

University of the Western Cape



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Institute for Social Development

**THE IMPACT OF LIVELIHOOD DIVERSIFICATION ON FOOD
SECURITY AMONGST FARM HOUSEHOLDS IN NORTHERN
GHANA: A CASE STUDY OF BOLE DISTRICT**

A full thesis submitted in fulfilment of the requirements for the degree of
Master of Arts in Development Studies at the Institute for Social
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THE IMPACT OF LIVELIHOOD DIVERSIFICATION ON FOOD SECURITY AMONGST FARM HOUSEHOLDS IN NORTHERN GHANA: A CASE STUDY OF BOLE DISTRICT

Clement Mensah

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ABSTRACT

Diversifying livelihoods has over the last two decades been identified as an important theme in the development work, particularly concerning the poverty reduction agenda. In the developing world, farm households, urged on by their survival instinct, diversify away from traditional subsistence agriculture to the production of high-value crops and at other times engage in off-farm and non-farm activities. This has become necessary due to the failures of agriculture to guarantee farm households sustainable livelihoods and improve their welfare. In sub-Saharan Africa, diversification is a vital instrument for reducing rural people's risk to poverty.

In recent years, however, diversification has been closely linked to food security. This is due to the fact that chronic food insecurity and its accompanying vulnerabilities continue to thwart poverty reduction efforts in the developing world. Paradoxically, whereas available statistics suggests that there is enough food to feed everyone, close to 900 million of the world's population is still food insecure. By implication, the food security challenge hinge on 'access' rather than food availability. In sub-Saharan Africa and for that matter Northern Ghana, the phenomenon is quite pervasive, often affecting rural farm households. This signals one thing – *a travesty to the existence of international human rights frameworks.*

Already, available empirical studies on the extent to which diversification amongst farm households impact on assuring household food security have revealed mixed results and are silent on the gender consequences. Using World Food Programme's 2012 Comprehensive Food Security and Vulnerability Analysis survey conducted in northern Ghana and an ordinary least squares estimator, this study sought to examine how livelihood diversification contributes to household food security and subsequently validate its effect for male and female-headed farm households in the Bole district of the Northern region of Ghana.

Results from the study revealed a significant positive relationship between livelihood diversification (the number of livelihood activities farm households engaged in) and household food security (household food consumption score). Whereas similar result

was observed for male-headed households, that of female-headed households was insignificant even though positive.

Following this, the study proposes a two-fold policy strategy for optimizing the impact of livelihood diversification on guaranteeing food security amongst farm households in the case study district in particular and northern Ghana in general. Firstly, support for boosting smallholder agriculture should be pursued rigorously, taking advantage of programmes such as the Savannah Plan for Accelerated Growth. Secondly, sustaining, up-scaling and re-orienting programmes such as Rural Enterprises Project and creating the policy milieu for farm households to explore local opportunities like eco-tourism should be mainstreamed, taking into account concerns of gender.



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DECLARATION

I declare that “The Impact of Livelihood Diversification on Food Security amongst Farm Households in Northern Ghana: A Case Study of Bole District” is my own work, that it has not been submitted before for any degree or examination in any other university, and that all the sources I have used or quoted have been indicated and acknowledged as complete references.

Clement Mensah



May, 2014

Signed:

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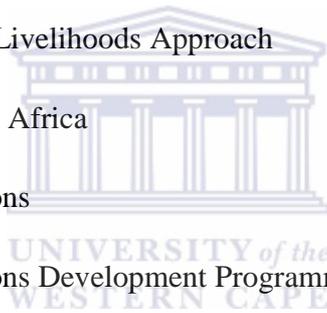
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LIST OF ACRONYMS AND ABBREVIATIONS

CFSVA	Comprehensive Food Security and Vulnerability Analysis
DFID	Department for International Development
DHHs	Diversified Households
DHS	Demographic and Health Surveys
FAO	Food and Agriculture Organization
FAPs	Food Assistance Programmes
FASDEP	Food and Agriculture Sector Development Policy
FHHs	Female-Headed Households
GH¢	Ghana Cedi
GLSS	Ghana Living Standards Survey
GoG	Government of Ghana
GSFP	Ghana School Feeding Programme
GSFP	Ghana School Feeding Programme
GSS	Ghana Statistical Service
IFAD	International Fund for Agricultural Development
IFPRI	International Food Policy Research Institute
ISSER	Institute of Statistical Social & Economic Research
LEAP	Livelihood Empowerment Against Poverty
MDGs	Millennium Development Goals
MHHs	Male-Headed Households

MoFA	Ministry of Food and Agriculture
n.d.	Not dated
n.pg.	Not Paged
NDHHs	Non-Diversified Households
NEPAD	New Partnership for Africa's Development
NGO	Non-Governmental Organization
OLS	Ordinary Least Squares
PDA	Personal Digital Assistant
SLA	Sustainable Livelihoods Approach
SSA	Sub-Saharan Africa
UN	United Nations
UNDP	United Nations Development Programme
US\$	United States Dollar
VIF	Variance Inflation Factors
WFP	World Food Programme



CHAPTER ONE

INTRODUCTION

1.1 Overview and rationale

Anchored to the global poverty reduction agenda lies the quest to attaining a hunger-free world, more particularly in developing countries. Admittedly, the advent of international frameworks such as the Universal Declaration of Human Rights in 1948 and the Millennium Development Goals (MDGs) in 2000 has galvanized support and provided significant impetus towards global hunger eradication. According to the 2013 Global Hunger Index Report, the number of hungry people has declined by approximately 33 percent in the past two decades (von Grebmer et al., 2013).

In spite of this progress, the onset of the 2008/2009 global economic crisis and food price spikes slowed progress towards the MDGs in general and hunger eradication in particular (UN, 2010; Green, 2012). In the wake of this, it is reported that some “41 million people in Asia-Pacific and another 24 million in sub-Saharan Africa have plummeted into hunger” (Karl, 2009: 10). In other words, global hunger remains a crucial concern for millions of people (Greenland, 2005; Ivers & Cullen, 2011). According to the 2012 *The State of Food Insecurity in the World* report by the Food and Agriculture Organization (FAO), World Food Programme (WFP) and International Fund for Agricultural Development (IFAD), some 870 million of the world’s population were found to be food-insecure between the period 2010 and 2012 (FAO, WFP & IFAD 2012), with developing countries accounting for almost 98 percent (Ivers & Cullen, 2011).

In sub-Saharan Africa (SSA), the phenomenon is rife, accounting for about 26.8 percent of hungry people worldwide (FAO, WFP & IFAD, 2012). Of these, 80 percent live in rural areas, working as ‘peasants, landless labourers and pastoralists’ (Tobin, 2009). While Ghana has been successful at addressing the food insecurity challenge to an extent, such progress remains uneven at the regional level. In Northern Ghana (Northern, Upper East and Upper West regions), the phenomenon is severe (WFP, 2009

cited in ISSER, 2012). The above statistics signal one thing – *a travesty to the existence of international human rights frameworks.*

Urged on by their survival instinct, however, farm households in developing countries diversify away from traditional subsistence agriculture to the production of high-value crops and or engage in off-farm and non-farm activities (Bryceson, 1999; Ellis, 1999). By this, farm households enhance their ability to secure basic needs including food, striking a linkage between diversification and food security.

While the need to increase agricultural productivity is crucial to the food security campaign (Tobin, 2009), livelihood diversification has been put forward as an equally potent complementary strategy for addressing rural poverty (See for example Ellis, 1999; Start, 2001; Smith et al., 2001; FAO/World Bank, 2001 cited in Khatun & Roy, 2012) as well as reducing “the vulnerability of the poor to food insecurity and livelihood collapse” (Ellis & Allison, 2004: 30). For Swift and Hamilton (2001), livelihood diversification remains the most effective weapon for addressing the seemingly intractable food insecurity across the globe. In Africa, it is viewed as a response to the “failure of agriculture to provide a sufficient livelihood for a substantial proportion of rural dwellers” (Bryceson & Bank 2001, Bryceson, 2002 cited in Ellis & Allison, 2004: 7-8). That is, with a broadened livelihood portfolio, rural households, the majority of whom live-off subsistence farming (Green, 2012), are able to maximize consumption (Hussein & Nelson, n.d.). In effect, diversification remains crucial for tackling food insecurity irrespective of the form it may take – either farm-based or non-farm or both. Thus, investigating its efficacy in assuring food security at the household level becomes imperative.

In SSA, about 30-50 percent of rural households earn income from non-farm livelihoods (Ellis, 1999). In south and south-east Asia, research has shown that diversifying livelihoods remains fundamental to the eradication of poverty amongst smallholder farmers (FAO & World Bank, 2001). In India for instance, unproductive farmlands have induced households’ to look out for other non-farm activities to support their livelihoods (Hiremath, 2007 cited in Khatun & Roy, 2012). Referring to the food

security crises that hit southern African countries between 2001 and 2003, Ellis and Allison (2004) found out that farm households with limited degree of livelihood diversification were the hardest hit.

Consequently, Maxwell and Smith (1992: 4) proffer that food security be analyzed within the broader context of “livelihood security” and not be treated as a stand-alone concept. Thus, tackling food insecurity cannot be actualized independently of livelihood diversification – a concept embedded in the Sustainable Livelihoods Approach (SLA).

This study therefore sought to critically examine how livelihood diversification contributes to household food security and subsequently validates its effect on male and female-headed farm households in the Bole district of the Northern region of Ghana. Again, it sought to highlight factors that induce households to diversify livelihoods as well as document coping strategies adopted by households in the event of food shortages. In doing this, the study adopted a secondary data analysis, using the World Food Programme’s 2012 Comprehensive Food Security and Vulnerability Analysis¹ (CFSVA) dataset which specifically focused on Northern Ghana. This study has been motivated by the fact that findings and lessons could help generate a new perspective in understanding the relationship between livelihood diversification and household food security. Again, as a fundamental outcome, the study offers useful insights for informing policies and livelihood interventions targeted primarily at farm households.

¹ The World Food Programme’s Comprehensive Food Security and Vulnerability Analysis is “A study, typically conducted in a crisis-prone food-insecure country, that describes the food security status of various segments of the population over various parts of a country or region, with the purpose of indicating the broader underlying causes of vulnerability, and recommending appropriate interventions to deal with problems identified” (WFP, 2009: 16). It is part of a broader effort to bring to bear food security and livelihood dynamics as well as inform policies in these regions or countries. This is discussed in detail in chapter three of this thesis.

1.2 Background and contextualization of study

1.2.1 Food insecurity in Ghana: Trends and policy context

Ghana has, over the last decade, made significant progress towards the eradication of hunger, making it one of the success stories in SSA as far as MDG 1 is concerned. According to the World Food Programme's Comprehensive Food Security and Vulnerability Analysis, about 5 percent of Ghana's population is food insecure, while approximately 9 percent remain vulnerable to food insecurity (WFP, 2009a). This represents a reduction of about 35.5 percent between 1990 and 2012 (FAO, WFP & IFAD, 2012) and has consequently led to a commensurate reduction in poverty in 2005/2006 (Ghana Statistical Services, GSS, 2008 cited in Al-Hassan & Poulton, 2009).

Undoubtedly, government's implementation of the Ghana Poverty Reduction Strategy 1 and 2 provided significant impetus for the progress made towards hunger eradication in particular and poverty reduction in general (WFP, 2009a; Nyantakyi-Frimpong, 2013). To ensure continuity of progress, the introduction of the 2010-2013 Medium-Term National Development Policy Framework (Ghana Shared Growth and Development Agenda) by the Government of Ghana (GoG) prioritized food security concerns with a specific focus on policy objectives such as the promotion of crop diversification, livestock production and fisheries development (GoG, 2010).

More specifically, the introduction of the National Social Protection Strategy in 2007, which encompassed interventions such as the Livelihood Empowerment Against Poverty (LEAP), the Ghana School Feeding Programme (GSFP), and the National Health Insurance Scheme have played important roles. Launched in 2008 by the GoG with support from the DFID and World Bank, the LEAP provides cash transfers to the extremely poor. As of 2012, about 71,000 households had been covered (accounting for about 177,500 direct beneficiaries), receiving between GH¢8.00 (US\$4.88) and GH¢15.00 (US\$9.15) monthly (FAO, 2014). Regarding its impact on food security, a recent study found that beneficiaries' food consumption has improved considerably (FAO, 2014).

The GSFP on the other hand, seeks to achieve the threefold objective of increasing school enrolments levels, improving food security and reducing malnutrition as well as boosting local food production. Here, children in participating schools are given a nutritious lunch using locally produced food crops, thereby creating incentive for market linkages (ECASARD/SNV, 2009). More so, government's introduction of the Food and Agriculture Sector Development Policy (FASDEP II) has resulted in positive outcomes for food production by increasing both male and female farmers' access to agricultural extension services (FAO, 2012). For instance, in 2009, all food staples but rice registered surpluses (Ministry of Food and Agriculture, MoFA, 2010 cited in ISSER, 2013); translating into increased food availability. In addition, the Root and Tuber Improvement and Marketing Program being implemented by MoFA with funding from IFAD has since 2007 contributed to improving rural household incomes and food security (GoG, 2012). As part of a broader objective of reducing the high levels of poverty and assure comprehensive development in northern Ghana, the Savannah Plan for Accelerated Growth has been introduced.

This notwithstanding, the rural-urban disparity and regional imbalances in terms of food insecurity prevalence are quite striking (WFP, 2009a; Nyantakyi-Frimpong, 2013). Close to 70 percent of the 1.2 million people in Ghana who are food insecure are residents in rural areas (WFP, 2009a). On a regional scale, food insecurity is more pronounced in the three Northern regions, namely Northern, Upper East and Upper West (Al-Hassan, Famiyeh & Jager, 1997; WFP, 2009a; Nyantakyi-Frimpong, 2013). It is therefore not surprising that they constitute the country's poorest regions (ISSER, 2013). Recounting some of the quintiles that are vulnerable to food insecurity in Ghana, the CFSVA revealed that food crop farmers, cash crop farmers, agro-pastoralists, food processors and unskilled labourers include the hardest hit (WFP, 2009a). This goes to confirm the vulnerability of farming households to food insecurity both in rural areas of Ghana and the Northern region in particular.

According to Akudugu, Dittoh and Mahama (2012 cited in ISSER, 2013: 310), factors such as "deforestation, urbanization and climate change" tend to influence food security

in Ghana. For Kuwornu et al., (n.d.: 27), the phenomenon is traceable to “low productivity in staple crop production, seasonal variability in food supply as well as price fluctuations.” In Northern Ghana and rural areas in particular, unstable food prices has the tendency to further increase the risk of households to food insecurity especially when expenditure on food alone is estimated to constitute more than 60 percent at both levels (GSS, 2008). From the foregoing, it is evident that the hunger eradication agenda remains unfinished, requiring a renewed effort both in terms of research and real-time interventions, especially in Northern Ghana. In the subsection that follows, livelihoods systems and diversification patterns in Ghana is profiled.

1.2.2 Livelihood diversification patterns in Ghana and policy context

Like most SSA countries, agriculture remains an important source of livelihood for millions of Ghanaians. According to the Ghana Living Standards Survey (GLSS) 5 report, approximately 60 percent of households derive their income from agricultural activities, including incomes from cash and food crops farming, and fishing (GSS, 2008). Wage employment, agriculture and non-farm enterprises constitute the main sources of household income (Coulombe & Wodon, 2007). It is observable that while agriculture still holds a strong place in terms of livelihoods systems in Ghana, the take-up of non-farm activities is gaining traction in both urban and rural areas (Asmah, n.d.).

Spanning the period 1991 to 1998, income diversification (non-farm activities) amongst farm households increased by 9 percentage points, that is from 76 to 85 percent (Lay & Schüler, 2008). During this period, diversification in rural Ghana was mainly induced by desperation and took the form of migration and engagement in non-farm activities (Lay & Schüler, 2008). However, the share of household income from non-farm engagement remained static from 1991 to 1998 – 38 percent, while incomes shares from farming was 57 percent in 1991 and 55 percent in 1998 (Lay & Schüler, 2008). On the contrary, the dominant sources of livelihood for urban households include wage employment and non-agricultural activities (GSS, 2008).

In a rural study in three ecological zones in Ghana, Oduro and Osei-Akoto (2007 cited in Asmah, n.d.) find that rural households' engagement in non-farm enterprises has surged. In Northern Ghana, some 20 percent of households earn income from non-farm employment (Al-Hassan & Poulton, 2009). Again, a study by the Ministry of Food and Agriculture (2007 cited in Al-Hassan & Poulton, 2009) in the same region revealed that livelihood strategies varied across households. For instance, 'food crops and livestock farming, petty trading, seasonal and semi-permanent migration' formed the main livelihood activities for poor households (about 35%) (2007 cited in Al-Hassan & Poulton, 2009). For well-off households (9%), 'tractor or transport services, medium to large scale trading, and salaried positions' constituted non-farm enterprises (2007 cited in Al-Hassan & Poulton, 2009).

Concerning strategies farm households in the three northern regions adopt in attaining food security, a study by Al-Hassan et al. (1997: 147) revealed two main strategies: "maximizing own-food production and non-farm income" and "maximizing own-food production and cash". This in effect indicates the relevance of diversification in guaranteeing improved welfare for farm households.

At the policy level, the joint implementation of the Rural Enterprises Project (REP 1 & 2) by GoG, IFAD and the African Development Bank between 1995 and 2011 has contributed tremendously to the entrepreneurial transformation taking place in rural areas in Ghana. As per its objective, the REP sought to contribute to the reduction of rural poverty through enterprise development. By targeting rural districts including the Bole district, REP sought to "improve the livelihoods and incomes of rural poor micro and small entrepreneurs" (GoG, 2012: 1).

The research problem, questions and objectives derived from the above introduction and contextualization are presented in the section that follows.

1.3 Problem statement, research questions and aims of the study

1.3.1 Problem statement

While a great deal of studies has surfaced to highlight the importance of livelihood diversification as a relevant poverty reduction strategy, empirical evidence on how it impacts on specific dimensions of poverty, more particularly on household food security, remains limited. Already, available empirical studies on the extent to which diversification amongst farm households impact on assuring household food security have revealed mixed results. For example, whereas Thuo (2011) and Hanazaki et al. (2012) confirm the general claim that livelihood diversification improves food security at the household level, findings from other studies have revealed the contrary (Kuwornu et al., n.d.; Awotide et al., 2010). Besides, Maxwell and Smith (1992) posit that to a large extent, literature that seeks to examine the linkage between food security and livelihood security are limited.

Moreover, the gender perspective of the impact of livelihood diversification on food security remains unexplored. That is, evidence on the extent to which livelihood diversification impacts on food security amongst female-headed and male-headed farm households rarely exist. Apparently, some empirical evidences on livelihood diversification are limited only to non-farm share of household income, with very minimal recourse to how these incomes influence other equally important welfare outcomes such as food consumption, education, and health. It is in view of this that the study was carried out to respond to the gaps enumerated above and contribute to broadening the frontier of research on livelihood diversification and household food security.

1.3.2 Research questions

Based on the research gaps enumerated above, the study sought to investigate the following key questions:

- Which livelihood activities are pursued by farm households within the Bole District and which factors induce households to diversify livelihoods?

- Does farm households' engagement in livelihood diversification influence farm households' resilience to shocks and stresses including food insecurity?
- What is the extent of food insecurity amongst farm households and what coping strategies are adopted?
- Does farm households' engagement in livelihood diversification improve household food security? And if so, to what extent are these impacts observable amongst male and female-headed farm households?

1.3.3 Aims of the study

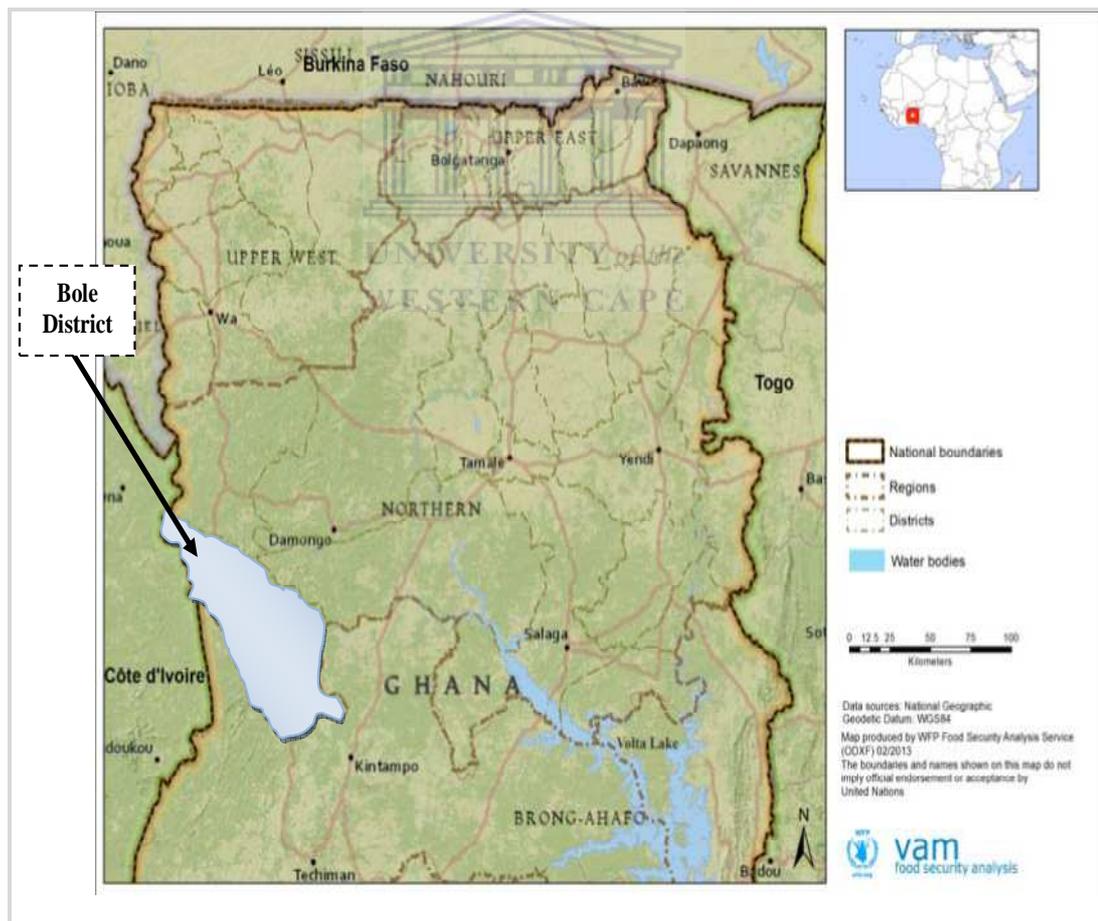
The overriding aim for undertaking this study was to draw on the 2012 CFSVA survey to assess the extent to which livelihood diversification impacts on household food security amongst farm households in Northern Ghana, focusing specifically on the case of Bole district. More specifically, the study sought to:

- examine contemporary literature on food security as a global development challenge, assess the effectiveness of livelihood diversification as a poverty reduction strategy in developing countries and how these two concepts are interrelated, both in theory and practice.
- provide a situational overview of livelihood systems amongst farm households in the Bole district and determine factors that influence households to diversify their livelihoods.
- establish the food security impact of livelihood diversification amongst farm households in the Bole district of Northern Ghana.
- assess the gender distribution of the impact of livelihood diversification on household food security.
- identify lessons and make recommendations that seek to improve sustainable livelihoods for improved household food security in northern Ghana in general and Bole district in particular.

1.4 Introducing the case study area – Bole District

Bole District was established under Legislative Instrument 1786 in 2004 and is situated at the extreme western part of the Northern region of Ghana (see Figure 1.1 below). It is bordered to the South by Wenchi and Kintampo Districts in Brong Ahafo, to the East by West Gonja District, to the north by Sawla-Tuna-Kalba District and to the west by the Republic of Ivory Coast. The district lies between latitude 8 10" 5 and 09" and longitude 1 50E and 2 45 W. Bole is the district capital, the only biggest town in the district. Other major towns include Bamboi, Maluwe, Tinga, Tasilma, Mandari and Banda-Nkwanta. For the percentage land take of District and the Northern Region in relation to Ghana (238,533sq km), they are 2.0% and 29.6% respectively.

