involve in more low returns natural or environmental resources and often fail to accumulate capital from that (Vedeld *et al.*, 2007).

Crop expansion or diversification is one strategy for managing food security, production and market failures or risks. Inter cropping or crop diversification is seen as a key step in moving from small scale production or subsistence to commercial farming. A move from crop production for family use to cash crop production contributes to improvement in food security and general improvement of households well-being.(Wamalwa, Ondieki-mwaura and Ayuke, 2018).

In most developing world as the case of Kenya, households of rural areas make a living from rearing animals and consider livestock holding as a store of wealth(Mandleni, 2011). It makes multidimensional contribution to the social and economic development of the rural people. In West Africa for that matter Ghana, livestock plays a crucial role in the rural livelihood by providing food, income and social and cultural functions for the average rural farmer. Livestock avails a buffer stock and effective hedge against shocks and trends(Fafchamps, Udry and Czukas, 1994)

There is a rising acknowledgement that the rural economy is not limited to farming or agriculture sector alone(Csaki and Lerman, 1996). The population of rural households now exceed the capacity of agriculture farming alone to provide sustainable livelihood to them(Artemyan, no date). Households depend on subsistence farming which now constraint them with precarious living and exposing them to adverse situations so they become risk managers. Therefore rural households seek to engage in non/ off-farm sources of income and sustenance than one activity or strategy(Litsegård and Billquist, no date). In terms of the number of people or rural households that are engaged in non-farm or off-farm activities in Sub- Saharan Africa for income, it is revealed that over 30% of the people have a share of their income from those activities(Ellis, Ellis and Frank, 2000). According to a study in Honduras due to the acute weather variability, off-farm activities could become the striking adaptation choices to agriculture activities. Despite rural households turning to off-farm and no-farm activities to meet their needs they are faced with financial gaps, this tends to limit their participation whereas educated and wealthier households use the opportunity of their human and physical capital to participate more in these activities(Marrit van den Berg - , 2001).

Livelihood concept stresses on perseverance for maintaining assets of rural households including capital assets as precondition for existence. In rural Kenya as well as other developing countries, rural livelihoods rely on five capitals such as natural, physical, human, social and financial for their survival. Access to all these capitals is required for a sustain livelihood(Heffernan and Misturelli, no date). Analysis of rural households is complicated due to the fact that they engage in various economic activities, they therefore make their living by combining a web of activities and connections. Households in rural areas vary their livelihood activities to generate income and better cope with adverse factors that affect agriculture(Israr *et al.*, 2014). Though rural households in third world countries chase a wide range of livelihood activities , there is a common perception that there exist to

a certain extent, different livelihood strategies across households(Wamalwa, Ondieki-mwaura and Ayuke, 2018)

A survey carried out by (Xu *et al.*, 2015) in China revealed that natural asset for that matter land has a negative correlation with household choice of livelihood strategy at 1% level of significance. The findings indicate the more land households own the more likely they prefer farming only. In the same survey skilled labour has significant positive correlation with engaging farming alone. It indicated that skilled labour households will adopt off-farm activities as a strategy than farming.

2.5 Smallholder farmers

Smallholder farmers are small scale farmers, pastoralists, forest keepers, fishers who manage areas varying from less than one hectare to 10 hectares. Smallholder farmers are usually focus mainly on family and rely mostly on family effort for production and using some of the produce for family use (<http://www.ifpri.org/topic/smallholder-farming>, accessed on 08/09/2018 at 3:04pm)

For the purpose of this study, smallholder farmers are smallscale crop farmers who manage areas from less than one hectare to 10 hectares. Pastoralists, forest keepers and fishers are exempted in this definition.

2.6 Livelihood

A livelihood consist of the capabilities, capitals and activities needed for a living. A livelihood is sustainable if it is able withstand and recover from stresses and shocks and maintain or improve its capabilities and capitals both present and in the future, yet not undermining the natural asset base. (DFID, 2000)

2.7 Household

A household consist of one or more people who live in the same dwelling and also share meals or living accommodation, and may consist of a single family or other grouping of people. In this study a group of people who live in the same dwelling but do not share the same meals will be considered as separate household. Attitude and characteristics of households coupled with external factors determine their livelihood strategies.

2.8 Influence of livelihood strategies on food security

The use of the terminology food security at the state and worldwide level tends to concentrate on the supply side of the food equation. However, availability does not promise access and enough calories do not assure good and nutritional diet. Access of food is important if food security will be a measure of family or individual wellbeing, to address access that is why FAO amplified the definition of food security.

Food security exists when people can get the right food in enough quantity to eat all the time(World Food Summit in 1996).

Food security concept has been used widely at the household level as a measure of wellbeing and people have tried to make the concept operationally useful in the design, implementation, and evaluation of programs, projects and policies. A household is seen to be food secure if it is capable of acquiring the food needed by all the members to be food secure, in this study food security means availability and access of food.

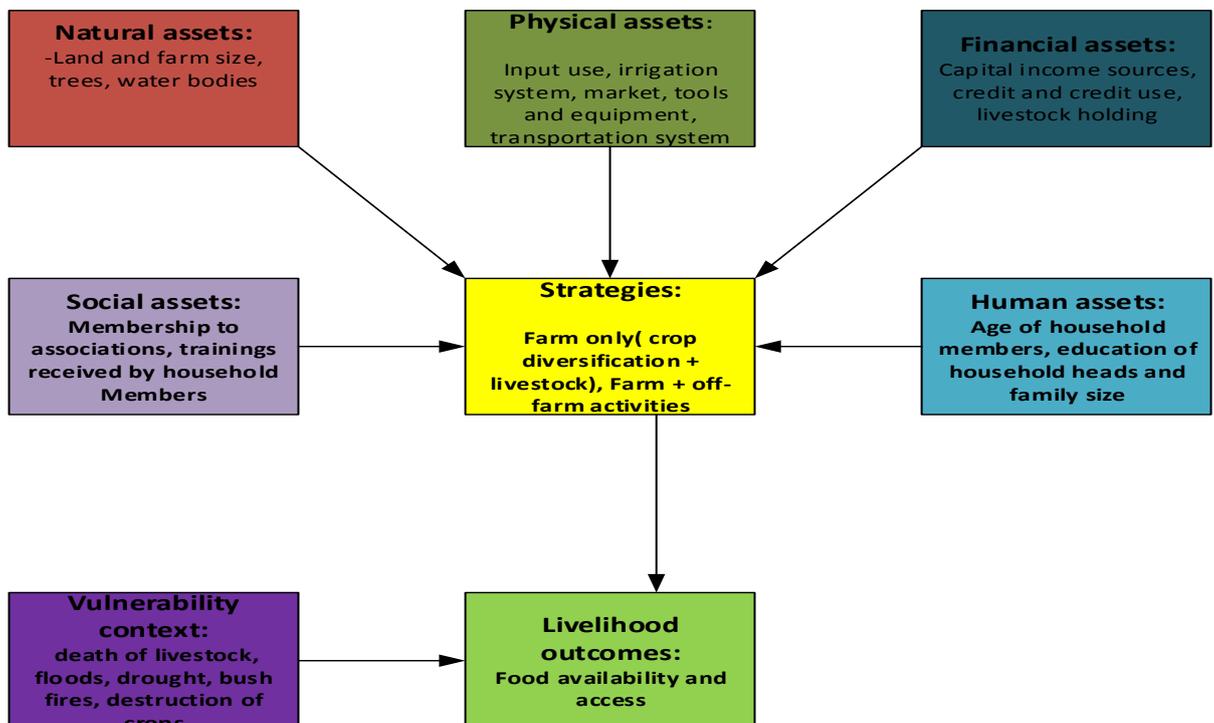
Improving food security persistently has been a major public policy challenge in developing countries. About 1 billion people worldwide are undernourished, and so much others suffer from micronutrient deficiencies and these number tend to increase further especially in Sub-Saharan Africa (FAO, 2008).