Figure 1.1: Bole district in northern Ghana context



Source: Adapted from WFP (2012: 10)

According to the 2010 Ghana Population and Housing Census, the district has a total population of 61,593 (see GSS, 2013a). As shown in Table 1.1 below, the ratio of males to females is 101.5 as compared to 98.4 and 95.2 for the regional and national levels respectively. On the average, there are six (6) persons in every household. While this is higher than the national average of 4.4, it is slightly lower than the regional average of 7.7. This disparity between the national level and that of the regional and district levels can be explained by the fact that in the latter, the practice of extensive family system is dominant due to the rural nature of the districts.

Table 1.1: Socio-economic characteristics of Bole District compared to National and Regional Contexts

Socio-economic indicators	National	Northern Region	Bole District
Sex ratio	95.2	98.4	101.5
Average household size	4.4	7.7	6.1
Households engaged in Agriculture	45.8	75.5	61.2
Rural population (%)	49.1	69.70	79.0
Age-Dependency ratio	76.0	96.9	91.2
Literacy rate (11 years and older)	74.1	37.2	41.6
Household headship (percent of male-headed households)	65.3	85.0	74.7
Household headship (percent of female-headed households)	34.7	15.0	25.3
Percent of economically active population 15 years and older employed in private informal	86.1	94.5	93.5

Source: Ghana Statistical Service, 2010 Population and Housing Census.

In Table 1.1, it is evident that the proportion of rural population for the Northern region and Bole district are higher (69.7% and 79.0% respectively) than the situation at the

national level (49.1%). That is, while the level of urbanization is high at the national level, the majority of people in Northern region and for that matter the Bole district are resident in rural areas, largely due to the fact that their livelihoods are dependent on agriculture. For example, of the 6260 households engaged in agriculture in the district, approximately 88.2 percent are resident in rural areas (GSS, 2013b). Unlike other districts within the Northern region, about 20 percent of the inhabitants in the Bole district comprise migrants from outside the region (GSS, 2013b).

At the district level, more than two-thirds of households are headed by males. This is about 11 percent lower when compared to the situation at the regional level (85.0% are male-headed households and 15.0% female-headed households). At the national level however, the proportion of males heading households is lower (65.3%) when compared to the regional and district figures. From Table 1.1, it is observable that unlike the national level, more than half of persons who are 11 years and older at the regional and district levels cannot read and write with understanding. This can be attributed to the fact that in the Bole district, access to education is very low. For instance, whereas access to primary education is about 80 percent at the regional level, only a half of children within the Bole district have access to primary education (UNDP, 2010).

Of the economically active population (15 years and older), the majority are employed in the private informal sector at the district, regional and national levels. Agriculture is the main source of livelihood for the majority of the working populace. Whereas fewer than 50 percent of households are engaged in agriculture at the national level, more than half of households in Northern region and Bole district are engaged in agriculture. Agricultural production is basically food crops at the subsistence level and mainly includes maize, yam, cassava, sorghum, beans, millet, and vegetables. To complement the primary livelihood source (crop farming), households engage in livestock production. In spite of its potential in agriculture production, both in terms of crop and livestock, poverty is quite severe within the district (UNDP, 2010).

Agricultural productivity and outputs are low due to over reliance on rainfall (UNDP, 2010). The over-dependence on traditional crops, inadequate access to credit coupled

with women's limited access to irrigated farmland generates adverse implications for realizing food security within the district. Within the Northern region, Bole district ranks second in terms of food insecurity severity, with some 28.2 percent of households being affected (WFP, 2012). It is in the light of this that the researcher seeks to examine how households' engagement in multiple livelihoods impact on food security.

More so, the researcher's previous engagement in livelihood empowerment programme in the Bui Hydroelectric Power project area, which had some project affected communities within the Bole district, motivated the choice of the case study area.

1.5 Structure of the thesis

The thesis is structured into five main chapters, with previous chapters serving as prelude to subsequent ones. The first chapter presents a snap-shot and contextualization of the study. It tersely introduces the concepts of livelihood diversification and food security, highlighting their importance and global as well as local trends. Here, the study is contextualized, providing a situational overview of food insecurity prevalence and livelihood diversification patterns in Ghana as well as highlights of national-level policies fashioned to respond to these concerns. From this contextualization, the research problem and questions, rationale and significance of the study and highlights of methodological approach are set out. In addition, the case study district, Bole, is introduced.

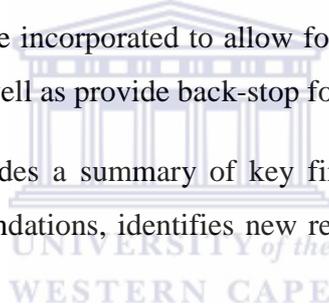
In chapter two, literature relevant to the study is reviewed and subsequently contours the theoretical and conceptual underpinnings for the study. First, key concepts, food (in)security and livelihood diversification are defined, including an explanation for the term *farm household*. Following this, an attempt is made to provide an understanding of the food insecurity challenge globally, highlighting specifically trends, causes and effects. Furthermore, the situation in SSA and West Africa in particular are highlighted. More importantly, historical and current perspectives are captured for livelihood diversification as well as food security. From this review, the Sustainable Livelihoods

Approach (SLA), which formed the theoretical basis for the study is introduced parallel to the conceptual framework used for the study.

Chapter three presents, in detail, the research design and methodological approach used in carrying out the study. Firstly, information on how the various concepts relevant to the study were operationalized is presented. This is followed by the research design and methodology, highlighting keys issues such as sampling and data analysis procedures as well as limitations of the study.

Subsequently, chapter four presents the study results and discussions. First, the socio-demographic information of the 196 households is presented. Thereafter, findings from the specific study objectives are presented and discussed. In doing this, descriptive as well as inferential statistics are used. Parallel to the discussions, relevant literature reviewed in chapter two are incorporated to allow for comparative and trends analyses of key study outcomes as well as provide back-stop for validating study findings.

Finally, chapter five provides a summary of key findings, highlights relevant policy implications and recommendations, identifies new research trajectories, and concludes the study.



CHAPTER TWO

LIVELIHOOD DIVERSIFICATION AND THE GLOBAL FOOD SECURITY AGENDA

2.1 Introduction

This chapter presents the state of global food insecurity in terms of trends, causes and effects and examines the contribution of livelihood diversification as an anti-food insecurity development programme, both theoretically and practically. Firstly, these two concepts are defined. Thereafter, global food insecurity trends are highlighted, narrowing it a step further to capture trends in SSA. Here, experiences from Southern Africa and the West African sub-regions are compared to identify nuances in terms of causes or drivers of food insecurity.

Furthermore, the conceptual origin of food security is discussed, bringing to the fore varying paradigm shifts, pre and post 1974. Also, contestations surrounding measurements and the notion of food sovereignty are highlighted. Similarly, the historical antecedents of livelihood diversification, what drives it and its significance to livelihood security are examined. This is discussed largely in the SSA context even though some experiences from Asia and the Latin America are incorporated. In examining the empirical relationship between diversification and food security, studies conducted in different contexts are reviewed.

Drawing on the sustainable livelihood approach by Robert Chambers and Gordon Conway, the remainder of this chapter presents the theoretical framework for the study. This is followed by a self-developed conceptual framework that formed the basis for investigating the relationship between diversification and household food security. From this, the study hypotheses are presented.

2.2 Definition of key concepts

2.2.1 Household food security

Different authors and institutions across different geographical contexts have put forward varying definitions for the concept of food security. Already, some 200 definitions and 450 different indicators have been documented as explaining the food security phenomenon (International Food Policy Research Institute, 1999 cited in Gross et al., 2000). This may be attributable to its complex and eclectic nature (Maxwell & Smith, 1992), plus the fact that it is perceived from different levels – global, national, regional, community, household as well as the individual.

One of the earliest definitions, which can be considered as the baseline definition for food security is the one proffered by the United Nations in 1975. The UN (1975 cited in Maxwell, 1996: 156) defined food security as the “availability at all times of adequate world supplies of basic food-stuffs ... to sustain a steady expansion of food consumption ... and to offset fluctuations in production and prices”. Since this was skewed towards the notion of food availability rather than access, the Food and Agriculture Organization in 1996 tabled a more comprehensive definition. According to the FAO (1996 cited in Ivers & Cullen, 2011: 1740S), food security “exists when all people, at all times, have physical, social, and economic access to sufficient, safe, and nutritious food that meets their dietary needs and food preferences for an active and healthy life”.

In an attempt to make apparent the importance of nutrition and health concerns to the conceptualization of food security, the Committee for World Food Security (2012 cited in Page, 2013: 4-5) proffered an expanded definition, claiming that:

“Food and nutrition security exists when all people at all times have physical, social and economic access to food, which is safe and consumed in sufficient quantity and quality to meet their dietary needs and food preferences, and is supported by an environment of adequate sanitation, health services and care, allowing for a healthy and active life.”

In between these landmark definitions, however, several other authors have offered divergent but principally similar views. Referencing from other definitions, Maxwell & Smith (1992: 8) posit that “food security is secure access at all times to sufficient food.” Contextualizing these definitions to the household, Pinstrup-Andersen (2009: 8) opines that “a household is considered food secure if it has the ability to acquire the food needed by its members to be food secure.” In other words, the inability of a household to access food in their right proportion and quality constitutes food insecurity. From the above definitions, this study adopts WFP’s definition enshrined in its 2012 Ghana CFSVA report, which principally, hinges on the FAO’s 1996 definition. This combines “diet diversity, frequency of consumption and the relative nutritional importance of different food quintiles” to capture food insecure households – ‘either severely or moderately’ (WFP, 2012: 2).

2.2.2 Livelihood diversification

The concept of livelihood diversification has been defined differently. One of the early exponents of the concept, Scoones (1998: 9), defines it as the development of “a wide income earning portfolio to cover all types of shocks or stress jointly or the strategy may involve focusing on developing responses to handle a particular type of common stock or stress through well developed coping mechanisms.” Start (2001) conceives livelihood diversification as involving two strands. On one level, it is seen as progressive development tool that spurs economic growth within the rural economy. On another level, livelihood diversification is a mere stop-gap for promoting secured livelihoods during adversities, what he calls “negative diversification” (Start, 2001: n.pg.).

For Barrett et al. (2001: 12), to diversify livelihoods is to “cope *ex post* with shocks to income”. However, the most widely cited definition and which is adopted as the working definition for this study, stems from the work of Frank Ellis (1999). For Ellis, livelihood diversification constitutes “the process by which households construct a diverse portfolio of activities and social support capabilities for survival and in order to

improve their standard of living” (1999: n.pg.). The process stated in this definition, may well refer to factors that induce people to engage in multiple livelihoods, which ideally, remain core to any livelihoods research.

The adoption of livelihood diversification by a household may signify two things: one reason may be linked to “increased vulnerability”, the other reason being a deliberate effort by households to broaden income streams for the purposes of “accumulation and investment in the future” (Swift & Hamilton, 2001: 87-88). The common underlying theme from these definitions is that diversification is a proactive or reactive strategy that seeks to provide some sort of cushioning for households livelihood security especially in rural areas. It is a strategy households leverage to either cope with risks or expand domestic resources (cash and non-cash) or a fulfillment of both.

2.2.3 Farm household

Farm or agricultural households have been defined from two scopes: broad and narrow. From the broader perspective, a farm household is one where “at least one member of the household is operating a holding” (UN, 1984: 15). The narrower definition on the other hand refers to farm households as “those where the income from independent agricultural activity, net of capital consumption, constitutes the main source of the total income of the reference person” (Karlsson, Pfuderer & Salvioni, 2005: 1).

In line with the study objectives and geographical scope of investigation, the narrower perspective is used albeit defined as households who engage in food crop farming as their primary livelihood activity. That is, households included in this study comprise those who undertake food crop farming as a major livelihood activity in addition to other livelihood activities.

2.3 Understanding the global food security challenge: trends, causes and effects

In a collaborative paper prepared for the International Conference on Financing for Development in Monterrey, Mexico in 2002, the FAO, IFAD and WFP hinted that prevailing food production supply was in excess of demand. That is, for each person in the world, calorie requirement was in excess of about 17 percent and that *ceteris paribus*, similar trends were to be expected in the future (FAO, IFAD & WFP, 2002). Thus, giving credence to the notion that '*there is enough food to feed everyone*' (IF Coalition, 2013).

Paradoxically, statistics by FAO, WFP and IFAD (2012) suggests that close to 900 million of the world's population is still food insecure, in other words, undernourished. Disaggregating this by region, whereas Asia and developing countries, have shown a consistent decline in the number of undernourished persons between 1990/1992 and 2010/2012, trends in Africa in general and SSA in particular reveal the opposite (FAO, WFP & IFAD, 2012). In Latin America and the Caribbean region, similar positive progress has been recorded, both in absolute terms and percentage-wise (FAO, WFP & IFAD, 2012). In effect, Africa in general and SSA in particular is lagging behind regarding the hunger eradication agenda.

With regards to gender, women tend to be more vulnerable to hunger than men (IF Coalition, 2013). As stated in WFP's '*Gender policy: Promoting gender equality and the empowerment of women in addressing food and nutrition challenges*' policy paper, three in every five persons suffering from severe hunger comprise of "women and girls" (WFP, 2009b: 5). In spite of this, women, have and continue to make significant contributions to food security in the areas of food production, processing and even preparation (Karl, 2009). When it comes to food production, women, the majority of whom are smallholders, lack the productive resources (credit access, technology, labour, and fertilizers) necessary for boosting production (FAO, WFP and IFAD, 2012). That is, women farmers continue to be marginalized despite the important contributions they make to increased food availability and for that matter food security.

Besides, projections by the FAO (2001 cited in FAO, IFAD & WFP, 2002) indicate that given the slow pace of progress in reducing the proportion of undernourished persons, it is unlikely to achieve the 2015 MDG target of halving hunger; at best, this is achievable in 2030. That is, even in the midst of plenty, some individuals are denied the right to food as a basic human need, implying the existence of a weak-link within the global food system. This weak-link stems from the problem of 'food distribution' and 'access constraints' (FAO, IFAD & WFP, 2002). The World Hunger Education Service (2013) enumerates causes of food insecurity to include natural disasters, conflicts, and climate change.

According to FAO, IFAD and WFP (2002), poverty remains the most significant cause of hunger or food insecurity. In simple terms, hunger exists because people, especially in developing countries, lack adequate incomes to purchase enough and nutritious food (Oppeinheim & Stuart, 2013). Also, a more recent article by the UN Special Rapporteur on the Right to Food, Olivier De Schutter (2014), points to biased global food regimes as contributing a great deal to the hunger challenge. At the household level, market barriers to agricultural products, lack of education, and over dependence on agriculture as primary source of livelihood tend to compound food insecurity levels in developing countries especially (WFP, 2009a). Specific to the African situation, Devereux and Maxwell (2001: 1) contend that "policy failures" have chiefly contributed to food insecurity even though they point to low incomes and low agricultural productivity as factors.

Indeed, being food insecure has the tendency to generate devastating consequences, which inevitably translates into huge cost, not only for households but also for Governments, NGOs and the private sector. Today, malnutrition is the number one killer and health risk (World Hunger Education Service, 2013). A comparative study of undernourished children under five years in Asia, Latin America and Africa by Gross et al. (2000: 2-3) revealed that the developing world continue to suffer from "stunting", attributing this phenomenon to "inadequate feeding and poor health". In Asia, productivity losses due to "stunting and iodine and iron deficiencies" are estimated to

trigger a depreciation of Gross Domestic Product by some 3 percent (FAO, IFAD & WFP, 2002: 11). Again, of the 12 million deaths that occur amongst children under five years annually, about 55 percent is attributable to malnutrition (FAO, IFAD & WFP, 2002). Estimates by Murray and Lopez (1996 cited in Young, 2004: 5) also indicate that “22% of total years of life lost (YLL) worldwide were attributable to malnutrition”.

Deducing from the above, the possibility of the current food insecurity trend to stifle the global objective of eradicating poverty is high. The IF Coalition report (2013: 6) for instance, projects that the current state of affairs concerning hunger and malnutrition will, if left unaddressed, increase poverty levels amongst the youth to about 1 billion by 2025. In effect, food insecurity is a universal challenge that is strongly tied to global poverty, thus requiring an eclectic approach to its eradication.

Already, concerns have been raised about the urgency for Governments and development actors to initiate the right-mix of policies to respond adequately to future food needs, 2050 to be precise (Foresight, 2011). In the wake of this, however, Tomlinson (2013) remains skeptical about such concerns, referring to such propositions as rather opportunistic campaigns to implicitly ‘market’ or infuse a certain food security agenda which could, possibly imperil the already appalling food insecurity situation. Tomlinson (2013: 82) points to an impending misconception regarding food security, with the status quo being that “hunger, starvation and malnutrition are a problem of ‘global food security’ and solving them needs a better global food system”, obviously a case for doubling global food production by 2050.

That is over-emphasizing a supply-side approach to addressing future food needs could prove disastrous, as this only addresses the challenge in part. By implication, food insecurity cannot be treated as a short or medium term challenge but could be devastating for future generations given the damning effects of climate change. The food insecurity situation in SSA is given further elaboration in the section that follows.

2.3.1 The food security situation in sub-Saharan Africa

According to Devereux and Maxwell (2001: 2), “poverty and food security are increasingly Africanized”. A staggering 234 million people are food insecure in SSA, which is 5 million less than the figure for the entire continent. Adding his voice to the calls for a concerted effort in addressing the state of food insecurity in Africa, the FAO Director-General, José Graziano da Silva, during the launch of the 2014 African Union summit bemoaned the fact that more than one in every five persons goes to bed hungry, charging Governments to step-up efforts to end hunger within the region (UN News centre, 2014). For Tobin (2009), low political commitment by Governments of SSA to create the enabling environment for addressing food insecurities is a key undermining factor.

For most SSA countries, public spending on agricultural research is less than 10 percent, which inevitably translates into low agricultural production (IFPRI, 2008 cited in Tobin, 2009). For example, an assessment of how food security policies were incorporated into recent poverty reduction efforts revealed that only a half of this number had actually prioritized food security concerns. Efforts at attaining the Comprehensive Africa Agriculture Development Program targets under Africa Union’s NEPAD initiative have been slow. Even for those that have mainstreamed food security policies into their broader poverty reduction frameworks, they remain disjointed and lack coherence; affirming the ‘policy failures’ argument put forward by Devereux and Maxwell (2001).

In a meta-analysis of 49 case studies within the Southern Africa sub-region, Misselhorn (2005: 37) finds that food insecurity is the “outcome of the interaction between environmental stressors, and socio-economic conditions, over various time scales.” In this study, he assembles about 33 drivers, including increase in food prices, poverty, environmental stressors, lack of education, in-and out-migration, poor human health, and unemployment. Misselhorn (2005), through a combination of direct and indirect indicators, found that constraints to food access were significant determinants than the

decline in food production at the micro-level, thus confirming the relevance of Sen's (1981) food accessibility perspective, which is examined extensively in the next section.

Within the West African sub-region, food security determinants are similar to those observed by Misselhorn (2005) in Southern Africa. These determinants, according to Assenso-Okyere, Benneh and Tims (1997: 2) comprise of "household incomes and economic assets (including stocks and animals), prices, demographic factors such as gender and age, and socio-cultural factors like health and sanitation status, educational level, cultural norms and food consumption habits". From a food production perspective, public investment in agriculture production is low (Assenso-Okyere et al., 1997), which has over the years accounted for the low levels of agricultural productivity. In the section that follows, the conceptual underpinnings and historical antecedents of food security are discussed.



2.4 Framing the food security concept: historical antecedents and perspectives today

The food security concept is not a recent phenomenon. It is a complex concept, making it one of the highly contestable strands of development, both in theory and practice (Maxwell & Smith, 1992). In recent years, the concept has been studied alongside equally important development themes such as livelihoods (see Webb & Rogers, 2003; Woller et al., n.d.; Hanazaki, et al., 2012), sustainability and climate change (see Sanchez, 2005; Gregory, Ingram & Brklacich, 2005; Lawrence, Lyons & Wallington, 2010; Foresight, 2011), urbanization (Maxwell et al., 2000; Satterthwaite, McGranahan & Tacoli, 2010), and other fields such as gender, vulnerability and globalization.

While the 1974 UN World Food Conference held in Rome provided the setting for a global action towards food security, the concept had been fairly articulated in the past, especially in the works of Reverend Thomas Robert Malthus (Greenland, 2005). Seeing the potential threats of food production shortfalls in the face of high population growth,

Malthus advocated for a sustainable approach to food production. His argument was skewed towards the supply-side and dominated the food security debate for years.

The post-1974 World Food Conference period, however, witnessed a renewed commitment to assuring food security and thus became an important development objective aspired to by all – governments, both local and international NGOs and the private sector. Such global action was necessary, not only because food security was considered a proactive response to curbing the adverse impact of ‘deficit food production and general agricultural market failures’ that characterized the early 1970s (Shaw, 2009; Page, 2013), but also based on the realization that food remained a fundamental human right.

Since its conceptualization, food security had undergone several transformations. In his work, *‘Food Security: a post-modern perspective’*, Maxwell (1996: 156) categorizes this transformation into 3 perspectives: macro-level analysis to micro; “from food first perspective to the livelihoods perspective” and a shift “from objective indicators to subjective perception”.

Prior to the early 1970s, the concept implied ‘food availability’ (Shaw, 2009; Burchi & De Muro, 2012) and was analyzed on a macro-level (global/national) rather than micro-level (individual/household) (Maxwell, 1996). By this perspective, food security “concerned the ability of countries to secure adequate food supplies” (Young et al., 2001: 3). That is, for a country to attain food security status, its food stocks ought to match-up with the food needs of its population, upholding Malthus’ long-held perspective of food security. This perspective is valid for two important but fundamental reasons: First, food availability forms the foundation for food accessibility. That is, if food availability dwindles, it equally raises concerns about food accessibility. Secondly, Malthus’ standpoint places agricultural production at the center of food security policies, thereby providing the agency for assuring improved and sustainable food production regardless of scale – household, community, regional, national and global. In other words, the need to make food available in adequate quantities,

irrespective of where it is produced should form the foundation for any food security policy.

This perspective, as indicated earlier, informed UN's 1975 food security definition. Policy-wise, countries were encouraged to increase food production whilst controlling population growth (Burchi & De Muro, 2012). While this gained dominance in food security debates, it was displaced in the 1980s by Amartya Sen's 'entitlement' approach (Burchi & De Muro, 2012), who contends that the food availability perspective to food security is a weak explanation of famine (Sen, 1981).

In the opening chapter of his book *Poverty and Famine: an Essay on Entitlement and Deprivation*, Sen (1981: 1) opines that "starvation is the characteristics of some people not having enough food to eat" and not a consequence of inadequate food supply. By implication, food availability does not necessarily guarantee food access to all people. That is, between food availability and accessibility lies a constraint – resources needed to facilitate the purchase of food in their right measures, both quantity and quality. For him, "A person starves either because he does not have the ability to command enough food or because he does not use this ability to avoid starvation" (Sen, 1981: 45). This brings to the fore another dimension to the hunger debate, that at times, an individual or a household may decide to go hungry in order to preserve available resources for future utilization – a kind of coping mechanism.

Central to the entitlement perspective are two terms 'endowment' and 'entitlements or commodity bundles'. For Sen, a person's existence relied on a 'set of entitlements', which include the commodities an individual is able to command and 'endowments', which constitute resources at their disposal to facilitate commodity exchanges (Devereux, 2001). Furthermore, he argues that a collapse of an individual's or a household's set of endowments available to them places a barrier on the amount of commodity bundles that can be accessed by them. This is typical in Africa, where seasonal farming has the tendency to cause a shrink in farmers' endowments, thereby exposing them to chronic hunger. Despite being credited for initiating a shift in the food debate – that is, from food availability to food access, Sen's entitlement approach

suffers some limitations (Devereux, 2001). Devereux (2001: 259) summarized these deficits to include: “first, a failure to recognize individuals as socially embedded members of households, communities and states, and second, a failure to recognize that famines are political crises as much as they are economic shocks or natural disasters.”

Sequel to this, the livelihoods perspective became central to food security debates (Maxwell, 1996). The livelihoods perspective posits that household food security is predicated on a secured livelihood (Maxwell, 1996). That is, by diversifying livelihoods, an individual or household stands a better chance of meeting food needs, particularly in times of adversity. However, this approach, like Sen’s entitlement approach, has proven to be more useful in emergencies or famine situations (Burchi & De Muro, 2012).

In general, these perspectives have contributed in shaping the food security debate globally, in terms of what it is, what it encompasses and how it should be measured. Contrary to UN’s 1974 definition, food security today embraces three key elements: ‘food availability’, ‘food access’ and ‘food utilization’ (Gregory, Ingram & Brklacich, 2005; Woller, et al., n.d.). Today, food security is perceived as a “global public good” that needs no compromise (Page, 2013: 21). Nonetheless, the concept is not devoid of controversies. This can be categorized into two focal areas: the first relates to what may be referred to as the ‘measurement problem’ (Maxwell, 2001; Pinstrup-Andersen, 2009) and the second relates to what is increasingly becoming an important paradigm to the global food regime – *food sovereignty*.

Amidst these contestations, Maxwell and Smith (1992; cited in Maxwell, 1996: 160) make an insightful contribution to the food security debate: what food security as a concept represents, how it should be approached and whose objectives are to be considered.

Flexibility, adaptability, diversification and resilience are key words. Perceptions matter. Intra-household issues are central. Importantly,....food security must be treated as a multi-objective

phenomenon, where the identification and weighting of objectives can only be decided by the food insecure themselves.

From this, livelihood diversification remains an indispensable element of food security. In the subsequent sub-sections, detailed discussions of both lines of contestation are presented.

2.4.1 Measuring food security: units of analyses and approaches

The debate surrounding the measurement of food security can be looked at from two levels: the first concerns the level or unit of analysis and the second borders on estimations or the appropriateness of indicators used in characterizing as to whether a person or household is food secure or not. Ostensibly, the various methods and approaches used are deeply rooted in how one perceives or defines food security. As indicated earlier, the shift in perspective, that is, from 'food availability decline' to food accessibility and then sustainable livelihoods, has in the past two decades or so drawn attention to a micro-level approach to capturing food (in)security levels globally. Whereas some (for instance Reutlinger, 1985; Gittinger et al., 1990 cited in Maxwell, 2001) favour the use of the 'individual' as the basic unit for measuring food security, others (Sahn, 1989; Swift, 1989; Eide, 1990; Frankenberger and Goldstein, 1991 cited in Maxwell, 2001) have focused on households. For each stance, reasons have been put forward.

Those who favour intra-household perspective argue that basing food security measurements on the household implied an oversimplification of the phenomenon and may fail to reveal the actual food security status of each household member (Maxwell, 2001). This, they trace to the unequal distribution of decision-making powers within the household, which in this instance borders on food acquisition and allocation. As a result, intra-household issues remain relevant for food security analysis. A review by Maxwell and Smith (1992) for instance, showed that food price fluctuations generated different effects for male and female household members in terms of food consumption. Thus, beyond the suspicion of underestimating food insecurity levels at the level of the

household, focusing on intra-household analysis of poverty, according to Haddad and Kanbur (1990: 866), underscores “the ultimate object of concern for economic policy”. As such, for people like Sen (1984), intra-household analysis is deemed most appropriate for rigorous micro-level welfare studies.

Contrary to the above, those who favour the use of households argue that traditionally, decisions about production and consumption take place at the household level, that is, by the head and thus the need to measure food security at the household level (Assenso-Okyere et al., 1997). Regarding methodologies, using the household-based approach is simpler and direct. Another reason why a household level analysis is mostly preferred is the fact that intra-household analysis can be “costly” (Haddad & Kanbur, 1990: 880). Also, it has become common practice globally to use the household as a unit as the main conduit for determining poverty and hunger levels (De Weerd et al., 2014).

In using the household as a basis for capturing food security levels however, Maxwell and Smith (1992) caution that such an approach should be guided by certain basic “assumptions”. These assumptions include: “(a) household members share a common set of preferences in resource allocation; (b) household income and food resources are pooled and allocated to maximize collective welfare.....(c) households with similar endowments respond similarly but independently to price, income and other exogenous changes...” (Maxwell & Smith, 1992: 19). In spite of these assumptions, this study, as per its objectives adopts the household as a basis for modeling food security amongst farm households in the Bole district.

Turning away from the levels or units of analyses, a number of approaches exist concerning how food (in)security is determined. In times past, food security was measured using for example “consumption of less than 80% of WHO average required daily calorie intake” (Reardon & Matlon, 1989 cited in Maxwell, 1996: 159). For some, such a straight-jacket indicator for determining an individual’s food security status is inappropriate based on the simple reason that variations do exist in daily calorie intake for different age cohorts, particularly for children and adults (see Payne and Lipton, 1994 cited in Maxwell, 1996). This indicator was also viewed as narrow, in the sense

that it concerned itself with the quantity of calories that one consumed, leaving out issues of nutrition.

Traditionally, consumption-based approaches are used, shares of household income spent on food is leveraged as a proxy variable (Pinstrup-Andersen, 2009, De Weerd et al., 2014). This measure, according to Pinstrup-Andersen (2009: 6), goes beyond food access to include “household food acquisition and allocation behavior.” This has the potential to either swell-up or shrink food security estimates (Pinstrup-Andersen, 2009). In recent times, however, the use of food security scores is gaining traction, what Pinstrup-Andersen (2009) refers to as ‘experimental measures’. This is used by the United States Department of Agriculture, which addresses “the issue of varying household needs and behavior” inherent in the consumption-based approach (Nord, Andrews & Carlson, 2004 cited in Pinstrup-Andersen, 2009: 6). Here, households’ perceptions on past experiences in relation to food are elicited and further quantified into scores (Pinstrup-Andersen, 2009: 6). Even with this, households with pre-conception of receiving benefits or support may result in misleading responses (Pinstrup-Andersen, 2009).

Commenting on the appropriateness of food security indicators, Pinstrup-Andersen (2009: 6) posits that being a food-secure household may not necessarily translate into “nutritional security” since household members’ food security depends on other non-food factors such as “sanitary conditions, water quality, infectious diseases and access to primary health care.” For him, a food security indicator that combines food access, behavioural issues and anthropometric measures can be more informative to food policies as well as bring an enhanced understanding to the food security discourse.

2.4.2 The food sovereignty paradigm: *an alternative or a complement to food security?*

While the concept of food security has traditionally been used as the principal guide for framing global food policies and programming hunger and malnutrition interventions, it has, in recent years, come under intense criticism by some civil society organizations,

both in the North and South. With leadership from the umbrella organization called *La Via Campesina* or the International Peasant Movement, they argued that the concept of food security was weak and unresponsive to the core issues of food production and distribution and agriculture in general (Schanbacher, 2010; Wittman, 2011). For this quintile, the definition of food security is shallow and barely incorporates political dimensions of the global food system, rendering it an incomplete concept (Patel, 2009). Pursuant to these calls, the food sovereignty paradigm was birthed in 1996.

For Via Campesina (1996 cited in Menezes, 2001: 29), food sovereignty meant “the right of each nation to maintain and develop its own capacity to produce the staple foods of its peoples, respecting their productive and cultural diversity”. That is, a focus on ‘right to food’ alone is insufficient to guarantee food security. The proponents rather argue for a global food system that creates the milieu for people, communities and nations to participate actively in decisions that results in food production, food access and food utilization – incorporating democratic principles in food policies. Unlike food availability decline, entitlement and sustainable livelihoods perspectives discussed early on, the food sovereignty thinking represents a sharp break away from how food security has conventionally been perceived. It attempts a ‘reconstruction’ of the global food regime in its entirety.

In a much broader perspective, the framework has emerged as a response to the failures of globalization (Menezes, 2001; Mazhar et al., 2007). Failures in the sense that unfair trading regimes by multinational corporations and international institutions such as the World Trade Organization have not been favourable to producers particularly in the global South, and remained unsupportive to agricultural development in general. The resulting effect of this is that Governments of developing countries have to succumb to “the interests of transnational corporations in the business of food and agriculture” (Mazhar, et al., 2007: 64). Referencing from the works of Rosset (2003), Windfuhr and Jonsén (2005) and McMichael (2008), Patel (2009: 665) offers a simple but apt account of what the food sovereignty represents and seeks to achieve: “that the politics of food security is something that requires direct democratic participation, an end to the

dumping of food and the wider use of food as a weapon of policy, comprehensive agrarian reform, and a respect for life, seed, and land.”

In pursuing this agenda, four key themes have been enshrined: promoting the ‘right to food’; pursuing policies that increase smallholder farmers’ ‘access to productive resources’; ‘mainstreaming agroecological production,’ and advocating for policies that promotes ‘trade and local markets’ (Windfuhr & Jonsén, 2005). The adherents of the concept believe that through these themes, the fundamental causes of protracted hunger and malnutrition would be addressed, making way for the realization of ‘genuine food security’ (Patel, 2009). For this reason, Menezes (2001) asserts that food sovereignty should not be treated as an alternative to food security but rather a complementary framework and precondition for attaining food security. Aside from this, the food sovereignty regime has the tendency to build sustainable livelihoods for marginalized producers, whom, as mentioned earlier, remain the real constituents of food insecurity and poverty (Windfuhr & Jonsén, 2005).

In spite of this, the food sovereignty agenda is operationally challenged, as it lacks the space to implement or activate these aspirations from a global perspective (Windfuhr & Jonsén, 2005). To this end, it is more idealistic and remains rhetorical. On the whole, food sovereignty provides a nuanced understanding to the food security discourse, in that it goes beyond mere food availability and accessibility to include other socio-cultural strands that ought to be embraced. For the purposes of this study, the objective of increasing farmers’ access to productive resources, which has a practical implication for the food availability element of food security, is briefly examined. Since the study targets crop farming households, highlighting issues that are pertinent to agriculture, particularly crop production constraints should provide useful policy options for increasing households’ own food production.

2.5 Coping with food insecurity

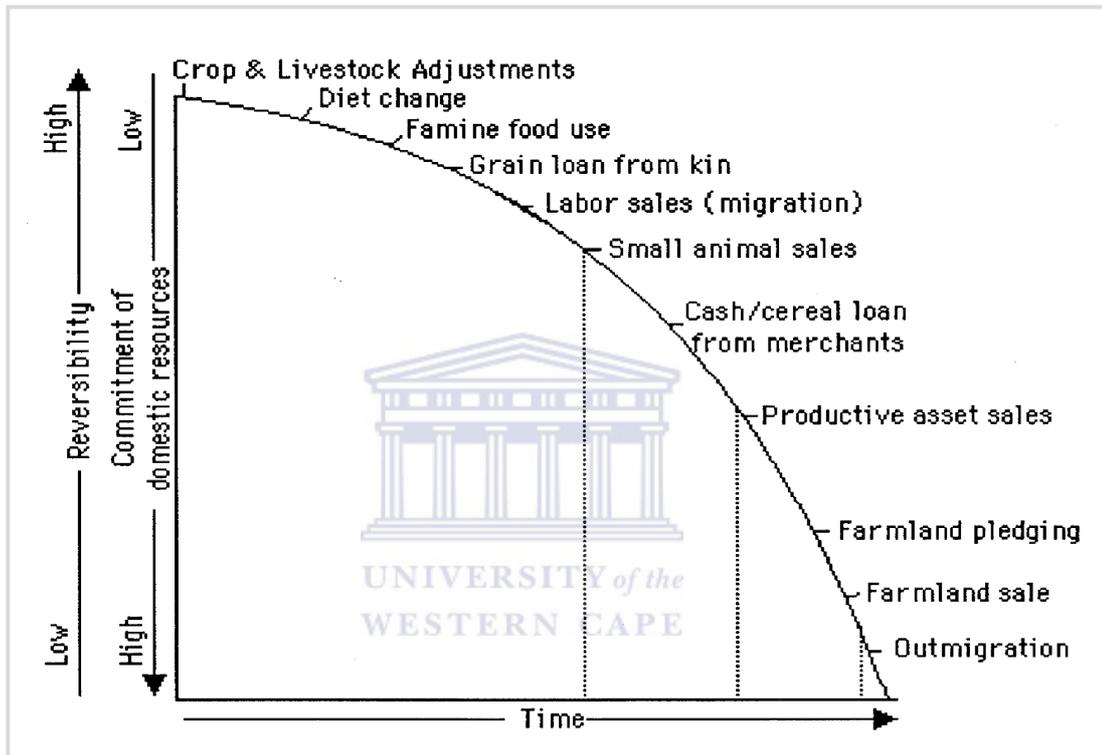
Generally, two forms of food insecurity can be distinguished: ‘transitory’ and ‘chronic or permanent’ (Assenso-Okyere et al., 1997; Pinstrup-Andersen, 2009). Whereas the former occurs for a short period of time and may be induced by shortage in food supply and or “temporary loss of adequate effective purchasing power for food”, the latter is “persistent and almost intractable” (Assenso-Okyere et al., 1997: 2). Food insecurity or shortage, as indicated elsewhere may be triggered by shocks and stresses. These shocks and stresses have the tendency to disrupt households’ ability to secure adequate incomes for a sustained livelihood and enough food. In the event that this occurs, rural farm households’ in particular have no option than to resort to coping, a stop-gap response to shocks (Niehof, 2004).

According to Ellis (2000: 297), coping strategies “comprises tactics for maintaining consumption when confronted by disaster, such as drawing down on savings, using up food stocks, gifts from relatives, community transfers, sales of livestock, other asset sales, and so on”. In relation to food shortages or insecurity, these coping options can vary from household to household and region to region and may range from dietary adjustments to the option of migrating to near-by towns to seek for wage employments. The commonest response to household food insecurity is “reduction in food intake or change in diet” (Corbett 1988, Fleuret 1986, Rahmato 1988 cited in Young et al., 2001: 5).

Drawing on an adapted version of Watts’ (1983) coping framework by Frankenberger and Goldstein (see Figure 2.1 below), it becomes apparent that the type of coping a household resorts to may be dependent on the form of food insecurity and resources available to them. For example, farm households experiencing transitory food insecurity resort to less drastic measures such as crop and livestock adjustments, diet changes (reduction in the quantity of calories taken a day or number of eating times), and seeking support from relatives or engaging in casual labour. These measures place limited pressure on domestic resources.

In the case of protracted hunger, more drastic measures, which have the tendency to limit commitment of domestic resources, are resorted to by households. These may include loan acquisition, sale of productive assets including farmland and the final resort of out-migrating to secure alternative livelihoods, mostly wage employment.

Figure 2.1: Responses to household food shortage



Source: Adapted from Watts (1983) by Frankenberger and Goldstein (1990).

From Figure 2.1 above, the importance of livelihood diversification as a risk management tool for rural households in particular is made evident. That is, depending on domestic resources, households tend to respond to food shortages differently. Within the context of this study, households' coping responses to food shortages as well as shocks and stresses are explored. Similarly, households' resilience to curtailing or recovering from shocks to food insecurity is assessed. Incorporating such themes to food and livelihood security studies provide a lens for a broader understanding of the phenomenon.

While the various coping mechanisms presented in Figure 2.1 above comprise mainly of households own tactics to addressing food insecurity, often, food assistance programmes (FAPs) implemented by national and international governments as well as NGOs do make vital contributions to minimizing the effects of food insecurity for vulnerable persons and even sometimes safeguard against hunger. This aspect of food security programming is tersely examined in the section that follows.

2.6 Food assistance programmes and food security: An overview

Inferring from Sen's (1981) pioneering work on famine and starvation reviewed early on in this chapter, food assistance has emerged as an essential add-on to the food accessibility campaign. That is, besides the need to assure improved and sustainable food availability, food assistance has been at the forefront of global policy actions aimed at addressing food insecurity and malnutrition. Several reasons underpin food assistance. As set out in the Food Assistance Convention, food assistance generally seeks to "save lives, reduce hunger, improve food security, and improve the nutritional status of the most vulnerable populations" (UN, 2012: 2). In effect, FAPs remain at the core of food security policies.

Domestically, FAPs have been a significant feature of national governments' efforts to addressing food shortages and preventing the effects of malnutrition in developed countries in particular (Barrett, 2002). The food stamps scheme, originally introduced by the US government in the 1930s, is one popular FAP (Barrett, 2002). Today, different versions of this initiative are being implemented in some developed and developing countries alike. Over the years, divergent food assistance modalities have evolved, some of which include supplementary feeding programmes, food subsidies and food price stabilization, micronutrient fortification, information and early warning systems as well as food-for-work schemes (Barrett, 2002). While food subsidies and food price stabilization is least preferred when it comes to FAPs, supplementary feeding programmes have, on the other hand, become a popular feature in domestically initiated

FAPs in SSA. An example is the implementation of School Feeding Programmes in Ghana and other SSA countries.

From the international perspective, FAPs come in the form of food aid and are largely responsive to humanitarian crises such as wars and natural disasters. According to Barrett (2002: 45), food aid is “the international provision of food commodities, usually surplus from the donor, for free or on highly concessional terms.” Traditionally, such food supports are given by rich economies to low-income countries for varying reasons: “economic, moral and humanitarian, environmental and national security” (Moore & Stanford, 2010: 440).

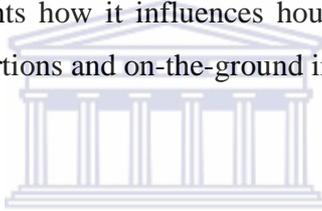
Nevertheless, the effectiveness of FAPs in general has been questioned. According to Barrett (2002: 73), food aid “driven primarily by surplus disposal and geopolitical concerns” tend to generate negative effects for recipient countries especially when it concerns domestic food production. By extension, food aid delivered to low-income countries in particular tends to increase local food supply, thereby forcing domestic prices down – a recipe for discouraging local food production. Simply put, food aid has the tendency to disrupt the livelihoods of local food producers, a situation that contradicts stipulations in the Food Assistance Convention (Moore & Stanford, 2010).

Like what pertains to the conventional aid regime, food aid has sometimes been criticized for not reflecting the priorities of recipient countries – a mismatch of food needs. For countries that benefit from food assistance from rich countries, poor planning and targeting at the local level tend to affect effective and efficient delivery of such support (Barrett, 2002). Within the wider food assistance regime, evidence on the added-value FAPs bring to the food security agenda is limited (Barrett, 2002).

In spite of these pitfalls, Barrett (2002) and Moore and Stanford (2010) maintain that some FAPs have been successful at improving food security for households. In their work, Kim and Frongillo (2007) also find that FAPs targeted at elderly people limits their likelihood of being overweight and depressed. Also, in responding to some of the weaknesses enumerated above, some FAPs are being re-engineered to encourage local purchases, like what pertains to School Feeding Programme implementation in Ghana

and other SSA countries. More particularly, the joint implementation of the Purchase from Africans for Africa (PAA Africa) initiative by the FAO and WFP with funding from the Government of Brazil holds high prospects of positive contributions from food assistance. The initiative targets five SSA countries (Ethiopia, Malawi, Mozambique, Niger and Senegal) and seeks to purchase cereals and legumes from smallholder farmers, which are then supplied to local school feeding programmes (FAO, 2013). The advent of such initiatives increases markets for locally produced food crops, thus safeguarding the livelihoods of smallholder farmers in particular.

While food assistance is not an explicit objective of this study, it is examined in relation to a broader context of farm households' access to safety nets, that is, food and non-food support. The remainder of this chapter provides a conceptualization of livelihood diversification and highlights how it influences household welfare and food security, drawing on theoretical assertions and on-the-ground impact studies.



2.7 Livelihood diversification: evolution, drivers and channels

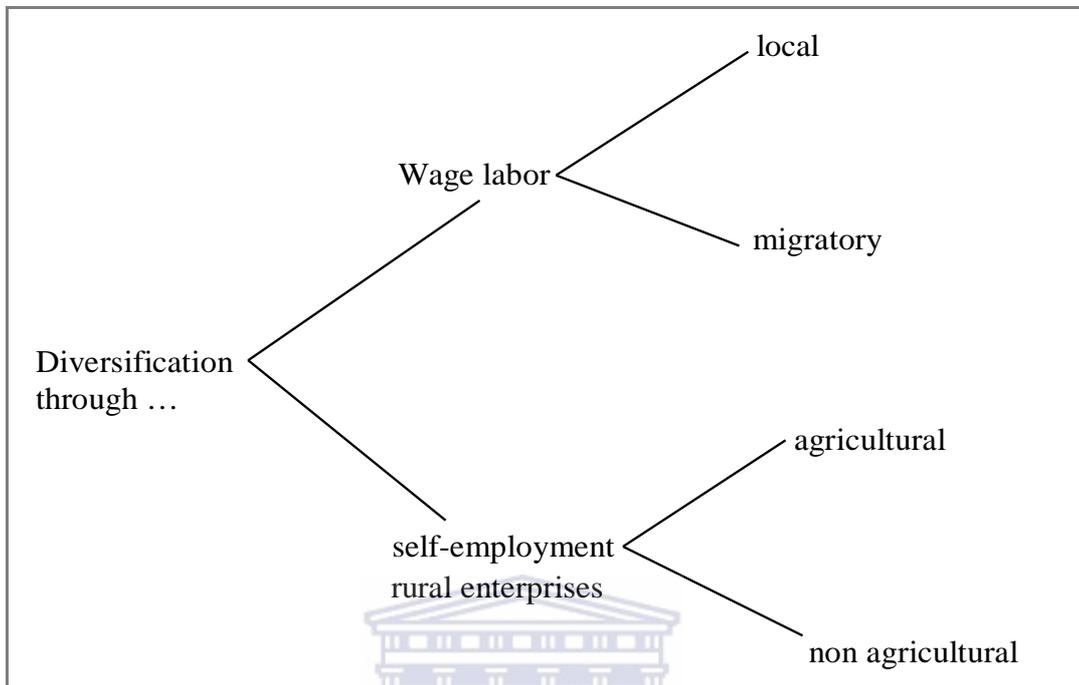
Core to the sustainable livelihoods approach is the concept of livelihood diversification. The concept, according to Ellis and Allison (2004), evolved as a response to the failure of International Monetary Fund and World Bank's Structural Adjustment Programmes to provide the catalyst for increased agricultural production in most developing countries. Its emergence is predicated on the fact that "poverty and vulnerability" are highly correlated with over-dependence on subsistence agriculture, hence the need for rural households to diversify away from agriculture (Ellis & Allison, 2004: 1). Diversification includes one of the broad categories of livelihood strategies available to rural households within the sustainable livelihoods framework aside from 'migration, agricultural intensification and extensification' (Scoones, 1998; Swift & Hamilton, 2001). Today, diversification of livelihoods has become commonplace in rural Africa (Barrett et al., 2001) and steadily gaining traction in urban settings.

Although the concept has over the years been studied from the lens of rural farming households, it has the potential to improve livelihoods for urban households. For instance, Njogu (2009), in a study of urban farmers in Nairobi found that for households that diversify from wage employment to pursue farming as complementary income source, they are able to improve their food security levels. Thus, given the rate of urbanization and the challenges it poses for welfare improvement in developing countries, urban agriculture can be a potential force in increasing incomes of households as well as guarantee food security (Redwood, 2009). Thanks to initiatives such as AGROPOLIS by the International Development Research Centre (1998-2005), literature on the subject continues to increase. Making no pretence of the fact that urban agriculture cannot substitute traditional agriculture, it could serve as a “livelihood that enhances food security, nutritional health, and creates employment” (Redwood, 2009: 235).

Generally, livelihood diversification takes two forms: agricultural or farm income and non-agricultural or non-farm income (Barrett et al., 2001; Ellis & Allison, 2004; Khatun & Roy, 2012). According to Barrett et al. (2001: 6), this is derived from “the sectoral distinctions of national accounting systems: primary (agriculture, mining, and other extractive), secondary (manufacturing), and tertiary (services).” From this, a possible classification is primary and non-primary activities. Agricultural or farm income constitute incomes derived from the production or gathering of unprocessed crops, livestock, forest or fish products from natural resources (Barrett et al., 2001). Non-agricultural or nonfarm income on the other hand comprise all other sources of income, including from processing, transport of trading of unprocessed agricultural, forest and fish products (Barrett et al., 2001). For Khatun and Roy (2012), agricultural diversification entails a switch from the production of food crops to high-value crops while non-agricultural take the form of wage employment. This distinction has over the years formed the basis for conceptualizing and estimating livelihoods diversification.

Warren (2002) also classifies diversification into wage labour and self-employment rural enterprises (see Figure 2.2).

Figure 2.2: Basic alternatives in rural diversification strategies



Source: Warren (2002: 8).