Agricultural development clearly is crucial for reducing hunger and poverty in rural areas, also crucial is non- agricultural activities such as non-farm or off-farm (Diao et al, 2007). Smallholder farmers usually maintain a number of income sources, with off-farm income being a major component of (Barret et al, 2001). Less is known on the influence of off-farm strategies on food and nutrition security. A few studies have looked into related linkages, and all are confined to the issues of household food expenditure. According to (Ersado, 2003) off-farm activities income is associated with a higher level of food consumption in Zimbabwe.

2.9 OPERATIONALIZATION

With natural resources the study looked access to land, availability of trees and water bodies and how they influenced livelihood strategy. For financial resources, the study concentrated on cash income, credit and credit use and livestock holding. Then physical, components such as access to market, transportation, irrigation systems, tools and equipment. Human capital the study will be looked at components such as age of head of family, education and training received and family size, then social capital the study concentrated on membership to associations, trainings received and leadership positions held by household members. The strategies concentrated on farm only (crop diversification and mixed farming) plus farm and off-farm

Figure 2:



CHAPTER THREE

3.1 Methodology

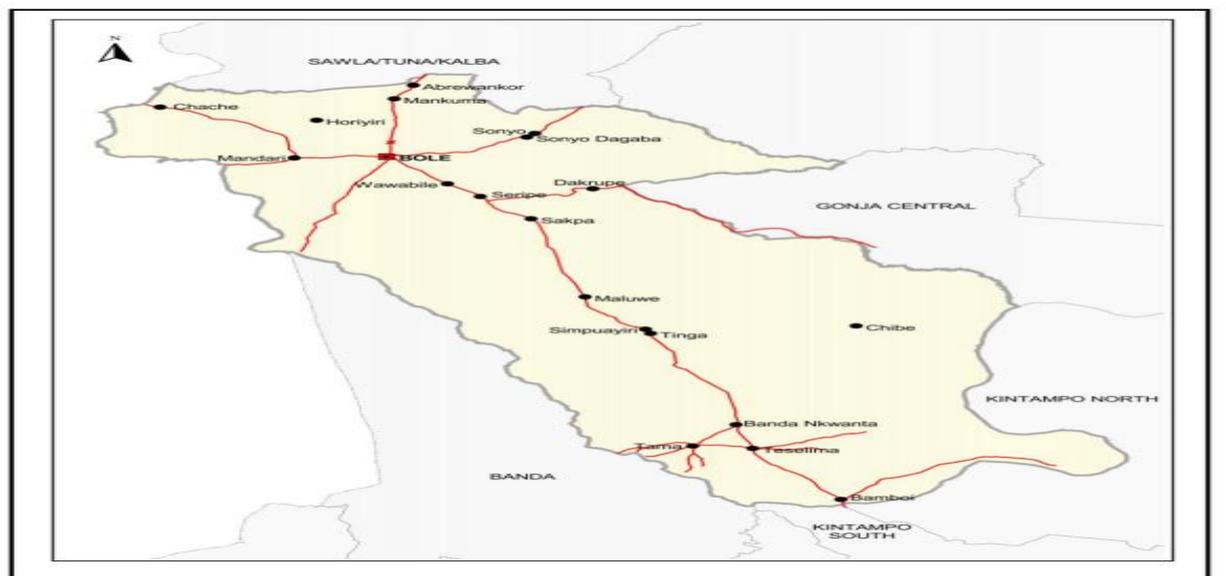
In this chapter the methodology adopted for the study is presented. It looked at the research design, research setting, research population, sample, sample size and sampling technique, research instruments, data collection procedures, data analysis and ethical considerations.

3.2 Profile of the study area

This study was conducted in the Bole district which is one of the 26 districts in the Northern Region of Ghana. The Bole district can be found at the western side of Northern Ghana and is situated between latitudes 8°10.5' and 09' and longitude 1.50E' and 2.45 W. It shares boundary to the north with Sawla-Tuna-Kalba district, to west with Ivory Coast at the Black Volta. It also shares boundaries with the West Gonja district at the East and to the south by the Wenchi municipal in BrongAhafo region. The District covers an area of 6,169.2 square kilometre, out of the area of 69,766.2 square kilometre of the Northern Region. This shows that the District covers nine percent of the total land area in the region. From the 2010 census, the District has a population of 61,593 comprising 51.4 percent males and 49.6 percent females. The population is sparsely distributed with a population density of 10 persons per kilometer square (GSS, 2010). In the district, 75% of the population is into agriculture of which crop farming is the main agricultural activity. The vegetation of the district consist of savannah wood land, with economic trees such as sheanut, dawadawa, teak, kapok and mango. It is important to note that the dominant soil type is the tropical brown soil which is suitable for grain crops and tobacco. (MoFA, 2010).