From figure 2.2 above, rural farm households, like their counterparts living in urban areas, have the option of engaging in either wage labour or self-employment rural enterprises. The former, according to Warren (2002: 8), refers to “the provision of work force to agricultural or nonagricultural enterprises owned by non-household employers.” As depicted in the figure above, this provides rural households with two channels: intra-community or out-migration. In an attempt to maximize labour efforts, some households may decide to deploy other active household members in such activities especially during the lean farming seasons when less labour hours are required on the farm. Mostly, men tend to migrate to urban areas, leaving behind wife and children or sending out an active household member to search for wage employments. Migrants sending households in turn, benefit from the wages earned from migrants’ engagements in the form of remittances.

The self-employment rural enterprises channel on the other hand are activities rural farm households deliberately plan and undertake by leveraging own assets – human,

physical, financial, social and natural (Warren, 2002). From the context of rural development, self-employment rural enterprises channel to diversification is preferred due to its potential for stimulating rural economic growth although it requires high investment and involves higher risks (Warren, 2002). Consequently, initiatives by international NGOs such as the International Fund for Agricultural Development (IFAD), with support from Governments have sought to create the enabling environment in curtailing some of the challenges rural households face in venturing into such enterprises. In the case of Ghana, some rural districts have since the mid-1990s benefited from the Rural Enterprises Project even though more investment is required in prosecuting this policy intervention (GoG, 2012).

What drives diversification is another area that has enjoyed extensive scholarship. At the household level, a number of factors propel households to diversify their livelihoods. Barrett et al. (2001: 4) contend that the majority of studies on livelihood diversification points to “risk management” as the basic reason for households’ engagement in multiple livelihoods. Meaning that diversification is more of a reactive strategy than a proactive one. Going a step further, other authors have proffered varying reasons, basing such claims on empirical studies and anecdotes. For Start (2001), ‘risk, discontinuity, complementarities and flexibility’ form the four core economic reasons that may propel an individual or household to diversify its livelihood set.

In his work, *‘The determinants of rural livelihood diversification in developing countries’*, Ellis (2000: 292) identifies “seasonality; risk; labour markets; credit markets; asset strategies; and coping behaviour” as key reasons for which farm households diversify livelihoods. Two of these factors are examined in detail.

Given the seasonality that comes with farming, households, in their effort to maximize labour hours, tend to engage in other non-farm activities during off-farm periods. During these times, household members may seek for paid employment or engage in commercial trading of some sort as discussed under Warren’s rural diversification scheme above. In the case of credit markets, Ellis (2000) maintains that a farm household may decide to diversify its livelihood portfolio because of limited or lack of

access to credit. For farm households, lack of access to credit would mean limited access to productive resources that are vital to increasing productivity. In their quest to meet these needs, farm households engage in off-farm income generating activities with the hope that earnings from such activities would be re-invested into their traditional farming business.

In a study in West Bengal, Khatun and Roy (2012: 123) found out that the extent to which rural households diversify their livelihoods depends on a variety of factors, some of which include experience, family size, skills, educational attainment level, physical assets and households', and access to credit. The study also revealed that "poor asset base, lack of credit facilities, lack of awareness and training facilities, fear of taking risk, lack of rural infrastructure, and lack of opportunities in non-farm sector" include the main inhibiting factors to livelihood diversification at the household level (Khatun & Roy, 2012: 123).

Similarly, Nghiem (2010) finds that the capacity of households (education and household size) influences households' diversification away from farming in the Mekong River delta region of Vietnam. Similarly, Owusu et al. (2011) find that access to credit and education influence people to take-up non-farm activities. Reardon, Berdegue and Escobar (2001: 396) categorize factors that influence diversification into two: pull factors such as maximizing incomes and push factors like "risky farming or land constraints, and missing insurance, consumption and input credit markets."

In exploring the potential impact of livelihood diversification on household welfare, Start (2001: n.pg.) identifies a variety of channels: 'income poverty, vulnerability, inequality and social and political well-being'. Ellis and Allison (2004: 12) assert that livelihood diversification enhances "human capital in terms of experience, skills and willingness to innovate" and "generates earnings and remittances" for reducing household vulnerabilities that come with seasonality. Incomes realized from non-farm activities provide an incentive for investment in agricultural production, thereby increasing smallholders' productivity (Evans & Ngau, 1991 cited in Ellis & Allison, 2004: 7).

Again, livelihood diversification builds households' resilience to food insecurity and other shocks and stresses (see for instance Ellis, 1999; Marschke & Berkes, 2006 cited in Hanazaki et al., 2012). Responding to shocks and stresses, as discussed above, may rely greatly on households' ability or resilience to cope. In the wake of the 2009 global food price hikes, the concept of resilience has been discussed quite extensively alongside the themes of food security and livelihood (Hanazaki et al., 2012). In recent years, it has become a common reference term within the development work given the spate of natural disasters.

According to Walker et al. (2004 cited in Hanazaki et al., 2012: 154), resilience refers to "the capacity of a system to absorb disturbance and reorganize while undergoing change so as to still retain essentially the same function, structure, identity, and feedbacks". In relation to food security, resilience measures the degree to which a household's livelihoods set are able to cope with food shortages. Based on this, Oshaug (1988 cited in Maxwell & Smith, 1992) classifies households into three quintiles: "enduring households", "resilient households" and "fragile households".

Resilient households are households who, after experiencing shocks and or stresses are able to "recover quickly" (Maxwell & Smith, 1992: 33). Maxwell and Smith (1992: 38) therefore proffer three preconditions under which households can be resilient against food shortages: wider scale of livelihood security (diversification of some sort); back-stopping from government and other NGOs to increase resilience levels and "strategies, networks and collective action at levels above that of the household". That is, being resilient at the household level does not depend solely on one's endowments but to a large extent, rests on one's social capital or networks, which Green (2012) enumerates to include relatives, friends, cooperatives or some other form of community quintileing. Citing the case of the 2008/2009 economic crisis and food price spike, Green (2012: 359) observed that families with strong social ties were more resilient in coping with the crisis through sharing of "food, money and information".

More importantly, engagement in multiple livelihoods has the potential of directly increasing household earnings. In rural Africa, it is an established fact that non-farm

activity is linked to “income and wealth” (Barrett et al., 2001: 2). Livelihood diversification ameliorates vulnerabilities (Ellis & Allison, 2004 cited in Awotide et al., 2010). Touching on its connection with food security, Ellis and Allison (2004: 30) contend that diversification “helps to lessen the vulnerability of the poor to food insecurity and livelihood collapse”. From this, livelihood diversification remains an important instrument for food security, which, in turn, is an important dimension of poverty.

Another trajectory crucial to the livelihoods discourse but has received the least research attention is gender relationships. According to Warren (2002), issues of gender are a vital to understanding households’ livelihood behaviour. Given the many different roles that are assigned to men and women within social set-ups, Niehof (2004) underscores the need to incorporate gender perspectives in the study of livelihoods. Subject to this, she posits that decisions regarding which livelihoods options to take can vary, given, for example, their attitudes towards risks.

From an inter-household perspective, households that are headed by women are “more vulnerable in terms of food and livelihood security” (Niehof, 2004: 331). For women with children, playing the dual roles of husband (as a bread winner for the family) and wife (performing reproductive roles) can be an excruciating endeavour. Incorporating such a variable in the examination of the relationship between livelihood diversification and food security becomes indispensable. For example, a study (Mtshali, 2002 cited in Niehof, 2004) of rural households in KwaZulu-Natal in South Africa revealed that female-headed households can easily diversify to take-up other income generating activities than male-headed households, confirming Maxwell and Smith’s (1992) claim that diversification ‘promotes gender equity’. This may be explained by the presence of favourable policies that induces women’s participation in non-farm incomes activities.

However, Ellis and Allison (2004) contend that the processes involved in diversification can be strenuous. For them, unsupportive policy environments tend to serve as a disincentive for households to diversify, which they enlist to include ‘rural taxation’. According to Barrett et al. (2001), a lack of or limited access to credit can also hamper

households from engaging in multiple livelihoods due to high barriers to entry. This tends to serve as a disincentive for higher agricultural productivity and breeds income disparities (Ellis, 1999).

Another drawback worth-mentioning is the fact that diversification also has the tendency to fuel inequality, not between men and women as highlighted earlier, but between the rural poor and rural rich. Canagarajah et al. (2001 cited in Barrett et al., 2001) found out that diversification spurred inequalities amongst households in Uganda, indicating how household capacity in terms of education or labour places a limitation on poor people's ability to diversify livelihoods, particularly for non-farm activities. According to Ellis and Allison (2004), there exist variations in the extent to which poor households diversify livelihoods as compared to non-poor households. For poor households, this will imply limited food consumption and thus, their vulnerability to food insecurity. Such disparities, according to Barrett et al. (2001), are as a result of policy failure, particularly in making the benefits of diversification work for poor households and other vulnerable quintiles.

Up until this point, it is glaring that diversification, since its advent, has contributed immensely to re-engineering the rural development agenda despite its limitations. That is, it holds a strong place in assuring secure livelihoods, which in turn, generates positive effects on households' food consumption levels. The next subsection discusses approaches and methodologies for quantifying household diversification behaviour.

2.7.1 Quantifying livelihood diversification

In general, capturing diversification behaviours and patterns can be a difficult endeavour. Like food security, a number of approaches and methods have been used in quantifying or estimating diversification. In their article '*Nonfarm Income Diversification and Household Livelihood Strategies in Rural Africa: Concepts, Dynamics and Policy Implications*', Barrett et al. (2001) offer an extensive elaboration of methodologies used in estimating diversification patterns and behaviours.

For Barrett et al. (2001), the most common approaches used are household assets, the number of livelihood activities and the non-farm income share of total household income. In a study by Nghiem (2010), the time household members spend on other non-farm activities was used as a basis for quantifying diversification. Besides, indices such as “Simpson index, Herfindahl index, Ogive index, Entropy index, Modified Entropy index, Composite Entropy index” have served as useful proxies (Shiyani & Pandya, 1998 cited in Khatun & Roy, 2012: 116).

While these methods tend to complement one another, the household income share has been widely patronized (Nghiem, 2010). The other two measures (activities and assets) are less favoured, due to their inability to adequately measure diversification. Barrett et al. (2001) for instance contend that in Africa, valuing assets of rural households can be challenging, as records of such assets at the household level rarely exist.

Again, Barrett et al. (2001) note that unstandardised approaches used in measuring diversification serves as a disincentive for comparative analysis and genuine inferences. As a result, they advocate for mixed methods. Specific to this study, the number of livelihood activities is used for simplicity.

2.8 Tracing the contribution of livelihood diversification to household welfare and food security

From an empirical stand point, there is ample evidence to justify the claim that livelihood diversification remains fundamental for assuring sustainable rural livelihoods in developing countries (Bryceson, 1991; Smith et al., 2001; Ellis & Allison, 2004). It has also been established that in SSA, higher household incomes are inversely related to the degree of reliance on agriculture, meaning that the “more diverse the income portfolio the better-off is the rural household” (Ellis, 1999: n.pag.). A similar review in Latin America and the Caribbean by Reardon et al. (2001) revealed that non-farm diversification make significant contributions to rural household incomes, averaging 40

percent. Statistically, it has been established that non-farm activity is linked to “income and wealth” (Barret et al., 2001: 2).

In south and south-east Asia, research has shown that diversifying livelihoods remains fundamental to the eradication of poverty amongst smallholder farmers (FAO/World Bank, 2001; cited in Khatun and Roy, 2012).

Referring to the food security crises that hit southern African countries between 2001 and 2003, Ellis and Allison (2004) found out that farm households with limited degree of livelihood diversification were the hardest hit. Also, separate studies (Reardon et al. 1992, Webb & Reardon 1992 cited in Barrett et al., 2001) showed a strong linkage between non-farm diversification and drought in Burkina Faso. A recent study by Hanazaki et al. (2012) in the Caiçara of coastal Brazil revealed that for households that had higher diversification options, their vulnerability to food insecurity was minimal, indicating somewhat relationship between the two concepts. Similarly, in a study in the Muhoroni Division, Nyando District, Kenya, Thuo (2011) found a significant association between farm enterprise diversification and food security. That is, for households that had diversified livelihoods, their vulnerability to food insecurity was minimal as compared to those who did not.

Using households’ shares of time spent on non-farm employments, Nghiem (2010) found a linkage between diversification and household consumption levels and poverty reduction in the Mekong River Delta of Vietnam. He attributes this change to institutional reforms and policy initiative that were implemented by the Vietnamese Government since 1986. Block and Web (cited in Barrett et al., 2001) reveal strong correlation between “non-farm income share” with household welfare in Ethiopia. Likewise, Lanjouw et al. (cited in Barrett et al., 2001) found that in peri-urban Tanzania, diversification displays a positive relationship with food consumption.

In a more recent study in Savelugu-Nanton district of Northern Ghana, Owusu et al. (2011) use propensity score matching techniques² and found out that farm households that engaged in non-farm work are more food secure than households relying solely on farming as a livelihood source. Similarly, results from a study of farm households in the Kwara State of Nigeria by Babatunde and Qaim (2010: 310) revealed that non-farm income affects “household calorie and micronutrient supply, dietary quality, and child anthropometry.” In examining gender effects, Canagarajah et al. (2001 cited in Owusu et al., 2011) found out that in Ghana, diversification helps female-headed households to escape dangers of chronic poverty and food insecurity. The evidence presented indicates the imperativeness of diversification for food security and household welfare.

However, other studies have revealed the contrary. In a study by Kuwornu et al., (n.d.) to find out factors influencing food security status of farming households in the forest belt of the central region of Ghana, it was revealed that household income, dependency ratio, access to credit and quantity of households’ own produce were significant factors while engagement in non-agricultural activities showed no significant effect. This finding is in contravention to the purported impact of livelihood diversification on household food security. Also, Awotide et al. (2010) found out in a study in Southwest Nigeria that livelihood diversification had an insignificant effect on household food poverty.

Inferring from the livelihood diversification issues reviewed above, three key observations can be made. First, livelihood diversification rests on the broader concept of livelihoods and livelihood behaviour. It does not only consist in expanding household income sources but it entails a whole process; a process that is induced by one’s assets, capabilities, social networks or one’s experience of certain risks. As summed up by Ellis (2000: 291), livelihood diversification is predicated on “choice” or “necessity”, and can sometimes be a mix of the two. Secondly, livelihood diversification is not an

² Propensity score matching technique is a useful non-experimental method for evaluating the impact of development interventions. It “uses information from a pool of units that do not participate in the intervention to identify what would have happened to participating units in the absence of the intervention” (see Heinrich, Maffioli & Vázquez, 2010: 3).

end in itself but a means through which farm households in particular mobilize additional income to smoothen household consumption while meeting basic needs. Sometimes, earnings realized from these complementary activities are re-invested into traditional household activities. Thirdly, livelihood diversification is not a stand-alone concept but linked to issues of gender, migration, and food security. Also, livelihood diversification is not exclusive to rural households. In recent years, urban households have resorted to multiple livelihoods, where farming sometimes serve as a complementary livelihood unlike what pertains in rural settings.

2.9 Theoretical framework: *The Sustainable Livelihoods Approach*

In the last two decades or so, the Sustainable Livelihoods Approach has inspired a new form of thinking, particularly regarding how development ought to be organized. Following the failures of past development approaches such as the modernization theory to significantly eradicate poverty, which at the time was virtually a rural phenomenon, new thoughts on how to approach the challenge were sought (Ashley & Carney, 1999). One of the starting points for this search stemmed from Robert Chambers's work in 1983, *Rural Development: Putting the Last First*. In this book, he posited that the state of rural development practice was appalling, as there seemed to be a complete disjoint between the reality of poverty on-the-ground and how development professionals' approached it. Based on recommendations that were outlined in this book and resulting engagements that took place, Robert Chambers and Gordon Conway, a decade later, teamed-up to proffer a new trajectory, *the sustainable rural livelihoods approach*, now globally referred to as the Sustainable Livelihoods Approach.

According to Ashley and Carney (1999: 4), the approach is conceptually predicated on the “evolving thinking about poverty reduction, the way the poor live their lives, and the importance of structural and institutional issues.” According to its proponents, Chambers and Conway and then later Ian Scoones (1998), the SLA responds to the failures of economic growth to effectively reduce poverty, positing that it overlooks the capability of poor people to access and harness the opportunities economic growth

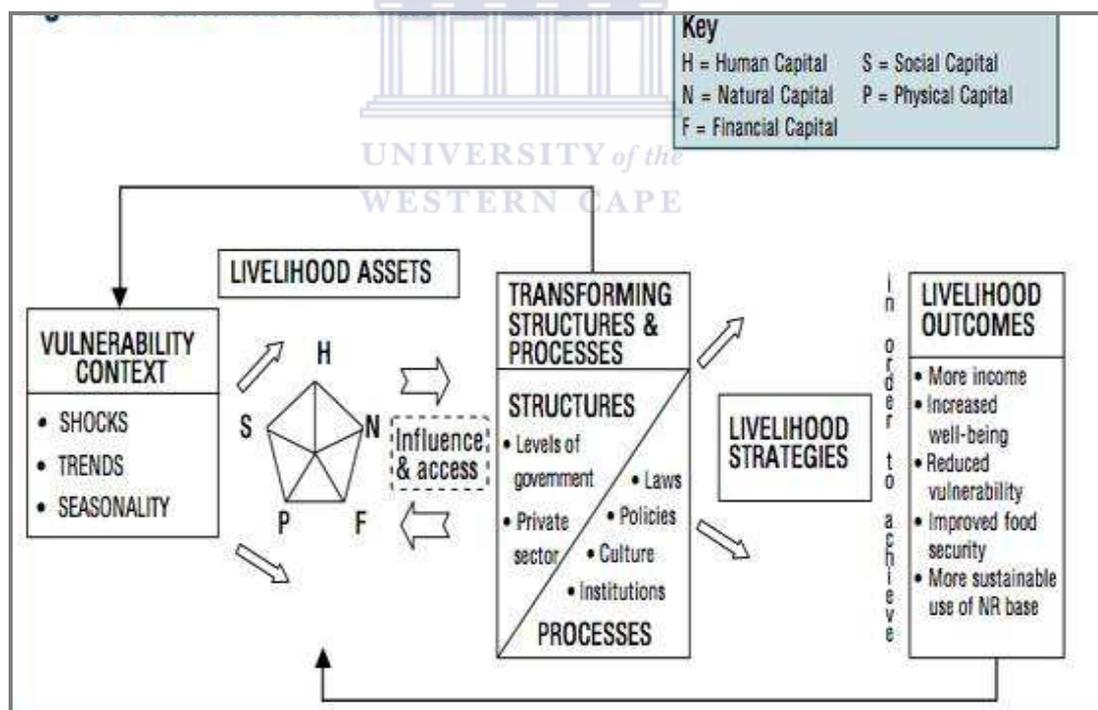
presents (Krantz, 2001). Furthermore, it challenges the “single-sector approaches to solving complex rural development problems” (Scoones, 2009: 172.). It is a practical guide for promoting “rural development, poverty reduction and environmental management” (Scoones, 1998: 3).

Thus, SLA employs a holistic approach to development by focusing “on the assets that poor men and women use and the strategies that they employ to making a living” (Farrington et al., 2002 cited in Yaro, 2004: 27). That is, it places people at the centre of development, identifies what resources are available to them and interrogates how these resources or assets are utilized to earn a living (Krantz, 2001; Yaro, 2004). It exists to assure sustainable poverty reduction outcomes by engaging with the real constituents of poverty and doing so within the ambit of the resources and assets that are available to them (Ashley & Carney, 1999). The DFID Guidance Sheets (1999 cited in Scoones, n.d.: n.pag.) describes it as follows:

Firstly, the approach is ‘people-centred’, in that the making of policy is based on understanding the realities of struggle of poor people themselves, on the principle of their participation in determining priorities for practical intervention, and on their need to influence the institutional structures and processes that govern their lives. Secondly, it is ‘holistic’ in that it is ‘non-sectoral’ and it recognises multiple influences, multiple actors, multiple strategies and multiple outcomes. Thirdly, it is ‘dynamic’ in that it attempts to understand change, complex cause-and-effect relationships and ‘iterative chains of events’. Fourthly, it starts with analysis of strengths rather than of needs, and seeks to build on everyone’s inherent potential. Fifthly, it attempts to ‘bridge the gap’ between macro- and micro-levels. Sixthly, it is committed explicitly to several different dimensions of sustainability: environmental, economic, social and institutional.

In a normative sense, addressing the poverty challenge in the developing world rests on building sustainable livelihoods (Chambers & Conway, 1992). As such, any attempt to correct this challenge should be approached from the lens of sustainable livelihoods, which according to Chambers and Conway (1991: 6), constitutes people’s ability to “cope with and recover from stress and shocks, maintain or enhance its capabilities and assets, and provide sustainable livelihood opportunities for the next generation; and which contributes net benefits to other livelihoods at the local and global levels and in short and long term.” A key feature of SLA is the Sustainable Livelihoods Framework (SLF), a tool for practical application of the approach (see Figure 2.3 below). Even though different development agencies (for example DFID, CARE, the Institute of Development Studies, and Oxfam) have generated different versions of this, they all depict the same thinking.

Figure 2.3: Sustainable livelihoods framework



Source: DFID Guidance Sheets (1999)

Practically, the concept has been applied in a variety of development themes including food security (WFP, 1998; Young et al., 2001; Hussein, 2002; Devereux et al., 2004;

cited in Burchi & De Muro, 2012). This is due to the fact that food is considered a fundamental component of people's livelihoods. For Burchi and De Muro (2012), the 'contextual and long-term perspective' of SLA and its emphasis on 'household assets' provide a practical guide for analyzing household food security as it brings to the fore issues of 'vulnerability, sustainability and coping strategies'. A livelihood approach to food security does not only focus on food access and availability but also takes into account what coping strategies are adopted by households (Young et al., 2001).

From the SLF presented above, both food security and livelihood diversification are key components, with the latter playing the role of an intermediate input for enhancing livelihood outcomes, including food security. For Maxwell and Smith (1992), food security and livelihood security are intertwined. Studies by Turton (1977) in Ethiopia and De Waal (1989) in Darfur have unequivocally established the claim that some food insecurity situations could be precipitated by households unwillingness to commit available domestic resources to stabilize or improve food consumption levels, in an attempt to secure their livelihoods in the future, thus becoming some sort of a livelihood strategy in itself. Thus, adopting a livelihoods approach to studying food security becomes imperative. From the perspective of programming, the approach has been used to inform the design and review of projects as well as programmes and policies in several international development organizations. It has become useful for improving planning processes as well as the field of environmental management (Ashley & Carney, 1999).

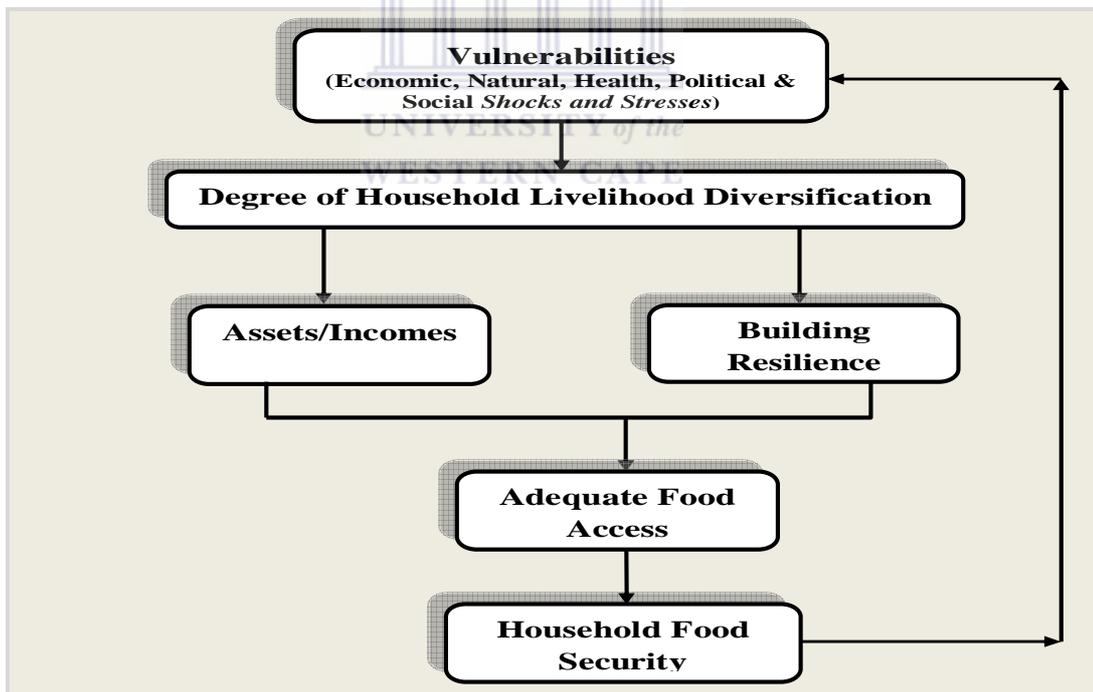
Nonetheless, Scoones (2009: 182) remarks that the SLA has failed in some accounts, particularly regarding its failure to "engage – with processes of economic globalisation, with debates about politics and governance, with the challenges of environmental sustainability and with fundamental transformatory shifts in rural economies". For some, a macro-level application of the approach is far-fetched as it is mostly linked to the household setting (Norton & Foster, 2001). Within the context of this study, however, the SLA is used as a theoretical guide because it favours a micro-level analysis of livelihood diversification and food security. The argument regarding the

processes of globalization and democratic governance, even though relevant, is not an explicit focus in this study. It is against this backdrop that the study adopts the SLA, which, as indicated earlier, provides the setting for understanding the linkage between the concepts of food security and livelihood diversification.

2.9.1 Livelihood diversification and food security: A conceptual framework

The search for a framework for understanding the linkage between the two concepts is still at a developmental stage. Whereas diversification brings a lot of leverage to rural household poverty reduction efforts, a direct framework for demonstrating its effect on household food security remains far-fetched. The figure below therefore was adopted to serve as a conceptual guide for the study.

Figure 2.4: Conceptual framework for understanding the effect of livelihood diversification on household food security amongst farm households

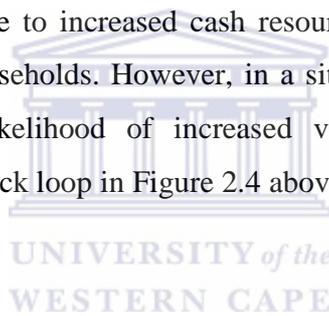


Source: Author's construct (2014)

As indicated earlier, farm households, especially in SSA, remain susceptible to a variety of vulnerabilities – shocks and stresses. In an attempt to manage the effects of these

daunting risks, farm households have no other choice than to diversify their livelihoods (Start & Johnson, 2004). By diversification, households may decide to expand their farms, introduce high-value crops, engage in livestock production or venture into non-farm enterprises. By expanding their livelihood portfolio, households stand to benefit in two ways. First, households' earnings are expected to rise, providing households with cash resources that could be used to smoothen their consumption, increase households' asset-base as well as boost their investment in farm implements, which eventually translates into increased household food production. Secondly, households, through diversification, become more resilient in handling the various risks enumerated above.

Consequently, it is anticipated that the outcomes generated from diversification will translate into adequate food access for households, both from 'own food production' and other food sources due to increased cash resources, which eventually guarantees food security for farm households. However, in a situation where food security is not achieved, there is the likelihood of increased vulnerabilities to health risks as demonstrated by the feedback loop in Figure 2.4 above.



2.9.2 Study hypotheses

Guided by the research questions stated early on and the review of literature, the study sought to test the following hypotheses:

- Farm households' engagement in multiple livelihoods improves food security levels.
- Impact of livelihood diversification on food security is higher for male headed-households than for female headed-households.
- Farm households' engagement in multiple livelihoods is associated with households' resilience levels.

So far, literature reviewed has revealed a linkage between the two concepts – livelihood diversification and household food security. Also, this review informed the study methodology regarding the indicators to use, the specific data needs as well as data analysis method to use. Details of these are presented in the chapter that follows.

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

Inferences drawn from chapters one and two informed the choice of research design and general methodology for this study. The chapter provides details on the sequence of processes and methodologies adopted for this study, provide detail on how concepts were operationalised, introduces the CFSVA survey by highlighting its objectives, sampling procedures utilized and outlines how the data was collected. Even though the CFSVA dataset covered all 38 districts in the three Northern regions of Ghana, the methodology adopted is discussed with recourse to the case study district – Bole.

3.2 Research Design

Deciding on a research design rests primarily on the specific question(s) a researcher seeks to inquire and the applicability of such a design (Berger et al, 2009). By definition, a research design forms the foundation or as de Vaus (2001: 6) puts it, the “logical structure” for conducting a particular inquiry. For Abbott and McKinney (2013: 35), research designs “give social scientists tools that help determine what observations they are going to use to test their hypotheses.” Whereas contestations continue to surround what research designs constitute (de Vaus, 2001), Abbott and McKinney (2013: 35) identify four key design types within the social science research enterprise: “surveys, experiments, field research, and secondary sources”. These can further be categorized into “quantitative and qualitative” designs (Abbott & McKinney, 2013: 35).

To this end, this study adopts a secondary analysis by relying on a cross-sectional data – the World Food Programme’s 2012 Comprehensive Food Security and Vulnerability Analysis survey conducted in Northern Ghana. Naturally, cross-sectional studies are deeply rooted in explanatory approaches; allowing for causal inferences (de Vaus, 2001). More so, cross-sectional designs remain relevant for secondary data analyses (Abbott & McKinney, 2013).

Within the social science research field, secondary data analysis is increasingly becoming a useful methodology (Smith, 2011; Vartanian, 2011). The approach, which predates the 19th century, has in recent years become a field of practice for many researchers (Smith et al., 2011). According to Glass (1976: 3 cited in Smith, 2008: 4), secondary data analysis involves “the re-analysis of data for the purpose of answering the original research questions with better statistical techniques, or answering new research questions with old data”. For Smith et al. (2011), the approach involves a re-analysis of data originated or generated by someone, but in this case with a different focus or research objective. In simple terms, it constitutes the “re-analysis or reporting of existing data” (Smith, 2008: 20). Secondary data analysis may take the following forms: administrative records, longitudinal studies, population census, and government surveys (Smith, 2008; Smith et al., 2011).

Compared with primary data analysis, secondary data analysis is less expensive, time saving and convenient to work with (Smith, 2008; Smith et al., 2011; Vartanian, 2011). Besides, it provides the platform for new research trajectories while relying on the same dataset and also increases researchers access to a great deal of sophisticated datasets that ordinarily would not be possible to generate through primary data. Inherent in secondary data analysis however are methodological deficits. It is susceptible to data ‘manipulations’ especially for datasets emanating from Government surveys (Church, 2001; Smith, 2008; Smith et al., 2011; Vartanian, 2011). Additionally, measures or indicators captured in the original data might not be necessarily useful for a new user. In spite of these limitations, however, Church (2001) contends that for some reputable organizations, data quality can be guaranteed.

3.3 Operationalization of key variables

Operationalization in the field of research involves the translation of theoretical concepts into empirical measures or observables. The specific study concepts were operationalized as follows:

Livelihood diversification: For the purposes of corroborating results, two different variables were used to measure households' degree of diversification – number of livelihood activities and share of income. The former was obtained by asking respondents the number of livelihood activities they engage in (including remittance), categorizing them into primary and secondary activities. Within the context of this study, these are interpreted as a count variable. More specifically, this variable is used as a proxy to establish the food security impact of multiple livelihoods.

In assessing the determinants of livelihood diversification, the number of livelihood activities was treated as a dummy variable. That is, households engaged in diversification or multiple livelihoods were assigned the value of 1, and 0 for households whose livelihood source is only crop farming. In addition, the alternate indicator, share of non-farm income, is incorporated for the purposes of descriptive analysis. It is a summation of households' incomes from the two non-farm livelihood sources including remittances. This was used to generate the percentage share of the total household income (households' income from each of the three main income sources summed up).



Household food security: This is measured using households food consumption level which has over the years been leveraged as proxy indicator for quantifying food security at the household level – *measuring both food availability and food access using a single indicator*. Within the Ghana 2012 CFSVA dataset, it captured as food consumption score (FCS), ranging from 0 to 112. The FCS is categorized as follows: a score between 0-21 implied poor food consumption, 22-35 implied borderline food consumption and more than 35 implied acceptable food consumption (WFP, 2012).

It combines dietary diversity, frequency of consumption (the number of days each food quintile is consumed) and the relative nutritional importance of different food quintiles. This was obtained “by multiplying each food quintile frequency by each food quintile weight, and then summing these scores into one composite score” (WFP, 2012: 66). It is worth-noting that whereas the FCS is used as the main indicator or dependent variable

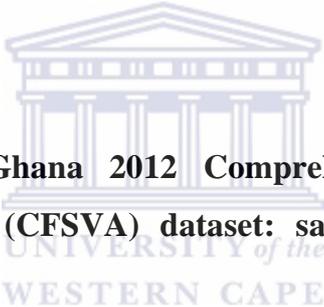
for modeling household food security, a dummy variable representing food insecurity, where 1 implies food insecure households and 0 representing food secure household was generated for the purposes of undertaking statistical tests other than regression analysis.

Household resilience level: As mentioned in chapter two, this measures farm households' ability to withstand and recover from stresses and shocks, including food shortages. Following Oshaug's classifications of resilient households, an ordinal variable measuring households' resilience or ability in recovering from stresses and shocks including food shortage was generated. Households who experienced difficulties over the last 12 months and had not recovered as at the time of the CFSVA survey were assigned the value of 1 (fragile households). Similarly, the values 2 and 3 were respectively assigned to those who had partially recovered (moderately resilient households) and completely recovered (resilient households) from difficulties. Households who did not experience any difficulties, referred to as enduring households within the context of this study were assigned the value of 4. The subsection that follows provide a general overview of the Ghana 2012 CFSVA dataset, survey methodology adopted and procedures used in arriving at the sample size for this study.

Household wealth index: While data on household income and expenditure were captured in the CFSVA dataset, assets owned by households and housing conditions were leveraged to compute wealth index to serve as an indicator for gaining an insight into poverty levels amongst farm households within the Bole district. At the national level, two main approaches are used in computing poverty levels: asset-based poverty measure based on the Core Welfare Indicators Surveys and consumption-based poverty measures based on the Ghana Living Standards Survey (Coulombe & Wodon, 2007). While the latter is preferred, the asset-based approach is favoured within the context of this study since it has been computed already in the Ghana 2012 CFSVA dataset. In '*Estimating wealth effects without expenditure data—Or tears: An application to educational enrollments in states of India*', Filmer and Pritchett (2001) posit that

household wealth can prove useful in understanding variations in various socioeconomic variables.

The computation of the wealth index followed the DHS survey methodology, the Principal Component Analysis (PCA) to be precise. According to the WFP (2012: 7), the PCA “creates a continuous variable which explains the underlying relationship and can be used as a proxy for household wealth.” In order to easily interpret and also make the continuous variable useful for relative poverty analysis, households were ranked and divided into quintiles.³ After running a series of iterations, the following variables were used in generating the index: Bed, table and chair, sewing machine, sofa, clock, radio, television, cupboard, cabinet, mobile phone, improved sanitation improved roofing, improved floor and motorized vehicle.



3.4 Introducing the Ghana 2012 Comprehensive Food Security and Vulnerability Analysis (CFSVA) dataset: sampling procedure and data captured

The CFSVA as indicated earlier seeks to ascertain information on food security dynamics of a country or some proportion of its people and suggest policy recommendations necessary for improving food security and livelihoods (WFP, 2009c). The Ghana 2012 CFSVA was carried out with funding from the Bill & Melinda Gates

³ “The selection of variables was based up on a low level of both under- and over-correlation between variables as well as a sufficient proportion of households with presence of the attribute (> 5 % of households and <95%). Livelihood specific assets were not included in the index, nor were variables showing small variance across the wealth quintiles, for example improved drinking water, which was found to be common over all wealth quintiles and ownership of refrigerator which was only found among those in the wealthiest quintile. Certain variables were grouped together to better explain the wealth situation. Ownership of boat with motor, car/truck or motorbike/scooter was combined into ownership of a motorized asset and ownership of bed, chair and table was combined into the variable owning furniture” (WFP, 2012: 67).

Foundation and the Australian International Development Agency and technical support from the Ministry of Food and Agriculture as well as Ghana Statistical Service.

Following the nationwide survey in 2009, the 2012 CFSVA provides a detailed insight into household food security and socio-economic condition in the three Northern regions of Ghana. The choice of the CFSVA over other available datasets is its timeliness, its relevance for the proposed study and is also based on the fact that all measures required for the proposed study are adequately captured. Given the focus of this study, the dataset for the Bole district was used, specifically the sample for farm households. A brief presentation of sampling details is provided below.

Sampling procedure

A two-stage cluster sample design was used for conducting the Ghana 2012 CFSVA survey as stipulated in the 2009 CFSVA Guidelines⁴. The cluster sampling method according to Babbie (2001 cited in Creswell, 2003) proves more useful when the researcher is unable to generate the sampling frame for a particular study. In the case of the two-stage cluster sampling method, aggregate units for example villages are first selected at random and then from these villages or clusters, households or individual units are selected to obtain the sample. Through this process, randomness of the sampling of individual units is guaranteed simply because like the clusters, “the individual units within the clusters also have an equal chance of being chosen” (Abbott & McKinney, 2013: 114).

While the CFSVA survey was conducted in all 38 districts (strata) in the three northern regions of Ghana, separate sample was drawn for each district, including the case study district – Bole. This allowed for the generation of a sample representative enough for district-level analysis (CFSVA, 2012). The first stage of the two-stage cluster sampling was the random selection of 11 communities (referred to as clusters) in each district. Clusters for the CFSVA primary data collection were selected using the World Health

⁴ The guideline was generated in 2009 and contains all relevant procedures, approaches and tools for designing, conducting, analyzing and disseminating CFSVA surveys. It was informed by lessons from previous CFSVA surveys and other food security related studies by the WFP.

Organization's STEPS sampling tool. The STEPS tool allowed for the random selection of clusters in each district using weighted probabilities based on community populations (CFSVA, 2012). This provided WFP with a sample that accurately reflects the population distribution within each district, rather than skewing the sample towards smaller, more rural communities. By implication, a self-weighting system was used to generate the sample. Such an approach does not only guarantee "sampling precision" but also allows elements in each cluster, in this case households, to have an equal probability of being selected (Magnani, 1997: 29).

Following this, a sampled list of communities (clusters) for each district was then cross-checked with enumerators of the Ministry of Food and Agriculture, who confirmed the existence or otherwise of sampled communities and provided advice on accessibility during the primary data collection (CFSVA, 2012). The second stage was the random selection of households within the sampled clusters. Households were then selected along walked transects in random directions from the central point of each the cluster or community.

Resulting from the above, a representative sample of 220 households was interviewed for the Bole district. This comprises an actual sample of 200 households as stipulated in the CFSVA guidelines and an additional 20 households to cater for non-response. Given the fact that this study had farm households as its main target, a total of 196 households, accounting for 89% of the entire sample were selected purposively. The remaining 11% which were excluded or 'dropped' from this study's analysis comprised of households for whom farming was neither a livelihood activity nor a primary livelihood source as well as households who did not indicate their primary livelihood source.

This was done in order to contextualize the dataset to the study objectives as well as eliminate possible contamination of estimates, which eventually helps to limit the extent of bias associated with drawing inferences. More specifically, targeting this sample was motivated by the need to highlight, simultaneously, the food insecurity situation and livelihood diversification patterns amongst farm households. Thus, it was anticipated

that results from this study will serve as a microcosm for understanding the concepts of food security and livelihood diversification in a region which is predominantly rural. The 11 clusters from which households were interviewed are presented in Table 3.1.

Out of the 196 households, only 6.12 percent were from urban localities, with the remaining 93.88 percent comprising of rural dwellers. This is traceable to the rural nature of the district.

Table 3.1: Communities/clusters for 2012 CFSVA survey – Bole district

Cluster/Community	Sample size	Percent (%)
Banda Nkwanta	20	10.20
Bole	14	7.14
Bonbontey	20	10.20
Carpenter	20	10.20
Chache	15	7.65
Chibrinyoa	18	9.18
Kakiase	15	7.65
Kedenso	20	10.20
Latiegberi	19	9.69
Maluwe	16	8.16
Ntereso	19	9.69
Total	196	100.00

Source: WFP – Ghana 2012 CFSVA survey

Data captured in the CFSVA

Generally, data captured within the Ghana 2012 CFSVA span from household characteristics to households' food consumption and livelihoods systems. Using the Personal Digital Assistant (PDA) tool, three (3) enumerators were engaged to administer the questionnaires to household heads, their spouses or an adult member of the household (CFSVA, 2012). Data captured covered demographic composition of

household and education, migration, housing facilities and assets owned and agriculture and access to markets. Others include income sources and access to credit, expenditures, food consumption and sources of food, and shocks, risk and coping. For variables such as sex, age, and educational attainment, data was captured for each household member, including the household head. It is important to remark that regarding this study, data on migration, housing facilities and agriculture and market access are not explicitly incorporated even though they provide a basis for key indicators of interest to this study.

3.5 Data analysis

In analyzing the dataset, version 12 of the Stata statistical software was used to generate raw and inferential statistics. Descriptive statistics used in describing socio-demographic and economic trends come in the form of frequency distribution tables, graphs as well as measures of central tendency. The following fields highlight statistical tests and methods used in analyzing each of the research questions outlined in the first chapter of this thesis.

Research question 1: In answering the first research question, both descriptive and inferential statistics are used. For the first part of the question, descriptive statistics such as frequency distribution tables, graphs as well as summary statistics are used. For the second part of the question, a logic regression model was used to identify factors that induce households' to diversify their livelihoods. The model is specified as:

$$T_i = \beta_0 + \beta_i X_i + \varepsilon_i$$

Where T is the dummy for participating in livelihood diversification (diversified farm households=1, non-diversified households=0); β_0 is a constant to be determined, β_i is a vector of parameters to be determined in the equation and ε_i is the error term with mean zero and a constant variance.

Research question 2: Here, cross tabulations and column graphs were used to describe stress and shocks farm households encounter. To find out whether livelihood diversification and resilience are associated, a chi square test was computed.

Research question 3: Here, a combination of cross tabulations, pie, bar and line graphs as well as a scatter plot were use to provide detailed information on household food insecurity levels and relationships. In addition, correlation and chi square tests were also used to examine relationships between food insecurity and underlying factors such as education, experiences of high food prices, and poverty.

Research question 4: In the case of the focal theme of this study, that is assessing the relationship between livelihood diversification and household food security, the Ordinary Least Squares (OLS) estimator was used. It is a statistical method for determining the coefficients in linear regression models.

The empirical model is expressed as:

$$F_i = \beta_0 + \beta_i X_i + \varepsilon_i$$

Where F is the food consumption score for household i ; β_0 is a constant to be determined, β_i is a vector of parameters to be determined in the equation and ε_i is the error term with mean zero and a constant variance. To further determine whether there is perfect correlation amongst the explanatory variables, implying the presence of a multicollinearity problem in the model, the Variance Inflation Factors (VIF) method was used. In a situation where the problem of multicollinearity arises in a multiple regression model, estimates obtained may be interpreted as inconsistent. As a result, the VIF, which measures the extent to which the standard error is inflated due to multicollinearity, was used (Freund and Littell, 2000). By way of interpretation, a VIF with a value greater than 10 for a variable implies multicollinearity.

It is important to note that all inferential statistics were computed at the 10% significance level.

3.6 Limitations of the study

Given the fact that the Ghana 2012 CFSVA was conducted during the lean season of farming (April/May), results from this study may not be necessarily reflective for other seasons of the year (WFP, 2012). Another significant limitation of this study is the small nature of the sample size used, which inevitably places a constraint on the generalizability of the study's results to the universe⁵. Even though the use of weighted probabilities in selecting the clusters or communities included in this study to an extent compensates for this limitation, it is believed that using a sample size higher than that used for this study could have yielded more accurate outcomes.

Concerning missing values, it is important to note that none of the variables used in the OLS model for the fourth research question had missing values (see Appendix 1). Similarly, none of the variables specified in the livelihood diversification model had a missing value, that is, the second aspect of research question one. However in the case of research question two, the resilience variable used in computing the chi square test had 10 missing values. These were excluded from the chi square test computation.

Thus, informed by the study objectives outlined in chapter one and subsequent literature review in chapter two of this thesis, the 2012 Ghana CFSVA dataset was used due to its appropriateness. That is, it captured all the relevant variables and indicators as per this study's data needs by following the relevant survey methodology. Results obtained from the CFSVA dataset and the analytical methods are presented and discussed in the next chapter.

⁵ This refers to the parent population from within which the sample for a research is drawn (See Magnani, 1997). In the case of this study, the universe comprises all farm households for whom crop farming is a primary livelihood source in the Bole District even though the original CFSVA sample of 220 is representative of all households in Bole District irrespective of livelihood activity.

CHAPTER FOUR

STUDY RESULTS AND DISCUSSIONS

4.1 Introduction

This section presents study results and discussions. The chapter provides descriptive analyses of the 196 farm households drawn purposely from the CFSVA Ghana 2012 Bole district dataset. This entails a description of household characteristics such as education attainment, gender composition, and marital status of household heads. This is followed by a detailed discussion of the livelihood systems farm households adopt in the case study district. In doing this, highlights of socio-economic characteristics such as household wealth and expenditure patterns are incorporated. Additionally, the determinants of livelihood diversification are examined as a response to the first research question.

Subsequently, the relationship between multiple livelihoods and households' resilience is discussed parallel to households' experiences of stresses and shocks. These comprise difficulties households encountered over the 12 month period prior to the CFSVA Ghana 2012 survey. The chapter further provides a situational analysis of household food insecurity amongst the study target. Here, issues relevant to food access and utilization in particular are elaborated. These include household food expenditure patterns, food sources, dietary diversity, and periods of food shortages and the corresponding copings adopted. It is worth noting that key determinants such as poverty, gender, locality to mention a few are used as channels to further examine the food insecurity phenomenon.

As a follow-up, the impact of livelihood diversification on household food security is examined using OLS estimator. Results realized from this are first discussed across the board; that is, including both male-headed and female headed households. Findings and discussions of the gender distribution of the established impact follows next. In responding to all research questions, findings emanating from analyses are discussed with recourse to already reviewed literature.

4.2 Socio-demographic characteristics of households

Table 4.1 profiles the socio-demographic characteristics of sampled household heads, cutting across gender composition, age structure, and educational attainment and marital status of household heads. For the purposes of this study, a total sub-sample of 196 farm households was purposely selected out of the originally determined sample size of 220 from the CFSVA 2012 Bole district dataset. The majority of these households were headed by males, about 91 percent. The remaining 9 percent comprised households headed by females. That is, at the household level, it is uncommon for a woman to be the head, except in the event of divorce, separation or being single.

Traditionally, women tend to assume the role of household heads because of the death of their husbands or partners. For example, a cross tabulation of gender and marital status variables (see Appendix 2) showed that out of the 18 females heading households in the sample, two-thirds were found to be widows and about 28 percent were divorced or separated. While this phenomenon is underscored by socio-cultural practices and is characteristic of rural districts in Ghana, it may have deep welfare implications, particularly for female-headed households (FHHs). Some of these implications are examined alongside livelihood systems and food insecurity in later sections of this chapter.

As shown in Table 4.1, about 86 percent of household heads were married, 6.1 percent were widowed, 5.6 percent were divorced or separated and 2.1 percent were single. Also, the majority (30.1%) of household heads were found to be within the ages of 55 and 64 years, followed by the 45 to 54 years age cohort (29.1%). Household heads between the ages of 35 and 44 years constituted 17.9 percent whereas 6.6 percent were between 25 and 34 years of age. Additionally, the proportion of the aged, which is 65 years old and beyond constitute about 15 percent. Mean ages for all household heads, male heads as well as female heads were 51, 51 and 54 respectively, implying that households are headed by relatively older persons.

Table 4.1: Socio-demographic Information of Household Heads

Characteristics		Frequency (n=196)	Percent (%)
Gender	Male	178	90.8
	Female	18	9.2
Age category (years)	Below 24	3	1.5
	25-34	13	6.6
	35-44	35	17.9
	45-54	57	29.1
	55-64	59	30.1
	65+	29	14.8
Educational attainment	No schooling	153	78.1
	Primary school	16	8.2
	Middle/JSS/JHS	20	10.2
	Secondary school	1	0.5
	vocational training	3	1.5
	Post-secondary	3	1.5
Marital status	Married	169	86.2
	Divorced/separated	11	5.6
	Widow(er)	12	6.1
	Single	4	2.1
Household size (persons)	1-3	14	7.1
	4-6	47	23.9
	7-9	65	33.2
	10-13	34	17.4
	14+	36	18.4

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Also, a third of farm households had members ranging from 7 to 9 persons, 24 percent had household sizes between 4 and 6 while a little under 20 percent had household sizes of more than 9. With an average household size of 9.2, it could be said that household sizes are considerably large amongst farm households within the case district. This is

more than double that of the national and district averages of 4.4 and 5.9, respectively (GSS, 2012). This could be explained by the fact that traditionally, farming households, influenced by cultural and geographical settings, tend to have larger family sizes as compared to non-farming households. For male-headed households (MHHs), the average household size is slightly higher (9.4) than that of the FHHs (7.3).