3.3 Administrative map of Bole District

Figure 3: District Map of Bole



Source: GSS 2011

3.4 Research Design and Strategy

This study employed largely qualitative approach through case study by means of a desk study and field work designed to capture an in depth understanding of livelihood assets available to smallholder maize farmers, the influence of these assets on their strategies, the influence of the strategies on food availability and access and the challenges they are faced with. Case studies refer to research of few units or cases. A common perception of case studies is that it deals with a limited numerical unit, like people, a group or an organization. Baxter in Hay (2010, p 81) highlighted that a “Case study research involves the study of a single instance or small number of instances of a phenomenon in order to explore in-depth nuances of the phenomenon and the contextual influences on and explanations of that phenomenon.” (Baxter in Hay 2010, p 81) Case studies are characterized by a research design where the focus of analysis is aimed at one or more units that represent the case. A case study analyses a lot of information about the few units or cases comprised by the study. In this study, the challenges and opportunities smallholder maize farmers and how those challenges have affected their livelihood strategies will be investigated in the Bole District.

3.5 Population of the study

The study population for this research work included smallholders maize farmers from Mandari and Bogdaa and the District Director of Agriculture.

3.6 Sample, sample size and sampling techniques

The sample size included 20 individual respondents, 18 focus group participants and 1 key informant bringing the total number to 39. The study used purposive and random sampling techniques to select respondents in the study setting. A register was given to me by the district director of agriculture together with names and contacts of focal persons. After contacting the focal persons we then together selected the farmers by circling every even number till we got the required number. The purposive sampling technique was used to select the key informant.

3.7 Data collection technique

The data was gathered from both primary and secondary sources. Primary data was obtained using a self-designed mixture of semi-structured and structured interviews while the secondary data was obtained from reviewed literature. Interviews were conducted by the researcher at the study setting. The interviews with each respondents lasted for 45 minutes maximum and 30 minutes minimum. The researcher also developed a semi-structured interview guide that was used to collect data from the key informant at the study place. Key informant interview with the district director of Agriculture was done to get in-depth information about the challenges of farmers, what programs in his opinion can best address these challenges farmers are faced with. . Audio recordings and pictures were taken during interviews with the consent of respondents.

The study also conducted a focus group discussion with two different farmer groups to know the challenges that are confronting them and what support is needed to overcome these challenges. Two communities (Mandari and Bogdaa) were selected purposely based on their differences in status in terms of ethnicity, religion, access and control of assets, and also due to easy accessibility of these communities to assess if there was differences and similarities in assets and strategies. For each group the criteria was the size of the farm and the crop cultivated, so maize farmers with more than 1 acre of farm but less than 11 acres of land were considered. The group in Mandari had 11 participants, that of Bogdaa had 7 participants and the meetings lasted about an hour. The researcher facilitated the discussions and a staff from the district supported with notes taking, audio recording and pictures. Also during the field visits, observation technique was employed to observe farm size, road network, and activities of household members.



Focus group discussion

Source: Abu

Figure 4

3.8 Data analysis and presentation

The data collected was first transcribed and read to identify meanings and coded systematically. Once all the meaning units were identified, theme statements were generated. Then a table or matrix was created for each theme, showing all the related meaning units which exemplify the themes. Evaluation of each meaning unit was done to ensure that the theme adequately and accurately captures its meaning and addresses the research problem.

3.9 Ethical considerations

The researcher requested verbal permission and was obtained from the respondents at the study place to conduct the interviews. The researcher sought the consent of all the study participants before conducting the interviews and all audio recordings and pictures were taking with their permission. In this study participation was voluntary and the study participants were allowed to withdraw from the study without any penalty imposed on them. Study participants privacy was also protected as their names were not written down.

3.10 Limitations of the study

This study was not without challenges. These challenges were, inadequate time, inadequate resources, lack of means of transport, network fluctuations, and unwillingness of some of the farmers to participate and frequent power outages. The researcher even though faced these challenges still managed to get the work done. With the issue of transportation, the researcher resorted to waking up early to catch the available free means to the farms. To overcome the power outage problem the researcher acquired a solar charger so to be able to keep in touch with the respondents. Unwilling participants were not forced to participate but freely joined base on the researcher related to them. These challenges did not affect the outcome of the result since they were skillfully dealt with.

3.11 Framework for the study

The framework below served as a guide throughout the study.

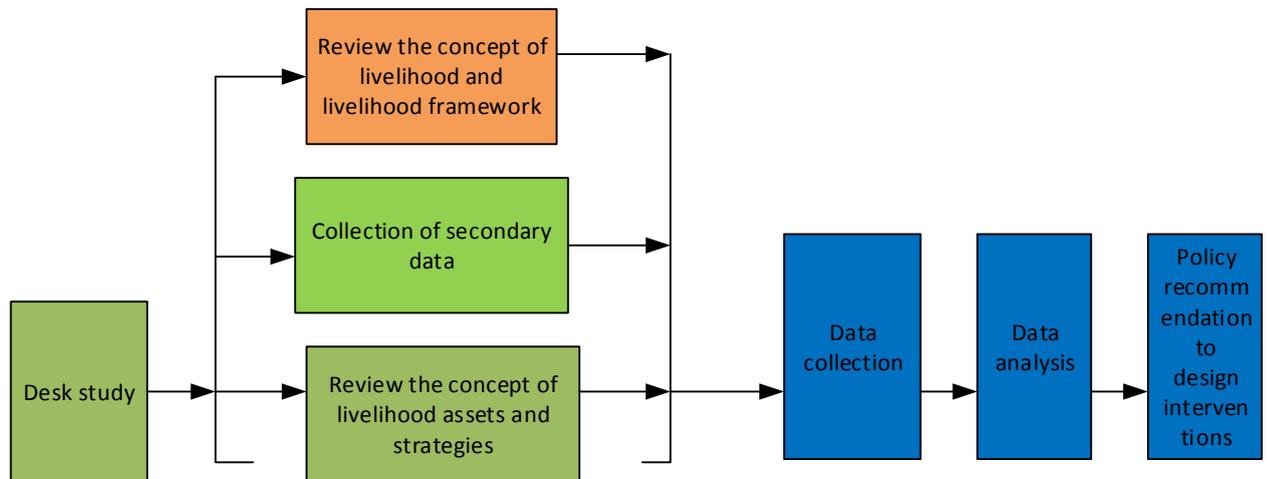


Figure 5: Research framework.