More so, the dependency ratio ascertained was the same for the entire sample, MHHs and FHHs (1.3); which is higher than the national average of 0.82 (GSS, 2008). This has the tendency to limit households' capacity to assign other members to undertake farming related activities or off-farm activities. Also, the dependency ratio of 1.3 may as well imply that each person within the working population (15-64 years) has the responsibility of supporting approximately an additional member of the household (those below the ages of 15 and 65 years or more). Given the fact that this measure relates the active population to that of the inactive and not based on the economically active population, that is, the proportion of the working population actually working, the dependency ratio may be even higher; a recipe for economic pressure on working household members.

It is also observable from Table 4.1 that the majority, that is, approximately 4 out of every 5 household heads have not had any formal education. About 8.2 percent have attained primary level education whereas 10.2 percent have completed middle school or basic education. The number of household heads who have attained post-basic education is negligible. About 0.5 percent attained secondary education, 1.5 percent had vocational training and 1.5 percent household heads have attained post secondary education. The relatively low level of literacy for persons 15 years and older as shown in Table 1.1, (41.6% at the district level and 37.2% at the regional level) to a greater extent, validates this finding.

The study also revealed that all females heading households within the sample do not have any formal education (see Appendix 3). This reveals a certain bias in terms of access to education amongst household heads especially across the lines of gender. In general, the low educational attainment amongst heads of households can be attributed

to several factors. Popular amongst these is inadequate access to educational infrastructure, which has over the years been identified as a critical development challenge in rural districts. For instance, whereas access⁶ to primary education is about 80 percent for the entire Northern region, it is only 50.8 percent in the Bole district (GSS, Core Welfare Indicators Questionnaire 2003 cited in UNDP, 2010). At the secondary level, the situation is dire, as access is about 6 times more at the regional level than at the case district (UNDP, 2010). Also, this phenomenon is motivated by the long-held notion that minimal or no education is required in entering the farming labour force but experience, hence the low importance attached to education. In the case of gender disparity, it could be linked to patriarchy, which had in the past, dominated northern Ghana. During these times, the education of boys was more paramount to parents than the education of the girl-child (see for instance Casely-Hayford & Gharthey, 2007: 29).

Consequently, the low educational attainment levels recorded amongst farm household heads come with it serious repercussions especially in assuring households welfare and building sustainable livelihoods since education has been identified as an important driver of employment and income. From the foregoing, the need to strengthen the almost defunct functional education system within farming communities in the Bole district and northern Ghana as a whole becomes imperative.

In the section that follows, a situational analysis of livelihood systems adopted by farm households within the Bole district are explored and discussed.

4.3 A situational analysis of livelihood systems amongst farm households

To provide a detailed background to and an in-depth understanding of livelihood diversification, a situational analysis of livelihood systems in the case study district is examined. From the study context, it provides a general appraisal or mapping of

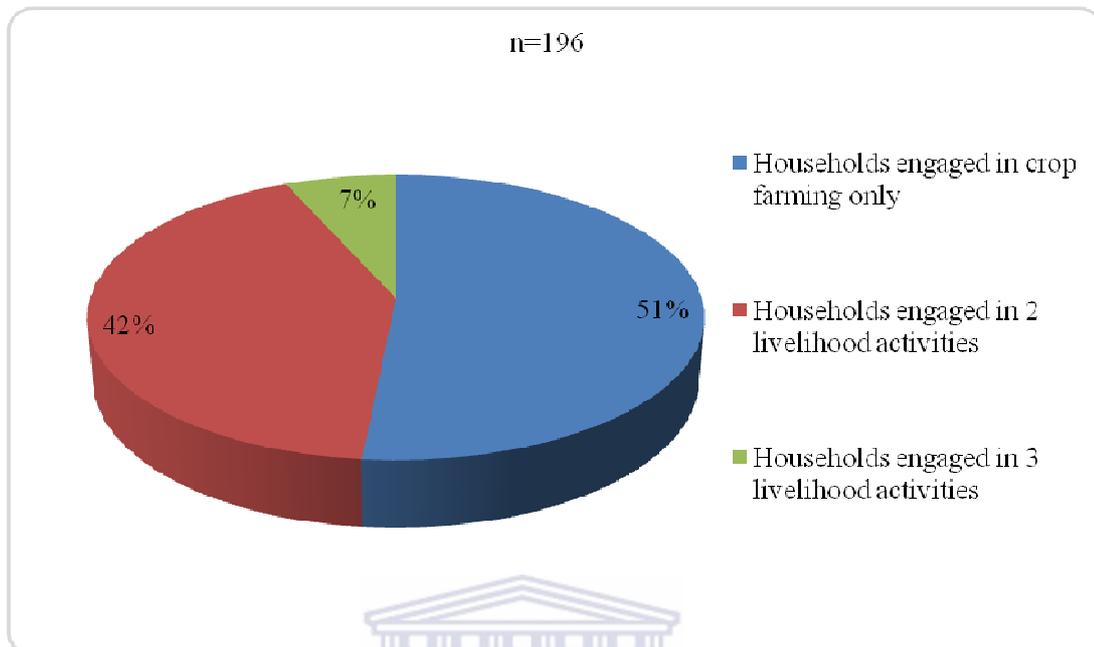
⁶ Access to primary and secondary school within this context refers to “children who reside less than 30 minutes from the nearest primary and secondary school respectively, not necessarily the one they attend.” (UNDP, 2010: 24).

livelihoods undertaken by farm households in the Bole district, how rewarding these livelihoods are in terms of incomes and the frequency of engagement in these livelihoods. In addition, the poverty situation of the target households is discussed using household wealth index as a proxy indicator.

As asserted by previous studies (Ellis, 1999; Warren, 2002; Ellis & Allison, 2004), livelihood systems practiced amongst farm households is undergoing transformation from the traditional over-dependence on agriculture to the development of rural enterprises. Apart from crop farming, which is the primary activity for all households within the sample, some households pursue other complementary livelihoods. As shown in Figure 4.1, approximately 51 percent of households depend solely on crop farming for their existence, 42 percent of households are engaged in only two livelihood activities (including crop farming) while the remaining 7 percent are engaged in three livelihood activities.

Also, the proportion of households engaged in multiple livelihoods is 49 percent (who, for the purposes of this study are referred to as diversified households - DHHs) as compared to 51 for those relying on crop farming only (also referred to as non-diversified households - NDHHs). The proportion of DHHs obtained for this study is 7 percent less when compared to national rural figure of 56% (FAO, 2012). From a gender perspective, the extent of diversification MHHs is slightly higher than that of FHHs: 49 percent for the former and about 44 percent for the latter (see Appendix 4).

Figure 4.1: Number of livelihood activities pursued by farm households



Source: Own computation based on WFP's Ghana 2012 CFSVA survey

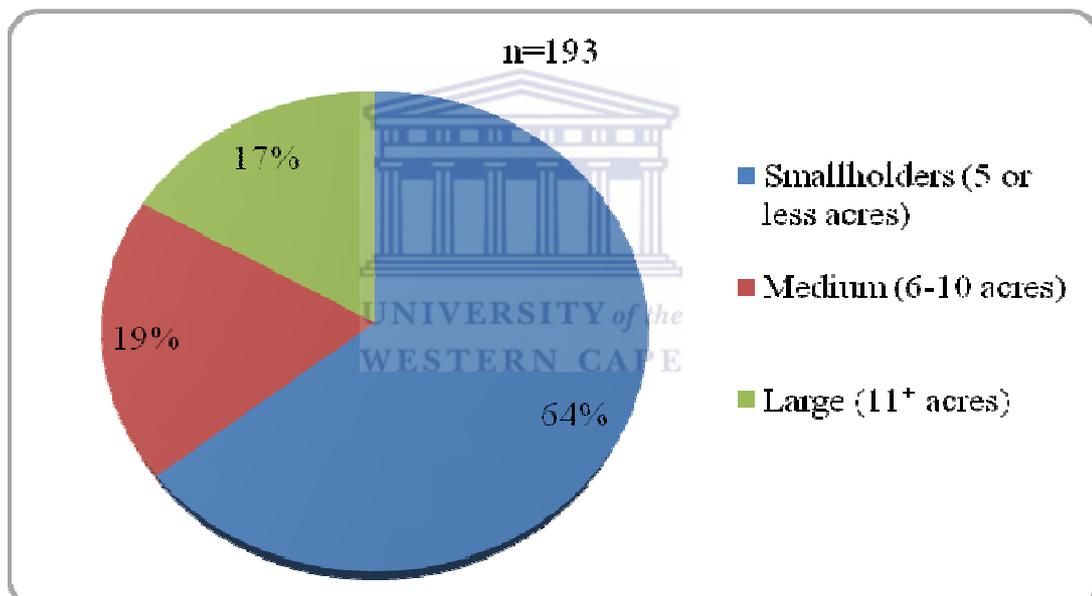
These findings as shown in Figure 4.1 above validate Ellis' (1999) claim that between 30 to 50 percent of rural households in Africa are engaged in some form of diversification. Also, the proportion of DHHs from this study is more than double the northern regional share of 20 percent reported by Al-Hassan and Poulton (2009).

This development can be attributed to a number of reasons, one being the inability of farm income to support large family sizes as discussed early on. More so, the implementation of the Rural Enterprises Project by IFAD with support from the Government of Ghana in the Bole district might have provided the impetus for households to engage in other non-farm activities. The fields that follow describe crop farming practices and challenges, details of complementary livelihoods farm households engage in and a tabulation of respective earnings.

4.3.1 Crop farming as a primary livelihood activity: implications for food production

Crop farming, particularly food crops, is a significant feature of agricultural practice in northern Ghana. Within the case study district, farming is practiced on a subsistence scale, with about 64 percent of farm households cultivating an area of 5 acres or less. This trend is slightly higher than the northern Ghana average of 62 percent (WFP, 2012). As shown in the Figure 4.2, 19 percent of households are medium-size farmers whereas the remaining 17 percent practice large-scale farming, that is, cultivating more than 11 acres of farmland.

Figure 4.2: Farm size (categorized)



Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Crops cultivated can be categorized into three main forms: cereal, tuber and leguminous crops. As shown Table 4.2 below, more than half of households (51%) cultivated yam as their major crop, followed by maize cultivation (21.6%) and groundnuts (11.9%). Other major crops mentioned by households include millet and sorghum (8.8%), cassava (2.1%) and cashew nuts, rice and beans being cultivated by 1.5%, 1% and 1% households, respectively.

Table 4.2: Main crops cultivated by households

Crop Type	All households		Rural households		Urban households	
	Frequency	Percent (%)	Frequency	Percent (%)	Frequency	Percent (%)
Maize	42	21.6	37	19.1	5	2.5
Millet/sorghum	17	8.8	17	8.8	-	-
Rice	2	1.0	2	1.0	-	-
Cassava	4	2.1	2	1.0	2	1.0
Yam	99	51.0	94	48.5	5	2.5
Potatoes	1	0.5	1	0.5	-	-
Beans	2	1.0	2	1.0	-	-
Cashew nuts	3	1.5	3	1.6	-	-
Groundnuts	23	11.9	23	11.9	-	-
Pepper	1	0.5	1	0.5	-	-
Total	194	100.0	182	94.0	12	6.0

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

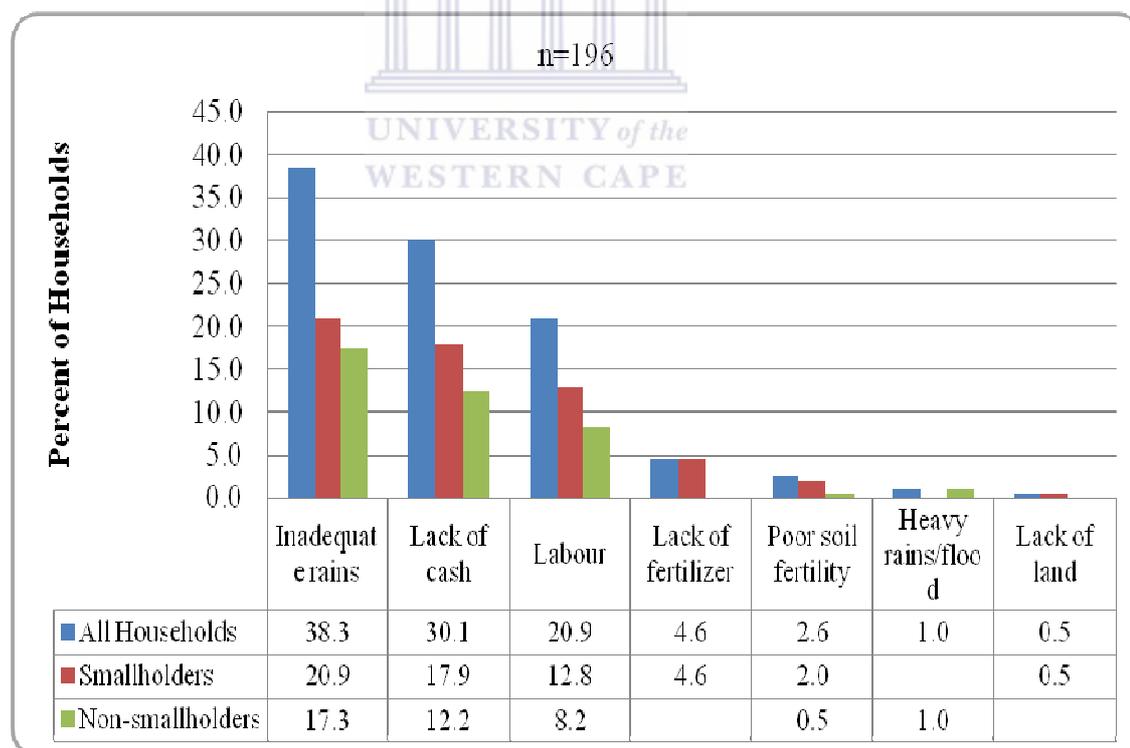
From the Table 4.2, it is observable that vegetable farming is rarely practiced amongst households, either as a major or complementary crop although it has the potential for dry season farming. Also, disaggregating main crops cultivated by locality (rural-urban) reveals that whereas the majority of farm households (94%) are domiciled in rural areas, only 6 percent of households are resident in urban areas, specifically in Banda Nkwanta and the district capital Bole and cultivate maize, cassava or yam as major crops. This goes to justify the notion that crop farming in particular is a rural phenomenon than urban. It is worth noting, however, that the role of farming as a complementary livelihood activity to urban wage employments cannot be over-emphasized.

Figure 4.3 below also provides information on respondents' perception about constraints to agricultural farming in the Bole district. Inadequate rains was identified as the commonest constraint to agricultural production (38.3). This is because farming households are traditionally dependent on rains (99.5%) for their crops and as such,

delays in rains tend to hamper production, eventually resulting in low yield for these farmers. The absence of irrigation infrastructure, even as is the case in the Bole district, has the possibility of further worsening the effect generated by farmers' over-reliance on rain-fed agriculture. This constraint can also serve as a disincentive to year-round farming.

Additionally, 30.1 percent and 20.9 percent of sampled respondents respectively mentioned lack of cash and inadequate labour as constraints to agricultural production. The lack of cash constraint is quite pervasive amongst farm households across Ghana and has the tendency to impede farm households' access to inputs and other productive resources. The remaining constraints as reported by respondents include lack of fertilizer (4.6%), poor soil fertility (2.6%) and heavy rains (1.0%).

Figure 4.3: Respondents' perception about constraints to agricultural production by farm size (multiple responses apply)



Source: Own computation based on WFP's Ghana 2012 CFSVA survey

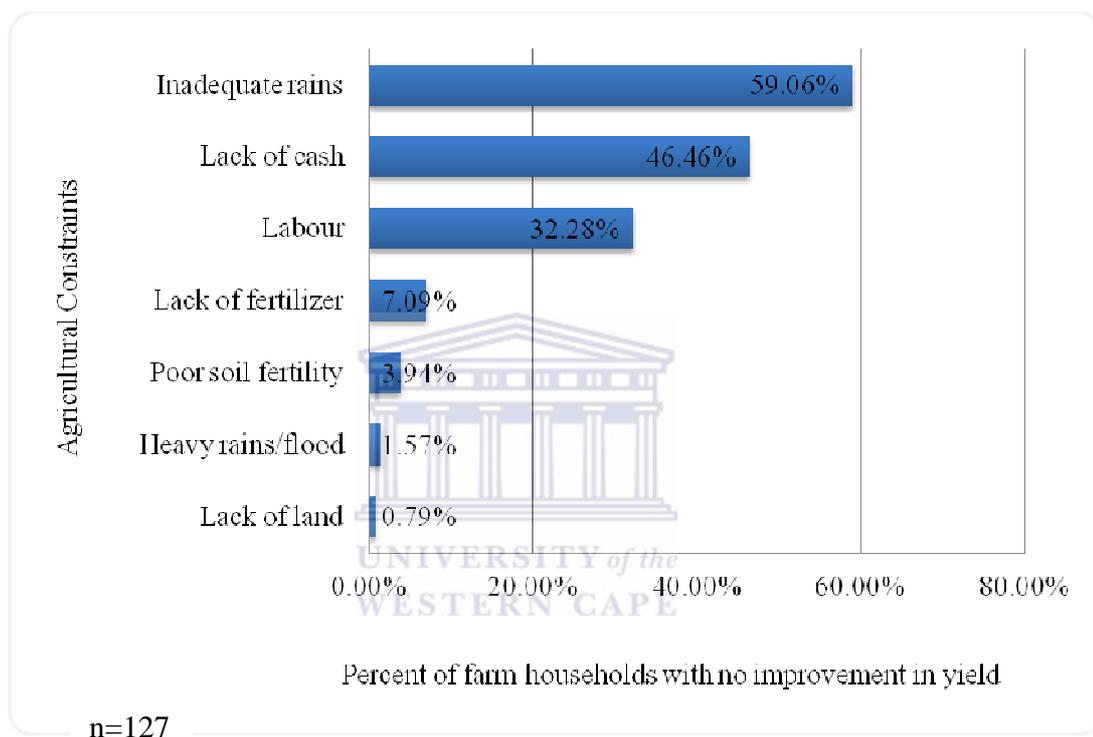
As shown in Figure 4.3, constraints reported by respondents were disaggregated by size of farm holdings. From this, it was observed that the proportions of smallholder households who were constrained in terms of rains, cash, labour, fertilizer and soil fertility were higher than their counterparts cultivating farmlands of 6 acres or more (non-smallholders). For instance, out of the 30.1 percent that reported lack of cash as a constraint, 21.9 percent were smallholder farmers whereas 8.2 percent were medium to large-scale farmers. Similarly, of the 20.9 percent who mentioned labour as a constraint to agricultural production, 16.8 percent comprised of smallholders whereas the remaining 4.1 percent were non-smallholders. Even in the case of fertilizer, none of the non-smallholder farm households saw it as a constraint.

The disparities enumerated above could be traced to the high prevalence of poverty amongst smallholder farmers, which limits their capacity to for instance, hire labour or purchase the necessary farm accoutrements. Medium to large farm households on the other hand tend to be wealthier and are able to access non-family labour easily. As noted by Doss (1999), the cost of hired labour for farming purposes in northern Ghana in particular is quite high (about 30%) and as a result, has the tendency to limit farm households' access especially for poor smallholder farmers. As part of effort to match-up the farm labour backlog, these households may resort to the use of their children in doing the sometimes tedious farming activities such as weeding. It is therefore not surprising that about 92 percent of child labour cases (those between 7-14 years) in rural areas are employed in the agricultural sector (GSS, 2008: 45).

While data on crop productivity is not captured in this study due to the multiplicity of crops, about 65 percent of the respondents indicated that for their main crops, yield was either the same or lower in comparison with the previous crop season (2010/2011). Only 26 percent of respondents reported yield increases. To establish whether the constraints presented in Figure 4.3 had any bearings on the low or same yield reported by respondents, a cross tabulation was computed, resulting in Figure 4.4 below. From this, three underlying factors were revealed: inadequate rains, lack of cash and

inadequate labour. For instance, out of 127 respondents who reported no improvement in crop production, about 60 percent experienced inadequate rains (see Figure 4.4).

Figure 4.4: Respondents’ perception about constraints to agricultural production as against farm households who had no improvement in harvest (multiple responses apply)



Source: Own computation based on WFP’s Ghana 2012 CFSVA survey

Moreover, some 46 percent of households reported being constrained by lack of cash. Figure 4.4 also shows that only a few of households were constrained by lack of fertilizer (7%), poor soil fertility (4%) and floods (2%). Even though approximately half of households claimed ownership of their farm lands, all but 0.7 percent indicated that access to land was not a constraint to crop production. These constraints, even though not affected by the majority of households, their existence has the tendency to adversely hamper crop production for the affected households. In the event where affected households constitute the poor, it might generate serious concerns about food production, both for home consumption and commercial purposes.

4.3.2 Households' engagement in complementary livelihood activities: Livelihood Diversification

Of the 95 households engaged in two or more livelihoods, the most preferred activity is livestock production (38.9%), followed by trading (26.3%). Other activities undertaken to complement crop farming include fishing/fish farming (22.1%), regular employments (3.2%), and casual employment (1.1%). For those engaged in a third livelihood activity as shown in Table 4.3 below, 38.5 percent undertake livestock production, 23.1 percent are into petty trade and 15.4 percent are engaged in casual employment and other activities each.

Table 4.3: Two main activities farm households engage in apart from crop farming

Type of Activity	1 st activity		2 nd activity	
	Frequency	Percent (%)	Frequency	Percent (%)
Livestock	37	38.9	5	38.5
Fishing/fish farming	21	22.1	1	7.6
Trading/commerce/selling	25	26.3	3	23.1
Regular employment	3	3.2	-	-
Casual employment	1	1.1	2	15.4
Others	8	8.4	2	15.4
Total	95	100.0	13	100.0

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Summing these activities reveals two main routes of diversification: enterprise-based activities and wage earning activities. Evidently, the former is most preferred, while as low as 4.3 percent of the 95 diversified households earn income from wage employments. This finding is in tandem with Warren's (2002) perspective on rural diversification alternatives as reviewed earlier in chapter two of this thesis. The rural nature of the case study district, which inevitably translates into limited economic opportunities, can be a possible reason for households' low preference for wage

employment. Another factor, which places a restriction on households' engagement in regular wage employment in particular, is low human capability (education). For instance, a cross tabulation of household heads' educational attainment level against livelihood activities other than crop farming revealed that none of the households with no education was engaged in regular employment. That is, since household heads were found to be relatively older, their likelihood of being educated is less.

More so, a close examination of Warren's diversification alternatives scheme, presented as figure 2.2 in chapter two, also identifies out-migration as a channel for farm households to secure wage employment. For example, of the 48 households who indicated that a member or some members had out-migrated over the last 12 months prior to the survey, 31 percent stated the need to secure paid employment as their primary reason (see Appendix 5). These wage employment seeking migrants, the majority of whom were from Kedenso, a rural community, were employed in activities such as illegal mining, popularly referred to as '*galamsey*' while others worked as casual labourers at the on-going Bui Hydroelectric Project located at Bui, a small village with close proximity to the Banda Nkwanta, Carpenter and Maluwe communities.

It is therefore evident that migration remains an important route of rural diversification as enshrined in Warren's work (2002) as well as that of Lay and Schöler (2008). It is, however, important to mention that not all migratory activities translate into transfers due to the varying motivations for which farm household heads' or their members migrate. This is given further elaboration in subsection 4.3.4 below.

4.3.2.1 Frequency of engagement in livelihood activities

In an attempt to examine how the dimension of time plays a role in livelihoods systems in general, information on households' extent of engagement in specific livelihood activities was captured.

As shown in Table 4.4, four in every five of farm households regularly engage in primary activity (crop farming). Of the 27 households who engaged in farming on a daily basis, only 30 percent were engaged in additional livelihoods (see Appendix 6). Also, about 6 percent did not engage in farming regularly. This may be due to their commitment to additional livelihoods. In some cases, cultural practices like taboos that are associated with farming in rural communities serve as a disincentive for daily engagement in farming. For example, it is a taboo in most rural communities in Ghana to engage in farming on every Tuesday of the week.