Source: Researcher's own construct, 2018

CHAPTER FOUR

4.1 Presentation of findings

In this chapter the main findings of the field study are presented using the Sustainable Rural Livelihood Framework. First the livelihood capital findings are presented, then the vulnerability context, the strategies and finally the outcome. Two categories of respondents were randomly selected and 1 key informant purposefully selected for the study. In total 38 respondents were interviewed, 33 males and 5 females. Their ages ranged from 35 to 60. Only 4 respondents out of the 38 have had some level of education. 1 had education up to tertiary, 2 had up to "A" Level and 1 had up to basic level. All respondents are married, the highest age was 60 and the lowest was 35.

4.2 livelihood assets of maize farmers

4.2.1 Social capital

Reciprocal aid among villagers is a wide spread phenomenon in Mandari and Bogdaa, people work together to the benefit of the entire community or of one of its members when the need arises. Contributions to members during occasions like naming ceremony, funerals and when disaster strikes a member is a common thing in these communities. The interviews conducted revealed how membership to associations comes with its associated benefits as R13 from Bogdaa put it *"in my group if one of us is sick we go to help him in his farm"*

Other benefits people get as R17 from Bogdaa said *"in the association we also contribute "susu" so if you need money to borrow you just pick it from the secretary then pay later with something small on top"*. Seven out of ten respondents from Bogdaa said they belonged to associations yet there were three others that did not belong to any association, or they opted to drop from an association they previously were members of for various reasons. Some of the reasons given were lack of trust, lack of commitment and unwillingness to pay group contributions, as R14 in Bogdaa said *"I used to belong to one group but some people didn't want to pay the contributions that we were making so our group collapsed, but if I get one I will join."*

There was disparity across the communities with regards to membership to associations. Majority of farmers in Mandari do not belong to associations or if they belong to one, is not vibrant. The reason they gave was lack of commitment, members don't attend meetings and so groups collapse even before they are formed as R3 in Mandari said *"in this our community they don't like attending meetings so any group formed will only last for a month or maximum of 3 months"*. According to him the women are even better than they the men because the women when they form groups are able to keep it going for a long while. From the observation made in both communities, the households live in circular compounds where each household has its own dwelling and responsibilities are shared across the household. It was also revealed that membership to an association has no influence on the job he does. *"I farm not because my group mebers are farmers, is a tradition here"*

4.2.2 Physical capital

This is essentially the tools used for farming, inputs and fertilizers, agricultural equipment, the means of transport that people have access to. Observations made about physical capital is that the common means of transport in both communities are bicycles, few motorbikes, tricycles popularly known as 'motoking', the motoking is what farmers use to convey their produce from farm to home and market centers.

In terms of tools used for farming both communities still use hoes and cutlasses. A farmer lamented how the lack of modernize farming tools affect their work during the focus group discussions *"farming is becoming difficult for us, we still use hoes but else where nobody uses such things, how can you progress. We need jobs to quit this farming"* Inputs and fertilizer use is very less across households especially in Mandari. The lack of inputs and fertilizers is a major concern and complain by the

farmers, they stress that it is not easy to access it though it is subsidized by MOFA. As a farmer said during a focus group discussion “ *the fertilizer we don’t see it here, MOFA says they are there but if you go there they keep tossing you come tomorrow, come next tomorrow so finally I am forced to buy from private stores which is expensive*”.

The road infrastructure from observation during the study is in deplorable state as larger parts of the roads are not motorable. This results in some post-harvest losses and high fares charge by transport operators. A farmer during focus group discussion said “*I sell my produce in Bole market, but the road is not good so that’s why the moto king people charge us a lot of money*”

Comparatively both communities have similar physical capital except that in terms of road network Bogdaa is a bit better, at least the road linking to Bole the district capital is an improved one compare to Mandari. However, in terms of electricity Mandari is connected to the national grid but Bogdaa is not. Both communities don’t have irrigation facilities.

From observation during the study, every household has a phone which means getting in touch with the outside world was not a problem to these people.



Road network in Mandari and Bogdaa

Source: Abu

Figure 6

4.2.3 Human capital

From the interviews conducted across the communities, majority of the household heads are 40 years and above. In terms of level of education only one respondent said he has senior high school education in Bogdaa whereas in Mandari only two said they had A’ Level education.

All respondents across communities were married with quite a high unskilled household size ranging from 4 as the minimum to 9 the maximum. Comparatively, Bogdaa has a high household size than Mandari that is a difference the researcher noticed

From observation during the study women especially in Bogdaa were seen to be actively involved in planting, weeding of their husbands farms but they also brew pito,. The grown children who are out of school were also seen weeding, scaring wild birds and other animals from destroying farm produce, but also provide labor sell labor to other farmers especially when they are less busy in the farm.

The situation in Mandari was a bit different, as women were home doing petty trading like processing gari, selling of fish. The youth were not seen to be actively involved in the farming especially in Mandari, many were seen either idling or doing galamsey.

From observation and interaction with respondents during the study it was revealed that all three of them with some form of education have a farm size of more than 4 acres.

4.2.4 Natural asset

Natural capital is important for the households of these communities. The land, sources of water, the vegetation and the trees constitute the basis of their livelihood. The most wide spread varieties of trees across the communities observed by the researcher are sheanut, baobab and dawadawa. Mandari is situated near the Black Volta but they do not rely on it for irrigation and to a community where gold deposits are discovered according a farmer. The communities are endowed with vast lands with beautiful vegetation. From the interviews conducted, the minimum farm size in terms of acreage in Mandari is 2 acres and the maximum is 5 acres. In Bogdaa the minimum farm size 2 acres and maximum 7 acres.

There is no significant differences between these communities in terms of natural resources except that Mandari is situated closer to the Black Volta, and also around Kui where gold deposits have been discovered. Also Bogdaa is more or less a wood land area with lot of trees. Both communities are endowed with shea trees and have vast land for agricultural purposes. From the interviews all households across the communities have access and control to land. From observation and during focus group discussion, water is a major challenge. Households depend on rain for farming, the rainy season goes from May to September, the pattern of the rainfall is erratic and it changes from one year to another as revealed during focus group discussion.

4.2.5 Financial capital

Access to formal credit is out of reach for almost everyone across the communities in the study area you are either not given a loan because you lack collateral or you cannot pay because interest rates are as high as 26% to 40%. From the interviews, it is revealed that aside the sale of crops for cash, livestock represent a relevant buffer stock for households. Selling cattle, goats, sheep, fowls or pigs is a crucial way to obtain cash when needed. A respondent in Mandari said *“when I needed money urgently to take my daughter to the hospital for surgery, it was my cattle I sold”*. Animal keeping is therefore very important and is seen as wealth accumulation.

But most times the sale of crops is the major source of income to these people. This asset is particularly the scarcest yet so important to combine with other assets for these people to be able to meet their livelihood needs. There is no much distinction between the communities so far as financial capital is concern except to say the livestock type and quantity mostly kept by the two communities differ. In Bogdaa, the common livestock kept is pigs, goats and sheep, while i Mandari they kept cattle, sheep and goats. Majority of households across the communities have these animals in subsistence.

4.3 Vulnerability Context

Crop production particularly maize production is extremely an in important sector in the livelihood of these people. During the researcher’s interaction with respondents in the focus groups discussions and individual interviews it became clear that at some points stocks dwindled and so they have to resort to eating fewer meals than expected. Food shortages at some specific periods is a familiar situation in the study area as this was attested to by a respondent.....” *Yes we sometimes even eat twice a day instead of 3 times, the quantity have to be reduced because you want to make sure at least the children eat something in a day.”*

There are many factors according to respondents that contributed to the intermittent food shortages; according to one respondent in Bogdaa *“the army worms is a big issue here, last season it destroyed all my crops, and the chemicals the MOFA people asked us to use is not effective, the use of omo is even better*. That was a shocked to most people as they struggle to recover even cost of production.

The rainfall pattern is erratic, unpredictable and sometimes drought couple with the fall army worm resulted in hardships.

Crops that will survive the fall army worm were also being destroyed by cattle of Fulani in the area. This has resulted a feud between these two groups at Mandari. As a farmer said *“the Fulani people now intentionally chase their animals into people’s farms.*

Food prices have also risen particularly maize because of the low yield farmers experienced last year. A farmer said *“a bag of maize which used to be Ghc90.00 is now Ghc140.00”*. From the focus group discussion, they also alluded to climatic factors such as drought and erratic rainfall as something they are battling with.

4.4 Strategies

Agriculture is very much an important activity in the two studied communities that the researcher visited, but production is in subsistence, farmers therefore are engaged in varied activities to support their wellbeing. The common strategies in the two communities are farming only and farming + off-farm. Farming only here means crop diversification and mixed farming and all other activities to earn income apart from farming.

4.4.1 Farming only

From the observations and interviews made by the researcher on the field, farmers in these two communities have adopted crop diversification as a strategy. In Mandari for instance, farmers cultivate maize alongside cassava, yam and cashew. During the focus group discussion in this same community a participant said.....” *my brother the problems we farmers are facing here are many, fertilizer is number one . You need to apply fertilizer before you can get high yield, yet the fertilizer is expensive, MOFA used to subsidize and give it to us on credit but now they have stopped so in this community we are not used to fertilizer, because you will not even get it the way you want it. So is better to cultivate yam and cassava in addition. As for the yam or cassava you don’t need to worry about fertilizer.”* Another person in the same community said *“cassava does well in this our community and this fall army worm does not affect it so is better to cultivate it”*

In Bogdaa community from the researcher’s observation and interviews with farmers revealed that, farmers cultivate maize either with groundnuts, guinea corn or beans. During an interview with a farmer he revealed why he is practicing intercropping *“ you don’t put all your eggs in one basket, what happened to me last year has thought me a lot of lessons, all my maize was destroyed by the fall army worm so this year I have decided to plant groundnut in addition”*. Another farmer also said that if you cultivate more than one crop, you will still be able to feed if you one fails *“if you grow more than one crop, then you are sure that if one fails you the other one will feed you”*

Mixed farming was also another livelihood strategy that farmers adopted, the keep animals in addition to farming. In Mandari, farmers in addition to crop farming also keep cattle, goat, fowls or sheep. Almost every farmer keeps at least some form of animal but in small scale, the same can be said about Bogdaa except that the type of animal they rear is pigs.

4.4.2 Off-farm + farm activities

During the interviews and observations, it was revealed that majority of the farmers apart from the on farm activities were engaged in off-farm activities. They are engaged in activities like charcoal burning, firewood fetching, mason work, pito brewing, gary processing, small scale mining popularly called galamsey. Pito brewing as well as charcoal burning are the common activities in Bogdaa. In an interview, a farmer said you *“know charcoal burning is what gives quick cash, and it really supports me so much in this community, the farming alone is not enough because the problems are too many”*. Men burn the charcoal and the women are charged with the responsibility of the sale of the charcoal. But not all are into charcoal burning, others have different activities they engage in for income, one respondent also said *“aside farming I do build other people houses for something (income) and it helps because when we run short of food in the house I don’t struggle to buy food*. He however could not tell how often he gets to build other people houses for income. Households that are into

The activities both communities are engaged in are similar but different in form and how much income they get from that, for instance charcoal burning is more profitable than firewood sale and galamsey is also more profitable than charcoal. But it also depend on the scale on which this is done. Majority of the people in the Bogdaa are engaged in these activities on subsistence scale. The few that do it in medium scale are better off in terms of income and wellbeing than those who do it in small scale.

4.5 influence of livelihood strategies on food security

Livelihood strategies are usually assembled to obtain specific ends in life called outcomes. The influence the various strategies on food security was assessed during the study and presented as below.

4.5.1 Farming strategy influence on food security

The on farm activities that they are engaged in as discussed earlier are crop diversification and mixed farming. Most part of the food they produce is for consumption, surplus is what is taken to the market. This was revealed in the interviews, and also cultivating different crops means they are able to consume different food groups as a farmer said *“the advantage of cultivating yam with maize is that we do not always eat “T.Z”, we eat “fufu’ at times, so the maize can sustain us to sometime.”*

The strategy of rearing animals and cropping is seen as a way of coping with the economic conditions. When the crops fail they rely on the animals for their food needs as a farmer in Bogdaa said *“last year when we run short of food I sold my sheep to buy maize”*

Apart from selling it to buy food or solving other needs the animal is food itself. This was revealed during the interviews with a respondent in Mandari *“keeping animals is very important, we use it for soup especially when you don’t have money to buy fish”*.

4.5.2 Off-farm + farming strategy on food security

Though farming is the major livelihood of the two communities, it was revealed during the interviews that the farming alone is not able to support the food security needs of most households in these communities. The therefore have combined farming with activities like charcoal burning, pito brewing, galamsey, firewood sale, mason work etc to support the farm. Though the respondents could not quantify how much they make from these activities, majority of them have been able to state that the income they make go into food. A respondent in Bogdaa said *“I don’t touch the money that I make from the charcoal, is kept purposely for housekeeping so when we run out of food I pick from there and even my children school fees”*. Another respondent. However respondents are not able to tell how much income they make and how much of that goes into food but they have revealed that the reason they are involved in the activity is to be able to feed their families. Generally their perception about their well-being is been positive.