Table 4.4: Frequency of engagement in livelihood activities

How often household members engage in activity	Primary activity		Secondary activity 1		Secondary activity 2	
	Freq.	Percent	Freq.	Percent	Freq.	Percent
Daily or almost daily	27	13.80	58	61.05	10	76.92
Regularly/predictable, but not daily	158	80.60	29	30.53	3	23.08
Irregularly/Unpredictable	11	5.60	8	8.42	-	-
Total	196	100.00	95	100.00	13	100.00

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

On the contrary, the frequency of engagement in non-farm activities is high, 61 percent for secondary activity 1 and approximately 77 percent for secondary activity 2. This may be attributed to the minimal socio-cultural restraints that come with rural non-farm enterprises. What is apparent from the above table is that in situations where farm households undertake multiple livelihoods, commitment to farming dwindles, as farm households tend to allocate more time to these complimentary activities than farming.

Nevertheless, such a phenomenon might not necessarily be interpreted as having a negative effect on agricultural productivity as earnings from non-farm activities could be leveraged as capital for boosting agricultural production.

4.3.2.2 Household income and expenditure pattern

Income realized by all farm households under review can be categorized into three broad sources: crop farming (100%), complementary livelihoods (48.5%) and remittances (9.2%). Whereas mean annual income is GH¢983 (US\$599.63)⁷ for all households, those of DHHs and NDHHs are GH¢1,219 (US\$743.59) and GH¢761.2 (US\$464.33), respectively (see Table 4.5 below). That is, on the average, income earned by DHHs is about 38 percent higher than that of NDHHs. To further confirm this finding, a two-sample Wilcoxon rank-sum (Mann-Whitney) test was computed for the two quintiles and the average annual household income variable; yielding z value of -5.044 (p=0.0000). This is interpreted to mean that there is a statistically significant difference between the annual household income of DHHs and annual household income of NDHHs.

This gain is traceable to the complementary livelihoods DHHs engage in, which as shown in Table 4.5, accounts for about 22.5 percent of total household income on the average for the entire sample. This is low when compared to the 40 percent average claimed to be the norm in rural Africa (Reardon, 1997 cited in Bryceson, 1999) and in Latin America and the Caribbean (Reardon et al., 2001). This could be explained by the fact that nearly half of farm households are not participants in non-farm livelihoods. Also, it may be linked to the fact that within the Bole district, opportunities for engaging in non-farm activities that generates high incomes for these households are limited.

It can also be observed from Table 4.5 that mean monthly household expenditure per capita is higher for DHHs (GH¢39.50, equivalent to US\$24.10) than NDHHs (GH¢25.70, equivalent to US\$15.68). In verifying the statistical significance of this finding, the Mann-Whitney test was computed, yielding a z score of -4.479 at the 1% significance level. By implication, there exist a statistically significant difference between the monthly household expenditure per capita of DHHs and NDHHs.

⁷ GH¢1.00 is equivalent to an annual average of US\$0.61 for the period under review – 2011/2012.

Table 4.5: Summary statistics for selected household income and expenditure indicators

Indicator	All Households	DHHs	NDHHs
Average annual household income (including remittances)	GH¢983.0 (196)	GH¢1219.0 (95)	GH¢761.2 (101)
Mean share of non-farm income in total annual household income (including remittances)	22.5% (193)	44.2% (93)	-
Mean income from primary activity (crop farming)	GH¢709.4 (196)	GH¢678.3 (95)	GH¢738.7 (101)
Mean monthly household expenditure per capita	GH¢32.4 (196)	GH¢39.5 (95)	GH¢25.7 (101)
Mean share of total expenditure on food in total household expenditure	42.2% (188)	41.9% (91)	42.5% (97)
Mean monthly expenditure on food per capita	GH¢14.6 (188)	GH¢17.8 (91)	GH¢11.6 (97)

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: The values in parentheses are number of observations.

Also, mean income households obtained from engaging in primary activity (crop farming) was GH¢709.4 for the entire sample, GH¢678.3 for DHHs and GH¢738.7 for NDHHs. Unlike the annual household income and monthly household expenditure per capita indicators, the Mann-Whitney test for incomes households generate from crop farming resulted in an insignificant z score of -1.199. Meaning that there is no statistically significant difference between DHHs and NDHHs in terms of income generated from crop farming.

Furthermore, the study revealed that households spent more on food than any other expenditure item, just as is the case for the national level. Household food expenditure accounted for 42.2 percent of total household expenditure across the board, about 45.9 percent for urban farm households and 41.9 percent for rural farm households. The

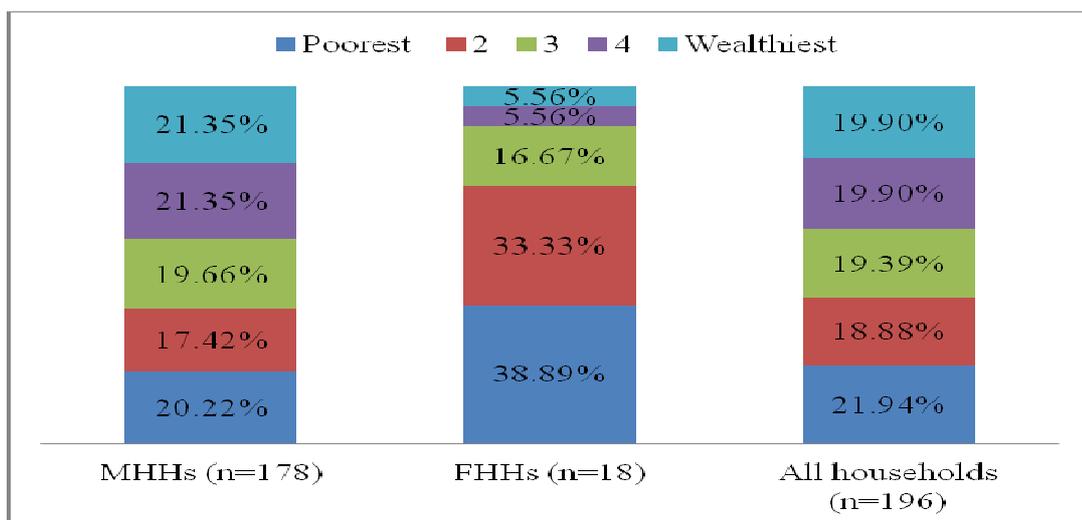
figures obtained for the entire sample and urban households do not differ significantly from the national averages of 40.4 percent and 44 percent respectively (see GSS, 2008). At the national level, average household expenditure on food amongst rural households is about 18 percent more than the average realized for this study. This may be explained by the fact that the sample targeted for this study comprise of farm households who mainly grow food crops. In such a situation, household cash expenditure on food tends to be minimal unlike non-farm households.

Nevertheless, the fact that farm households spend 42.2 percent on food alone could still be interpreted as high. By implication, in the event of high food prices or fluctuations, which indeed was the case for some households, they may be forced to give-up other expenditure items such as education and health to secure enough food. In other words, such a phenomenon may translate into dire food security concerns for farm households.

4.3.3 Examining poverty prevalence amongst sampled households

As indicated in chapter three, assets owned by households were used to compute a wealth index. Resulting from this is a wealth quintile (Figure 4.5), which the Ghana 2012 CFSVA report identifies the poor to include the first and second quintiles.

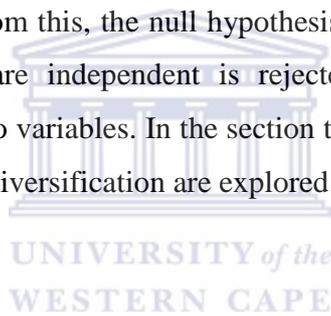
Figure 4.5: Household wealth index quintile by gender



Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Of the 196 farm households, 40.82 percent, belonging to the two poorest wealth index quintiles as shown in Figure 4.5 are poor. This is fairly low when compared to the regional figure of 52.3 percent and quite higher than the national figure of 28.5 percent (GSS, 2007 cited in ISSER, 2012). In addition, about 72.2 percent of FHHs were found to be poor as compared to 37.6 percent for MHHs. Also, about 5.7 percent of FHHs fail within the wealthiest quintile as compared to 21.4 percent for their male counterparts. This signals a huge wealth disparity along gender lines. This could be linked to several factors: low education attainment amongst women heading households, low earnings resulting from limited participation in wage employments, and high dependency ratio.

To illustrate the relationship between household wealth and gender (where MHHs=1 and FHHs=0), a Pearson chi square test was computed, yielding a value of 8.9634 at the 10% significance level. From this, the null hypothesis that household wealth and being a male household head are independent is rejected, thus indicating a significant association between the two variables. In the section that follows, factors that determine or induce households into diversification are explored.



4.4 Determinants of livelihood diversification amongst farm households

As mentioned in chapter two of this thesis, a mixed-bag of factors influences households' decision to take-up additional livelihoods aside conventional farming. In exploring these factors within the case study district, a binary logistic regression was run, results of which are presented in Table 4.6.

As shown in Table 4.6 above, 193 out of 196 households were included in the regression analysis. Also, the Pseudo R^2 of 16.48% and the likelihood ratio chi square of 44.07 with a p -value of 0.0000 reveal a statistically significant model in comparison with the null hypothesis of no predictors.

Table 4.6: Determinants of livelihood diversification amongst farm households - Bole district

Explanatory Variables	Dummy for livelihood diversification (DHH=1, NDHH=0)		
	Odds Ratio	Standard errors	z values
Household wealth index	2.295***	0.566	3.37
Dependency ratio	0.980	0.154	-0.13
Farm-size	1.558*	0.371	1.86
Household size	0.915**	0.036	-2.22
Household head educational attainment	0.708	0.237	-1.03
Household experienced high food prices	2.638***	0.883	2.90
Access to improved drinking water	0.220***	0.088	-3.74
Household head age (in years)	0.996	0.013	-0.24
Gender (Male=1, Female= 0)	1.280	0.768	0.41
Household experienced soil infertility	10.249**	12.143	1.96
Constant	8.043*	8.599	1.95
Pseudo R ²		0.1648	
LR chi ²		44.07***	
No. of observations		193	

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: *, ** and *** denote significance at 10%, 5% and 1% levels respectively.

Of the explanatory variables specified in the model, four were found to be insignificant predictors of livelihood diversification, namely dependency ratio, household heads educational attainment, age and gender. The result for educational attainment in

particular deviates from findings from studies carried out in West Bengal (Roy & Khatun, 2012) and Mekong River Delta (Nghiem, 2010). In both studies, the educational attainment level of household heads was found to be a significant predictor of diversification. This result can be attributable to the fact that close to 80 percent of household heads have had no schooling. Even for household heads that have attained some level of education, it is mostly basic, thereby placing a limitation on the extent to which households can diversify into wage employment in particular.

Despite exerting a positive effect on diversification, gender, interpreted as being a male-headed household was insignificant, rendering claims that gender issues especially the case of inter-household level are indispensable to livelihood behaviours skeptical (see Warren, 2002; Niehof, 2004). Perhaps, an intra-household analysis of gender and livelihood diversification may reveal the contrary.

The remainder of the variables, including the constant, yielded significant results. Household wealth variable yielded an odds ratio of 2.295 at the 1% significance level. This implies that for a unit increase in household wealth, the odds of engaging in livelihood diversification is higher by a factor of 2.295. In other words, the odds of diversifying livelihoods is higher for wealthy households. This goes to confirm views alluded to earlier that diversification has some bearings on household wealth (see Barrett et al., 2001; Roy & Khatun, 2012). Similarly, the household size variable exerted a significant relationship (at the 5% level) on the dependent variable, implying that for an additional increase in household size, the odds of diversifying livelihood is lower by 0.916. In simple terms, the probability of engaging in multiple livelihoods is lower for large family sizes. This finding directly contravenes Reardon's (1997) assertion that large family sizes maximize households' welfare and secures livelihoods by deploying active household members to engage in other wage employment opportunities. A possible reason for this result lies in the fact that about half of household members are dependants, limiting the availability of labour to support additional livelihoods. It is, however, not surprising that 21 percent of households indicated lack of labour as a constraint to boosting agricultural production.

In the case of farm size, odds ratio of 1.558 was obtained. What this means is that the odds of engaging multiple livelihoods is higher for medium-large farm holders than smallholders. Ideally, a negative relationship is to be expected. That is, it easier for farm households cultivating 11 acres or more to increase their livelihood portfolios since they are assumed to be wealthier than smallholder farmers. For example, a cross tabulation of farm size and wealth quintile reveal that about 72 percent of households who cultivate 5 acres or less fall within the poorest quintile (see Appendix 7). In such a situation, their capacity to diversify becomes limited as posited by Ellis and Allison (2004).

As expected, households' experience of high food prices was found to be a significant predictor of participation in livelihood diversification at the 1% level. Meaning that for farm households who experience shock in the form of high food prices, they are 2.638 times likely to diversify their livelihoods or engage in multiple livelihoods. This, as indicated elsewhere in this thesis, goes to validate the claim that risk management is one of the fundamental factors for diversification (see Barrett et al., 2001). More so, soil infertility, a variable captured by asking whether farm households saw soil fertility as a constraint to agricultural production demonstrated the strongest effect on livelihood diversification at the 5% significance level. That is, households who experienced soil infertility are 10.249 times likely to engage in livelihood diversification. Interestingly, improved access to drinking water generated a negative significant effect on diversification.

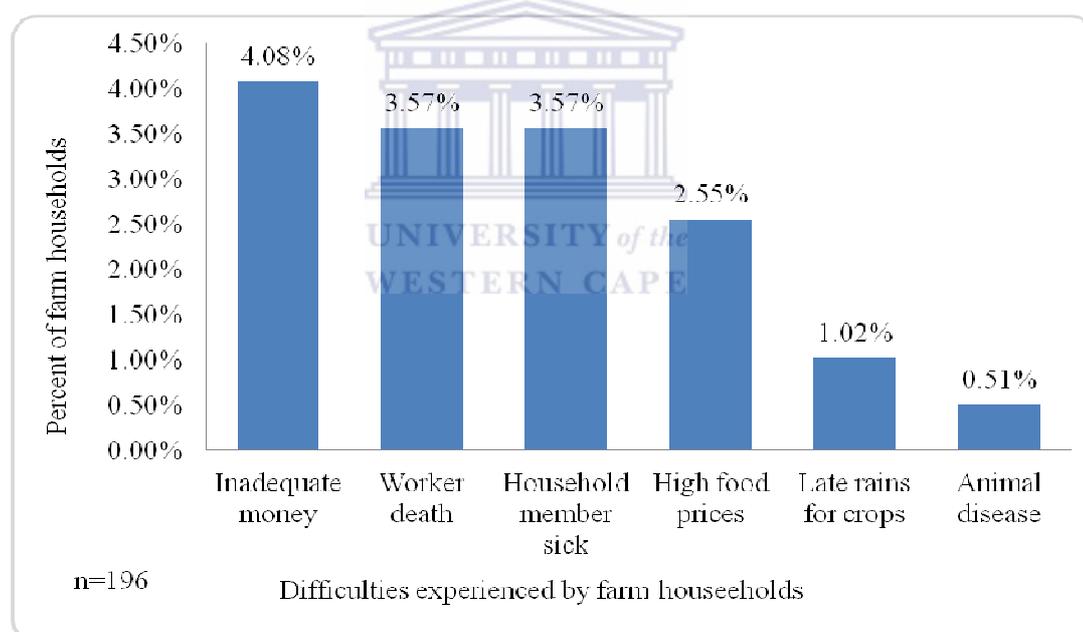
Having given a situational overview regarding livelihoods systems practiced amongst farm households and identified determinants of diversification, the section that follows investigates the second research question of this thesis by examining whether there is a relationship between livelihood diversification as discussed above and households' resilience to general shocks and stresses.

4.5 Diversification and households' resilience to shocks and stresses

Aside from poverty and limited socio-economic infrastructure, food security can be threatened by shocks and stresses, which are captured as difficulties that farm households encounter. These difficulties, as displayed in Figure 4.6, include inadequate money, which affected about 4 percent of households, followed by worker death (3.6%) and household member being sick (3.6%).

Other difficulties experienced by households include high food prices (2.6%), late rains to support cultivation (1%) and just a single household indicated its livestock were diseased.

Figure 4.6: Shocks and Stresses that affect farm households (multiple responses apply)



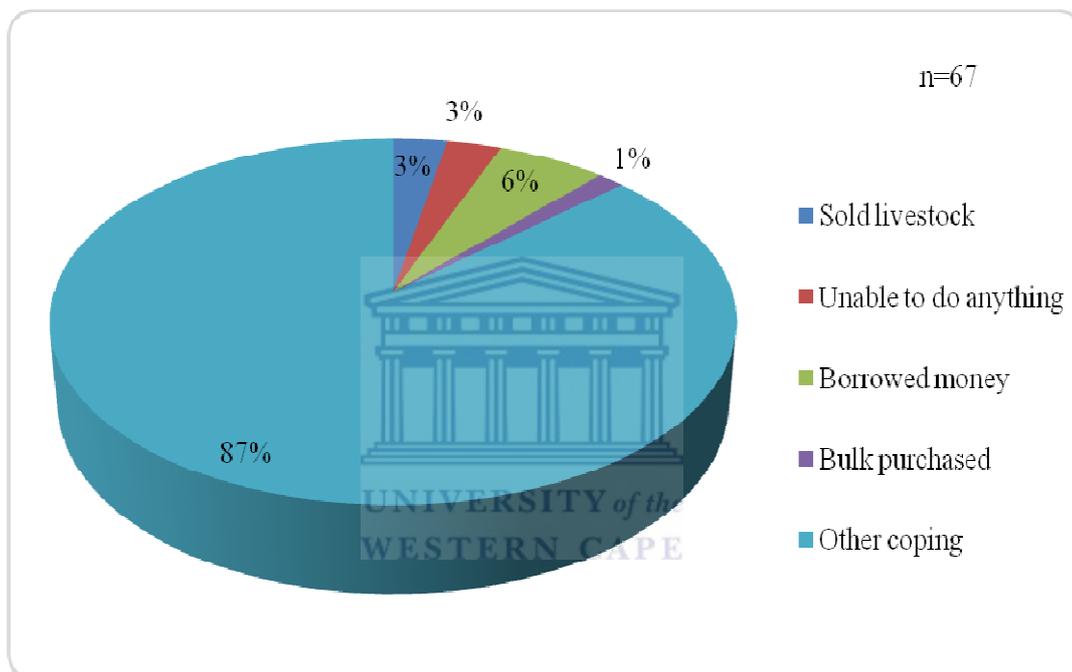
Source: Own computation based on WFP's Ghana 2012 CFSVA survey

The above stated difficulties, coupled with other agricultural constraints pointed out earlier have the potential of generating negative consequences for the welfare of farm households. For instance, households that experienced the death of a working member will have a challenge meeting the basic necessities of life, including food. In view of this, households who experienced some form of difficulty, four in every five households

indicated that their access to food decreased. This confirms several studies, particularly the work of Misselhorn (2005) in southern Africa, who found that socio-economic as well as environmental stressors tend to contribute immensely to food (in)security.

As shown in Figure 4.7, households adopt a variety of coping strategies in response to the above mentioned difficulties.

Figure 4.7: Most common responses to difficulties



Source: Own computation based on WFP's Ghana 2012 CFSVA survey

From the figure above, the commonest coping strategies households adopt include borrowing money from relatives or friends (6%), bulk purchases (1%) and sale of livestock (3%). That is, in times of difficulty, livestock becomes an important savings and insurance strategy for the survival of some households. Interestingly, 3 percent of households who were exposed to one or more of the difficulties stated above are unable to adopt any form of coping strategy. The remaining 87 percent of farm households who experienced difficulties adopt other coping strategies which include engagement in casual work outside of their communities, reducing household expenses such as transportation, relying on less expensive food to mention a few. It is important to

remark that coping strategies discussed above constitute a broader scope and not specific to food shortage copings. Food shortage copings are examined separately under the food insecurity discussion yet to follow.

4.5.1 Relationship between livelihood diversification and household resilience

As a follow-up to the discussion surrounding difficulties farm households experience and the main coping strategies they adopt, this subsection focuses specifically on answering the second research question; that is, assessing the relationship between diversification and households' resilience. Table 4.7 below presents details of households' resilience disaggregated by diversification status.

Table 4.7: Contingency table for livelihood diversification and households' resilience

Recovery from difficulties	NDHHs (n=94) %	DHHs (n=92) %	Total (n=186) %
Not recovered (fragile households)	4.26	9.78	6.99
Partially recovered (moderately resilient households)	13.83	27.17	20.43
Completely recovered (resilient households)	3.19	3.26	3.23
No difficulties (enduring households)	78.72	59.78	69.35
Total	100.00	100.00	100.00

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

From Table 4.7, about 69 percent of households did not experience any form of difficulty. Of the 31 percent who were exposed to some form of stress and or shocks, about 3 percent were able to recover completely and 20 percent had recovered partially.

The remaining 7 percent had not recovered as at the time the CFSVA survey was being carried out. Interestingly, the proportion of enduring farm households for NDHHs is higher (79%) as compared to DHHs (60%). This is due to the fact that the proportion of DHHs who experienced difficulties was higher (39.0%) than that of NDHHs (19.8%). For those who have not recovered at all from difficulties (fragile households), the proportion for DHHs is about twice that of NDHHs.

Deducing from the above, diversification amongst households with no difficulties is higher than those who do experience difficulties. Meaning that the kinds of diversification undertaken by farm households is motivated by 'push factors', which in a way lends support to the claim that diversification in rural areas is more of risk management phenomenon (Barrett et al., 2001). Results obtained for soil infertility and high food prices as significant predictors of diversification justify this claim.

To test the relationship between household resilience and diversification, a Pearson chi square test was run since both variables are categorical. This resulted in a value of 8.4905 with a p-value of 0.037. This shows an association between the two variables at the 5% significance level and as such, the null hypothesis that the two variables are not associated is rejected.

While this test does not indicate the direction of the relationship, a negative relationship can be expected in this case in the sense that higher resilience may result in less diversification. On the contrary, the more diversified a household is, the more resilient it may be – a positive relationship. The section that follows present details on food insecurity incidence amongst farm households and further focuses on identifying possible factors that are associated or linked to it.

4.6 Food insecurity levels amongst farm households

The incidence of food insecurity amongst the sampled farm household is high, 29.08 percent. This is 6 times the national figure of 5% (WFP, 2009 cited in ISSER) and

almost 3 times the regional figure of 10% (WFP, 2012). By definition, these households are either severely or moderately food insecure. That is, their food consumption level is classified as poor, not only in terms of quantity but also in terms of quality - dietary diversity and nutritional value. As shown in Table 4.8, 70.92 percent of households are food secure, constituting farm households that are mildly food insecure of food secure.

Table 4.8: Incidence of food insecurity amongst farm households – Bole district

Food security status	NDHHs (n=101) %	DHHs (n=95) %	Total (n=196) %
Food insecure	37.62	20.00	29.08
Food secure	62.38	80.00	70.92
Total	100.00	100.00	100.00

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Disaggregating the food insecurity incidence by livelihood diversification status reveals significant differences. As shown in Table 4.8 above, food insecurity incidence is higher for households that are not diversified (37.62%) than diversified farm households (20%). Of the 95 households engaged in multiple livelihoods, about 80 percent are food secure as compared to a little over 60 percent for households whose sole livelihood is crop farming. What this implies is that for households who are engaged in some form of diversification, their risk to food insecurity is lower as compared to their counterparts who pursue single livelihoods. To test this statistically, a Pearson chi square test was computed, yielding a value of 7.3724 at the 1% significance level. This is interpreted to mean a significant association between food insecurity and livelihood diversification.

Consequently, eventualities or shocks, particularly crop failures, can further exacerbate the food insecurity situation for households who are not engaged in any form of diversification. This impact is demonstrated in two ways: In the first instance, experiences of crop failure are likely to limit the proportion of households' food consumption from own production. The other channel of impact is that crop failure

would also mean low crop earnings, thereby posing a threat to their access to food economically. Beyond livelihood diversification, other core factors relevant to the discussion of food insecurity incidence amongst farm households in the case district are examined in the fields that follow.