4.6 Challenges

The researcher conducted two focus group discussions and key informant interview in the study areas to understand the challenges farmers are faced with. It became clear from all the interviews that farmers in all the communities are faced with common challenges but also have some unique challenges pertaining to communities or even households.

The common challenges as revealed during the discussions are lack of access to fertilizer, farmers complain of the difficulties they face in accessing fertilizer and majority have to end up buying from private people which is expensive as respondent from Mandari R9M put it *“the fertilizer we don’t see it here, MOFA says they are there but if you go there they keep tossing you come tomorrow, come next tomorrow so finally I am forced to buy from private stores which is expensive”*. The same concern was raised in Bogdaa during the focus group discussion RB4 *“we need fertilizer but it appears you have to belong to a particular party to get it from government”*.

Another challenge mentioned during the discussions in the communities was tractor service. According to these people there is only one tractor that comes from Bole to plough their farms but it sometimes delays before coming to their community, it goes to other areas before it comes to them. In Bogdaa a participant have this to say *“how can one farm the way you want when you don’t have access to tractor, even if you clear a vast land you can only plough a small portion with your manpower, so we need tractors badly”*. In Mandari a participant expressed frustration about the situation and how it resulted in him farming late last year *“ when it is time for farming another headache we go through here is tractors, last year I have to farm late because there was no tractor immediately”*.

Water for agriculture purposes is scarce in these communities, the Northern Region generally experiences a unimodal rainfall pattern so farmers are vulnerable to drought or erratic rainfall pattern. According to the farmers their reliance on nature to farm makes them unable to predict the outcome of their effort. There are no dams, dugouts or irrigation infrastructure. A participant referred to as R8M said *our dependence on rain means that we are gambling, you don’t know as you are planting whether it will rain or not”*. In Bogdaa the story was the same during the focus group discussions, the express their desire to do dry season farming to improve their livelihoods as said by a participant referred to as R1B *“in some places farmers have the opportunity to plant twice in a year, we need that here, I want to do dry season farming so that I can grow okro”*.

Deforestation is also another challenge they are grappling with in the community. People cut down trees indiscriminately for logs. Activities of wood logging is a common practice in this area, a business that is fetching some people money but at the expense of the entire community. During the discussion a participant said *“I believe the reason we are experiencing this unpredictable rains is the result of the trees these people are cutting down”*

Lack of access to credit to expand their farms, a lot of the farmers expressed their desire to expand their farms but the challenge is the capital to take this initiative.

Aside these common challenges all these communities face, there were some other challenges peculiar to different communities and different households. In Mandari for instance farmers complained about the lack of agricultural extension agent (AEA) in their community, according to some of them the officer assigned to them does not come so they don’t have access to information about weather changes, prices of things and new innovations sometimes *you want to talk to an officer about a problem but he is not available for you to contact, you see”*. This was however a controversial point as some others disagreed on that assertion. According one farmer to the best of his knowledge the problem was from all of them and not the officer *“you see in this our community we are not serious, an officer will come here for a meeting and only few will turn up mostly women who are not even farmers”*

Lack of training was a concern to them, they said they are relying on their own knowledge and wished that the agriculture officer could come and train them especially on how to improve on their farming systems.

Bad road network is also a great concern to them, the road leading to the district capital is in a very deplorable state as well as roads to their farms and this comes with numerous disadvantages as a farmer put it *"because of the bad nature of this road armed robbers have evaded it, you can't go to Bole after 9pm"*. Another participant thinks that is why the market women cheat them when they come to buy their produce *"the market women complain a lot when they come here so that is why they buy our produce very cheap"*

Lack of improved cashew seeds; the community is good for cashew production but access to improved seeds or grafted plants is a challenge to many farmers. A farmer said *"I would have love to cultivate cashew but how to get the 'agric' seeds is the problem so if you people can help us we will be grateful"*.

Peculiar challenge in Bogdaa has to do with lack of storage facilities, they complained they are compelled to sell their farm produce right after harvest because they don't have keep it for that long because rodents and termites will destroy them.

Electricity is also a major complain of these people and the importance of electricity to production cannot be overemphasized

During these discussions, it was revealed that, access to market and pricing, lack of irrigation facilities, lack of access to fertilizer, inadequate tractor services were the most emphasized ones mentioned across the communities.

The key informant interview with the Director of MOFA also confirmed these challenges farmers faced but he mentioned the lack of finance as the major issue but that was not peculiar to the district alone.

He enumerated some of the interventions currently that are being rolled out but that some are on pilot bases *"currently the planting for food and job is the major government intervention, we also have WFP running Orange Flesh Potato (OFP) but we are piloting it in Kiape. Then we have Adaptation Fund funded by UNDP where 7 NGOs recently came for the inception program, two of those NGO have demonstration on vegetable production at Kakiase and Serupe, they place is fenced and so farmers will be trained on vegetable production in these communities so we can replicate in other communities."*

Another NGO is also expected to come and train farmers on bee keeping also using the Adaptation Fund, then they will also train farmers on shea butter processing.

There is also currently a program we call shea park where we are planting shea tree, is a 50 acres of land reserved for that so farmers will be employed to engage in this tree planting. Papadep an NGO is training farmers on savings, how to save their money and how to start and sustain a business, I think these are the interventions on going. But for government intervention is the planting for food and jobs where farmers are given fertilizer and seeds at subsidized rate".

CHAPTER FIVE

Discussion

This chapter discusses the main findings of the research under the following thematic areas; livelihood assets and the influence on strategies, livelihood strategies and the influence of the strategies on food security.

5.1. Livelihood assets and the influence on strategies;

Capitals of the two communities were assessed during the study and it came out that their assets were similar in some ways but also were their differences. In the same vein they pursue similar strategies but on different level, for instance majority of them are engaged in charcoal business but the more endowed ones deal on higher scale than the less endowed ones. The two communities are endowed with abundance of land for agricultural purposes which is essential for their livelihoods since farming is their main livelihood. From the interviews and focus group discussions all households have access and control to land, also from the interviews majority of households aside farming engage in off-farm activities. This contradicts previous findings of (Xu *et al.*, 2015) that the more natural resources particularly land households own, the more likely they prefer to concentrate on only farming. The possible explanation for this contradiction is that the value and quantity of land differs from one Geographical area to the other, in the Bole District of Ghana where this study was conducted land is not particularly a scarce commodity. However, is not so fertile so farmers have to resort to the use of fertilizer increase their yields

From observation and interviews, households in both communities are using traditional tools for like hoe and cutlasses for farming, during focus group discussions lack of access to tractor, irrigation facilities and other modern tools for farming is a big challenge in these communities. They are constrained to expand their farms and so households feel demotivated to concentrate on their farms only. This confirmed previous findings of (Xu *et al.*, 2015) that the more advanced agricultural production machines a farm households possess or have access to and the more appropriate the infrastructure for agricultural production is the more motivated farm households are to keep to agricultural production.

From the interviews majority of households aside the farming are engaged in charcoal burning, gari processing, pito brewing, galamsey and so on but they are limited in participation due to financial constraints. The few that are a bit wealthy participate more in these off-farm activities at a high level than the poor households. This confirmed the findings of (Marrit van den Berg-, 2001) that wealthier households use the opportunity of their wealth to participate more in off-farm activities than their poor counterparts. Meaning the more financially sound you are the more you engage in off-farm activities.

Majority of the households from the findings are unskilled but also participate in off-farm activities aside farming. This contradicts previous findings of (Bhandari *et al.*, 1996; Bhandari, 2006; Cain, 1997) that unskilled households largely concentrate on farming than participating in off-farm activities). The possible explanation could be the off-farm activities they are engaged in does not require skilled labour so it really depends on the type of off-farm activity.

The findings revealed that some of the households belong to some form of associations and benefits from these groupings vary from cash soft loans to communal labor. However, these people that belong to these association did not think their membership to association has an influence in what they do. Therefore social capital have no significant influence on livelihood strategy.

5.2 The influence of livelihood strategies on food security

About 1 billion persons globally are undernourished, and so much others suffer from micronutrient deficiencies and these numbers keep increasing further especially in Sub-Sahara Africa (FAO, 2008). According to (Diao, et al, 2007) agriculture is crucial for reducing hunger and poverty in rural areas, also crucial is off-farm activities.

During the interviews, it was revealed that majority of households have farming plus off-farm activities as their livelihood strategy. Agriculture in these communities is however on subsistence basis, the primary objective is to feed the family first. From the findings stocks from farming alone is not able to feed majority of households so they combine this with other activities like charcoal business, gari processing business, galamsey to supplement the farm. Findings also show that a large chunk of the income earned from these activities is used for food. This confirmed previous findings of (Ersado, 2003) in Zimbabwe that off-farm activities income of households is associated with a high level of food consumption.

CHAPTER SIX

6.1 Conclusion and Recommendation

This chapter concludes the study and incorporates the summary of the findings. Conclusions are then drawn from these findings from the study and appropriate recommendations given to improve the livelihoods of farmers.

6.2 Conclusion

Agriculture will forever remain an important sector for the development of the economy with respect to ensuring food security and improving livelihoods. Agriculture is clearly very important to the livelihoods of these rural households, that is the sector they rely on most for survival but it is also true that this sector is bedeviled with many challenges, risks and shocks. Several interventions have been implemented to support these households cope with these challenges yet the impact is not felt, farmers are becoming poorer, their food security is threatened. It is perhaps development workers don't understand how rural households get around to survive. Therefore it is time to get to understand what resources rural households possess and their capabilities and how they combine these to improve their food security situation and their general wellbeing. Therefore the appropriate questions that need to be asked are;

1. **What farm livelihood assets are available to smallholder maize farmers in the Bole District?**
2. **What are the main livelihood strategies of smallholder maize farmers in the Bole District**
3. **What is the influence of livelihood strategies on food security?**
4. **What are the challenges of smallholder maize farmers in the Bole district**

And overall what is the influence of farm livelihood assets on livelihood strategies and food security in the Bole District?

What farm livelihood assets are available to smallholder maize farmers in the Bole District?

From the findings the livelihood assets available to smallholder farmers are human capital, physical capital, financial capital, social capital and natural capital. Across all the households human capital is characterized by unskilled labour, large household sizes especially in Bogdaa, low level of education.

For physical they have very bad roads, no irrigation facilities, they have hoes and cutlasses as their farming tools which makes them backward as compare to some parts of the world, they lack access to fertilizer upon all the depleted nutrient soil and so their yields are low,

Financial capital is the scarcest capital to the people, they don't have access to credit, and their main source of income is from the sale of crops. Every households have at least fowls. They keep livestock but on a small scale. In Bogdaa the main livestock is pigs while that of Mandari is goats and cattle.

For natural capital, the study area is endowed with shea trees, baobab, dawadawa(pakia biglobossah) gold, and Mandari is situated closer to the Black Volta. In terms of natural resources they are blessed

For the social capital, majority of the people don't belong to associations especially in Mandari but they still live communally.

What are the main livelihood strategies of smallholder maize farmers in the Bole District?

Agriculture in these communities is on subsistence base, the produce to feed their families. But because of the numerous challenges they face such as drought, pest and diseases, depleted soils, credit challenge etc their yields are unable to feed their families all year round with the farming alone. Hence they engage in off-farm activities to support their families. The incomes earned from these activities is used to purchase food

There are two main livelihood strategies across the communities according to the findings of the study. Farming only and farming plus off-farm activities. Majority of the farmers especially in Mandari cultivate maize along with either cassava, yam or cashew, so crop diversification is a strategy a strategy, but they also keep animals in addition so within the farm only strategy they also have mixed farming and crop diversification.

Bogdaa people also cultivate maize with either groundnuts or gueneacorn or millet, they keep pigs alongside the farming.

Majority aside the farming also engage in charcoal business, mining, pito brewing, gari processing, firewood fetching and the sale of fish.

What is the influence of livelihood strategies on food security?

Agriculture is the main activity across the communities, households produce primarily to feed their families. Production however is not enough so households participate in off-farm activities to buy food when the need arises. From the findings it was revealed that a big part of the incomes earned from these activities is used to purchase food.

What are the challenges of small holder maize farmers in the Bole District?

Farmers faced a lot of challenges in their quest to make ends meet, some these challenges as was revealed during the interviews are;

Lack of access to fertilizer, lack of irrigation facilities, lack of access to credit, bad road network and so on, deforestation, pest infestation, lack of training, lack of adequate information.

What is the influence of farm livelihood assets on livelihood strategies and food security?

In this study, the influence of farm household livelihood assets on livelihood strategies was first theoretically analyzed, then a qualitatively studied. It was revealed that Natural capital and physical capital have significant influence on household livelihood strategy, the more natural and physical assets they have the more they choose to engage in farming only

Also the more human capital and financial capital a household possesses the more they engage in off-farm activities aside the farming.

Social capital does not have much influence on household livelihood strategy, and finally the consumption of food increases with households that participate more in off-farm activities in addition to farming.

6.3 Recommendations

The role of agriculture on the livelihoods households of these communities cannot be overemphasized and so is the role of off-farm activities. From the findings, it is imperative that the challenges households in these communities face are enormous. The dependence on rainfall coupled with bad roads, lack of irrigation systems, lack of access to fertilizer, pest infestations and host of others as in the findings is taking a toll on the gains these farmers are making. Because of these challenges farmers have resorted to spreading their risks in other to cope with the situation by participating in off-farm activities like galamsey, pito brewing, the sale of fish, charcoal burning, mason work, gari processing, sheanut picking and processing. They also diversify crops and keep some livestock as a cushion.

Reducing food insecurity and deprivation among smallholder farmers can be achieved through growth in incomes. Income growth can be achieved through both off-farm and agricultural activities.

I therefore recommend that base on this findings, the Ministry of Food and Agriculture through the district assembly should consider investing in irrigation infrastructure in the district. This will offer farmers the opportunity to cultivate more than once on their plots in a year.

Improving the skills of farmers will go a long way to improve yields, from the findings, one of the complaints of farmers was lack of training so I recommend that the Ministry of Agriculture in collaboration with NGOs should consider organizing training for to improve their farming skills

Lack of credit is a challenge that affect poor households' level of participation in off-farm activities, they are constrained to take full advantage of these opportunities. They are therefore not able to accumulate wealth making them live in a vicious cycle of poverty, the Ministry of Trade and Industry through the Ministry of Food and Agriculture is advised to set up local industries like gari processing industry, sheanut industry and provide households with Masloc loans and training to take advantage of these opportunities.

The findings from the study present new research challenges that must be considered by students or the Ministry of Food and Agriculture. There can be further study on sustainable use of natural resource

CHAPTER SEVEN

7.1 Reflection paper:

It all began on the 27th of June when I flew all the way from the Netherlands to Ghana through Egypt for data collection. Before the journey I have to submit a proposal before I was given the green light to go for data collection. I landed in Accra on the 29th of June 2018 and then proceeded to the northern part of Ghana where the study area was. I spent some days in Tamale the capital of the Northern Region with my daughter who was not well at that time, I also during this time prepared for the field work. Finally I got to Bole the district capital of my study area on the 11th of June 2018. I spent 10 days on the field. The first day I had a meeting with the District Director of Agriculture and the District Chief Executive and other members of the assembly to formally introduce myself and the reason I was with them. I handed the introductory letter given to by VHL to him then we later planned scheduled for data collection, he introduced me focal persons of the study area then I took it from there. Initially I planned to study three communities but upon a reflection I noticed two of the communities had almost the same characteristics so I dropped one of those and did two.

I must say there were moments of joy and moments of frustration as well during the research process. The joy of interacting with the farmers was immeasurable, making new friends with these people, the audience they granted me and above all the show of love and hospitality cannot be over emphasized. This was also the first time I conducted a research of this kind, waking up knowing that the success of this thesis was a sole responsibility of me though put pressure on me but it was still a joy to do.

However, there were moments of frustration during this journey as well. The first focus group discussion that I conducted was a bit challenging, participants gave answers that were not exactly what I will say related to my thesis. All kinds of answers were given and some few individuals tried to hijack the whole show probably because I didn't start well. This actually was frustrating but also made me improved on the conducting focus group discussions, hence my next focus group was a great improvement of the first. It was also challenging having to ride motorbike to farms sometimes very early in the morning which I am not used to. Then also there were times I booked appointments with people only to be disappointed and sometimes as much as you tried not to be bias and judgmental it appears you are, then the data analysis. This was more frustrating especially organizing and putting together the report. But due to the support from my supervisor I overcome all challenges and so overall it was a nice experience, I learnt a lot about research and human behavior in the sense that most of the respondents because I mentioned I was schooling in the Netherlands, it influenced their responses. Some also made demands that I could sense was due to the way I introduced myself.

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Appendix 1 Interview guide

Interview (guide) checklist for farmers

Name:

Age:

Sex:

A. Guiding questions on livelihood assets

1. What does owning a land mean to your livelihood?
2. If you own the land on which you farm how did you acquire the land?
3. What does having a large land mean to you?
4. How many hectares of land do you cultivate? Why don't you cultivate more since you have land in abundance?
5. What does expansion of farm size mean to you?
6. If you depend on only rain for farming what is the implication of that to your livelihood?
7. What impact does access to inputs like fertilizer, seeds and weedicides have on your livelihood?
8. How do you finance your farm activities?
9. If you rear animals in addition to cropping what kind of animals do you rear and why?
10. What type of crop(s) do you cultivate in addition to maize and why the inter cropping
11. After harvesting where do you sell your produce?
12. Having guaranteed price to your farm produce
13. How do you transport your produce to the market?
14. Do you belong to any association?[yes].....[no] If yes, what association and what benefit do you drive from the association?
15. How many people depend on you for a living?
16. How do you feed all of them?

B. Guiding questions on livelihood strategies

17. Apart from farming what other activity are you engaged in for a living and what could be the reason for choosing that activity
18. I

C. Guiding questions on influence of livelihood assets on food security

19. Do you produce all your food needs or access enough food to feed your family all the time? If no why
20. In the past 4 weeks was there ever no food to eat of any kind in your household? If no how often and how did you survive those periods?
21. In the past 4 weeks did you or any other member of your household have to eat fewer meals? If yes how did you cope

Transact walk observation guide

1. Observing livelihood assets in the community and their use
2. Observing daily activities of farmers
3. Observing farm size of farmers

Focus Group discussion guide with farmers

1. What challenges do you face in your farming activities and how do you cope with those challenges

2. Which are your main challenges and why not the other challenges
3. What do you think can be done to solve some of these challenges?
4. What do you need in other to improve your household food availability?

Key informant interview guide with district director

5. What are some of the programs and projects being rolled out in the district?
6. What are the challenges farmers face in the district and how can these challenges be overcome?
7. What challenges does your department face in the discharge of its duties

Appendix 2 Pictures