4.6.1 Understanding the food insecurity situation: exploration of underlying factors

As pointed out in chapter two of this thesis, several underlying factors drive food insecurity, both at the macro-level and micro-level. In the light of this, some of these factors are discussed in the subsequent sections using contingency tables and correlations tests.

4.6.1.1 Poverty and food insecurity

Table 4.9 below presents a cross tabulation of households' wealth index quintiles and food insecurity. Whereas about 52.6 percent of food insecure households are located in the poorest quintile, approximately 9 percent of food secure households find themselves within the same quintile.

Table 4.9: A cross tabulation of households' wealth index quintiles and food insecurity

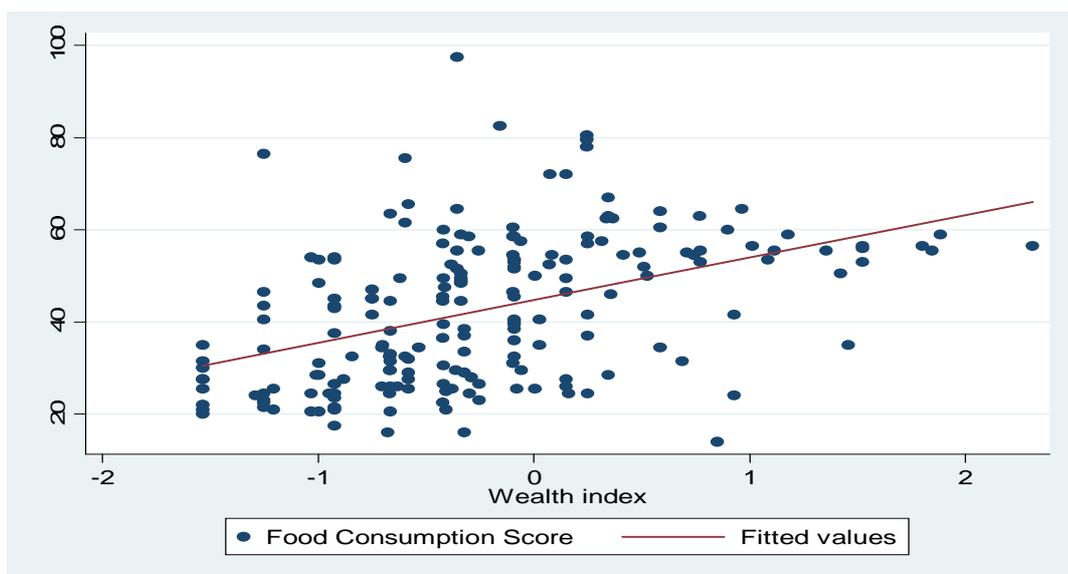
Wealth quintile	Food secure (n=139)	Food insecure (n=57)	Total (n=196)
1 (Poorest)	9.35	52.63	21.94
2	10.79	38.60	18.88
3	24.46	7.02	19.39
4	28.06	0.00	19.90
5 (Wealthiest)	27.34	1.75	19.90
Total	100.00	100.00	100.00

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

In the second quintile, also classified as poor, food insecurity is still high, about 39 percent. This reveals some level of relationship between households' wealth and food insecurity, in that poorer households tend to be more food insecure. In effect, those who are wealthy are more food secure. This explains why food security is very high for households within the third quintile (24.5%), fourth quintile (28.1%) and wealthiest quintile (27.3%) as compared to 7%, 0.0% and 1.8% for food insecure households respectively.

In an attempt to statistically verify these findings, a Pearson correlation was run using the wealth index and the food consumption score variables. Results from the test revealed a fairly strong positive correlation coefficient of 0.4420 at the 1% significant level. This is interpreted to mean a fairly strong linkage between poverty and food insecurity. While this may not necessarily imply causation, it gives the indication that poverty and food insecurity are significantly related. The two scatter plot presented as Figure 4.8 gives a graphical illustration of the relationship between household wealth and food consumption score.

Figure 4.8: A two-way scatter plot showing the relationship between household wealth and food consumption score (food security)



Source: Own computation based on WFP's Ghana 2012 CFSVA survey

The graph above displays a positive relationship between the two variables being compared. That is, as household wealth increases towards a positive index, the food consumption score increases as well. It is also interpreted to mean that the lower the wealth of households (that is being poor), the lower their food consumption would be (being food insecure).

A further disaggregation of this relationship by gender revealed quite a strong correlation coefficient for female-headed households, 0.4859, with a p -value of 0.0409. Correlation coefficient obtained for male-headed households was also quite strong (0.4186, with $p= 0.0000$). What can be deduced from this is that the linkage between household wealth and food security is more pronounced amongst female-headed households than their male counterparts. This may be attributed to income disparity between male-headed and female headed households. Policy-wise, poverty and food insecurity are intertwined and that reducing poverty levels amongst farm households should result in a reduction in hunger levels.

4.6.1.2 Gender and food insecurity

In the case of gender, the study revealed that whereas 25 percent of male-headed households are food insecure, incidence amongst female-headed households is quite rife, accounting for two-thirds of all FHHs within the sample. Evidently, the majority of MHHs are food secure (62%) as compared to a low 27 percent for their female counterparts (see Table 4.10 below). This disparity in food consumption justifies claims articulated earlier by Assenso-Okyere et al. (1997) and the IF Coalition (2013) that women tend to be more vulnerable to food insecurity.

This can be attributed to a number of factors. First of all, the majority of FHHs practice farming on a small scale and as such yield from crop farming is low. By extension, this translates into low food availability for them and their families.

Table 4.10: Incidence of food insecurity by sex of household head

Food security status	Male (n=178) %	Female (n=18) %	Total (n=196) %
Food insecure	25.28	66.67	29.08
Mildly food insecure	12.92	5.56	12.24
Food secure	61.80	27.78	58.67
Total	100.00	100.00	100.00

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Besides, out of the 18 FHHs within the sample, 17 are either divorced or widowed, a situation that places a limit on the extent to which they engage in livelihood activities since they have to play the dual roles of being mothers (that is for those who have children) and bread-winners for their families. These social-cultural factors, coupled with the fact that about 72 percent of these women belong to the bottom two of the wealth quintile make them more susceptible to food insecurity.

To test the above findings statistically, a Phi correlation was run between gender (where MHHs=1 and FHHs=0) and food insecurity (where food insecure=1 and food secure=0), yielding a fairly weak coefficient of -0.2632 at the 1% significance level. This implies that being a MHH is inversely related to food insecurity even though a weak one.

4.6.1.3 Smallholder farming and food insecurity

Due to the challenge of converting the varying measuring units used for the many food crops captured in the CFSVA 2012 study, households farm sizes, categorized into stallholders, medium and large farming households was used to determine the relation between the size of area cultivated and food insecurity. As shown in Table 4.11 below, the incidence of food insecurity for smallholder farm households is 31.45 percent, slightly higher than the figures for medium farm households (29.73%) and large farm households (18.75%).

Table 4.11: A cross tabulation of categorized farm size and food insecurity

Food security status	Smallholder farming household (n=124) %	Medium farming household (n=37) %	Large farming household (n=32) %	Total (n=193) %
Food insecure	31.45	29.73	18.75	29.02
Food secure	68.55	70.27	81.25	70.98
Total	100.00	100.00	100.00	100.00

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

In the above table, it is evident that food insecurity decreases as the area cultivated by farm households increases. In other words, as households transform from being smallholders into medium or large farming households, their food security improves, 70.27 percent and 81.25 percent respectively. The implication of this is that increasing the size of cultivable land for farm households brings with it increased food production, thereby allowing them increase the shares of food obtained from their own production. Also, increased production resulting from improved access to cultivable land would mean increased cash resources, some of which could be used to purchase productive assets, access nutritious food as well as serve as an incentive for investment in other non-farm income generating activities. This goes to underscore Malthus' food availability perspective (Greenland, 2005) and remains core to tenets of the food sovereignty paradigm as discussed earlier.

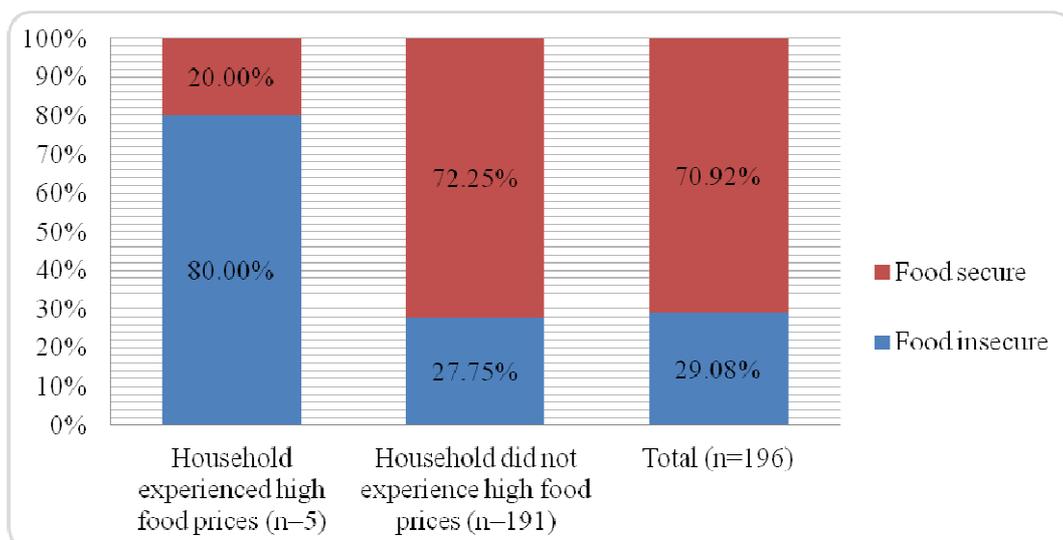
A statistical proof of a perceived relationship between the farm size (categorized) and food insecurity revealed the contrary. That is, results from a Pearson chi square test revealed a value of 2.0037 at $p=0.367$, upholding the null hypothesis that the two variables are independent. Nonetheless, a further split by a dummy variable generated for households who reported low harvest as compared the previous crop season (2010/2011) revealed a significant association for farm households that experienced a reduction in harvest of their major crop. Chi square test from this was 7.2527 at the 5% significance level (see Appendix 8).

Similar tests for farm households who either maintained the same level of harvest or increased harvest revealed no significant associations, 0.0000 for the former ($p=1.000$) and 0.0496 for the latter ($p=0.976$). That is, even though no significant relationship exists between the two variables examined above, a significant relationship is observable for households who experienced crop failures or low crop harvest. As such, it could be inferred that being smallholder agriculturist and experiencing crop failures or low yields simultaneously can result in food insecurity, in a way validating assertions by Tobin (2009) and Devereux and Maxwell (2001) that low agricultural productivity is a significant underlying factor for food insecurity. In view of this, addressing food security concerns effectively in SSA for instance would require a prioritization of smallholder agriculturists.

4.6.1.4 Food prices and food insecurity

Another important channel for explaining food insecurity has to do with food prices. As shown in Figure 4.9 below, 80 percent of households who experienced high food prices are food insecure as compared to about a quarter for those who did not experience high food prices.

Figure 4.9: Food prices and food insecurity



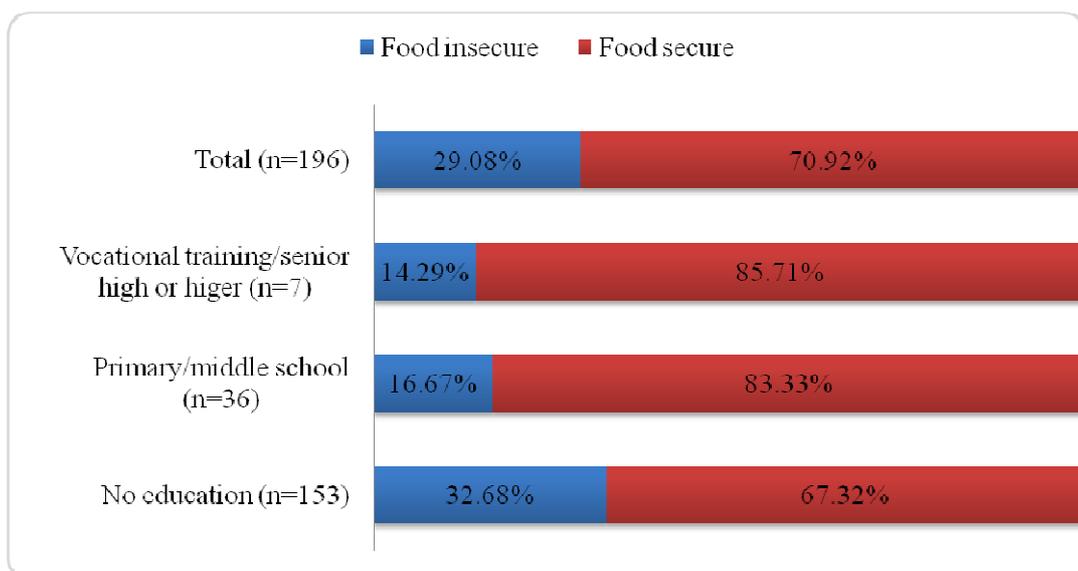
Source: Own computation based on WFP's Ghana 2012 CFSVA survey

To establish whether households' experience of high food prices is statistically linked to household food insecurity, a value of 1 was assigned to households experiencing high food prices and 0 to those who did not, resulting in a dummy. Using this, the Spearman correlation test was computed between the two variables – households experienced high food prices and food insecurity. This revealed a somewhat weak relationship (0.1814), even though positive at the 5% significant level. Whereas this result confirms to an extent the long-held view that high food prices and food insecurity are related (Assenso-Okyere et al., 1997; Misselhorn, 2005; Kuwornu et al., n.d.), the fact that only 5 households experienced this phenomenon raises concerns regarding the robustness of the test results. Nevertheless, having in place mechanisms that provide some form of cushioning to households who are affected by high food prices becomes an imperative.

4.6.1.5 Educational attainment and food insecurity

The educational attainment level of an individual, in this case, of a household head, offers a useful lens for determining household welfare. Demonstrating this within the study context, farm household heads educational attainment level was used to examine how education is related to food insecurity.

Figure 4.10: Food insecurity by educational attainment of household head



Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Results obtained, as displayed in Figure 4.10 shows that for household heads with no formal education or who have had no schooling at all, food insecurity is very high, about 32.7 percent as compared to 16.7 percent and 14.3 percent for those who have attained primary education and vocational, senior high or post secondary respectively. From the above, it can be deduced that farm households who have attained some level of formal education are more food secure, with food security levels well over the total prevalence of 70.9 percent.

In examining these results further, a Spearman correlation was computed. This revealed a correlation coefficient of -0.1437 at the 5% significant level; indicating an inverse relationship between the two variables. While the strength of association is weak, the null hypothesis that educational attainment and food insecurity are independent is rejected.

4.6.1.6 Locality and food insecurity

The rural-urban dynamics of food security studies has over the years offered in-depth perspectives to identifying who the food insecure are and where they are located. In Table 4.12, it is observable that food insecurity incidence is about 30 percent for rural farm households. This is about double the incidence for urban farm households (16.7%).

Table 4.12: Household food insecurity by locality

Food security status	Rural (n=184) %	Urban (n=12) %	Total (n=196) %
Food insecure	29.89	16.67	29.08
Food secure	70.11	83.33	70.92
Total	100.00	100.00	100.00

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

The above goes to justify the claims by Tobin (2009) and findings by the WFP (2009a) that food insecurity in SSA is a rural phenomenon. For instance, of the 57 farm

households who were found to be food insecure, about 96 percent are resident in rural areas; higher than the national figure of 70 percent (WFP, 2009a). A sub-district analysis further revealed that food insecurity levels were high for Bonbontey and Kedenso communities (17.5% each), followed by Carpenter (15.8%), Latiegeberi (12.3%) and Chache (12.3%). Interestingly, all sampled farm households (19) in Ntereso, a rural community, were found to be food secure. In finding out what might have accounted for the zero food insecurity incidence for the Ntereso community, it was revealed that all 19 households were engaged in multiple livelihoods (see Appendix 9). This goes to emphasize the fact that rural households with high level of livelihood diversification tend to be food secure. It is however important to point out that the small number of urban households within the sample as used in the comparative analysis above might not be a sufficient representation of food insecurity patterns in the case study district. Nevertheless, it is an undisputed fact that majority of the hungry in the Bole district is found in the rural areas as revealed by other studies (for instance WFP, 2012), requiring that efforts towards rural enterprises development be mainstreamed.

Besides the above discussed linkages, inadequate infrastructure and access to basic social amenities tend to influence food security. For instance, improved access to sanitation by farm households was found to be inversely correlated with food insecurity (-0.1258 at the 10% significance level). Again, a Pearson chi square test of households' access improved drinking water and food insecurity revealed a value of 7.4964 at the 1% significance level. This implies that the availability of and households' access to social facilities, to some extent, has a bearing on household food security. The remaining subsections provide insight into periods households experience food shortages, what copings are used, and food sources.

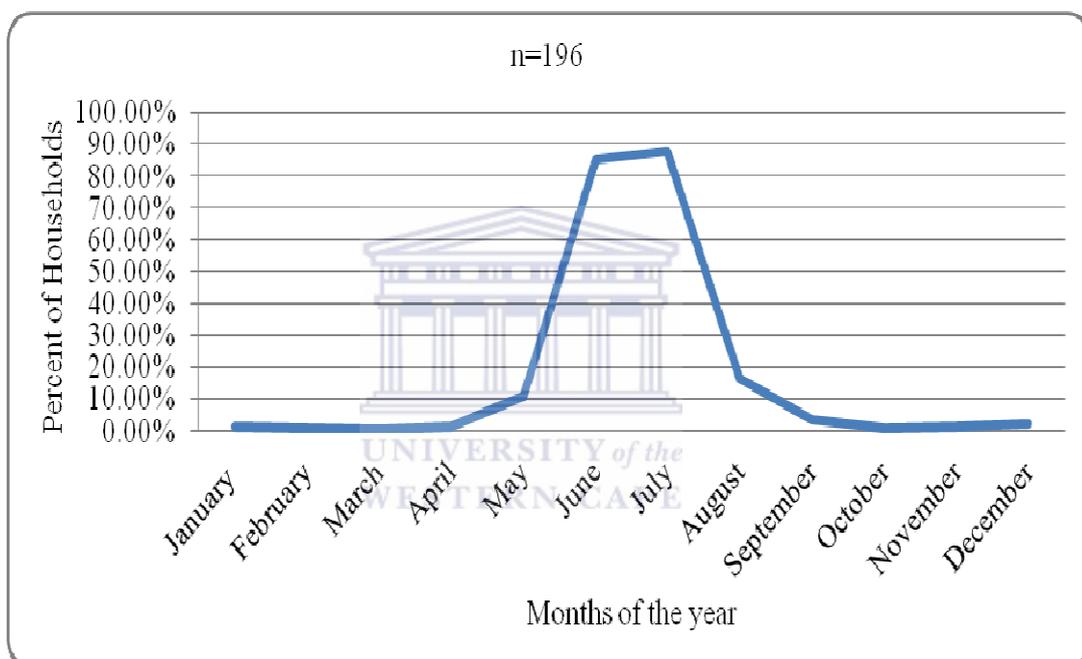
4.6.2 Periods of food scarcity amongst households

One important issue of concern to the food insecurity discourse as pointed out by Maxwell and Smith (1992) in the review of literature is timing. Delving into this does not only contextualize the debate but more importantly serve as an incentive for

planning food security policies and interventions. As a result, data on when households normally experience food insecurity or find it difficult securing food within the year is examined.

As shown in Figure 4.11, households barely have difficulty accessing food at half-way the year, which is between January and April. Similar trend is observable towards the end of the year, from September to December.

Figure 4.11: Months households have difficulty getting food



Source: Own computation based on WFP's Ghana 2012 CFSVA survey

From figure 4.11 above, food scarcity surfaces in May, peaks in the months of June and July and then falls in August. It could be observed that in the months of June and July, over 80 percent of farm households have difficulty getting food in their right quantity and quality. During this period, the availability of food, that is, food from households' own production is very low. Several reasons may be cited for this. In the first place, this period of high food scarcity is the planting season for majority of crops cultivated in the district and as a result, farm households have little or no stock of food from the past season to adequately satisfy their food needs. The situation is further aggravated by

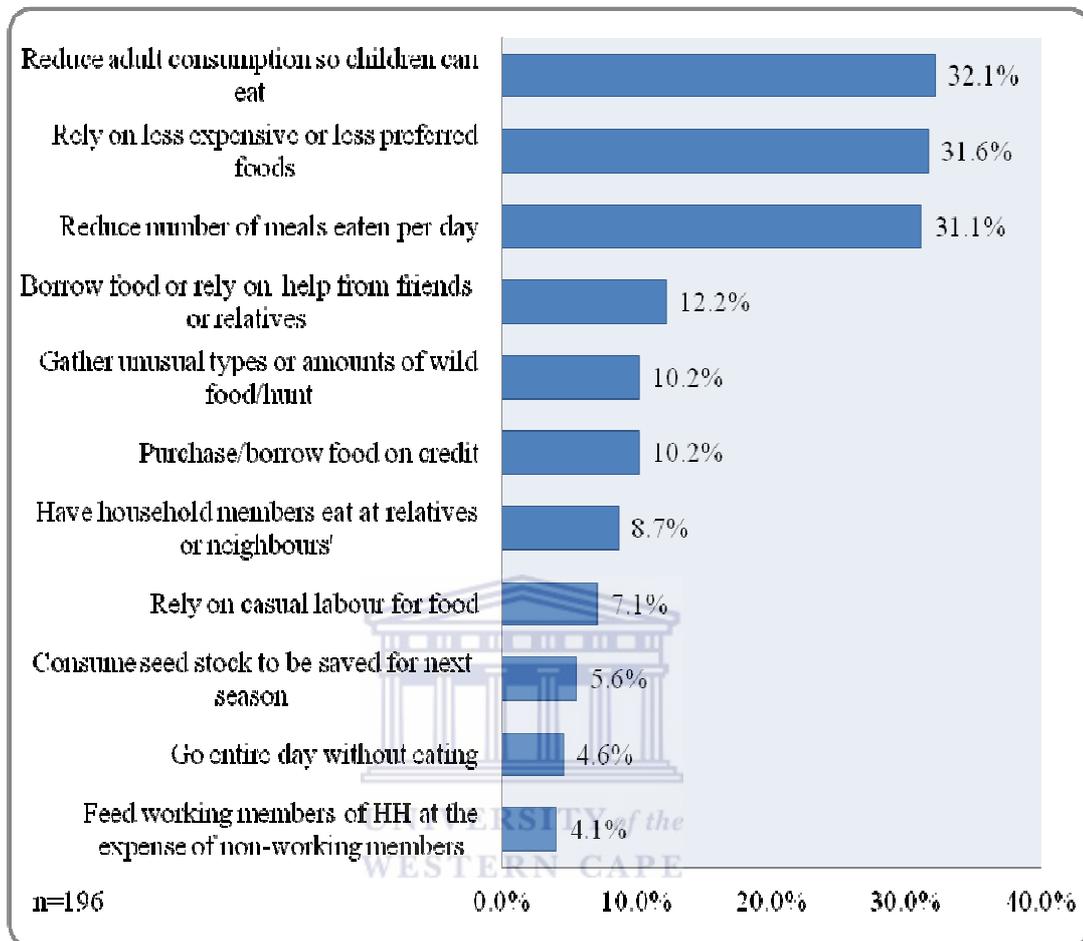
inadequate storage facilities; a potential recipe for post-harvest losses of crops. In its 2006 -2009 District Medium Term Plan, high post-harvest losses was cited as one of the key challenges hampering agricultural development in the Bole district (UNDP, 2010).

During these times, the issue of economic access becomes critical especially for families with limited or no diversification, thereby resorting to a barrage of survival strategies or copings. That is, urged on by their survival instincts, households may decide to reduce the frequency of times they eat or out-migrate to nearest urban settings in the hope of maximizing their food consumption. Details of these copings strategies, whether effective or otherwise, are examined in the subsection that follows.

4.6.3 Food shortage coping strategies

Within the Bole district, it was found that farm households resort to multiple copings during food shortages. It is important to note that these copings are not carefully thought-out strategies but are spontaneous responses, and that the kind of coping that households adopt is largely dependent on the intensity of food scarcity. Out of the 11 coping strategies shown in Figure 4.12, reduction in adult food consumption stands out as the most preferred option (32%). This is done in an attempt to at least satisfy the food consumption requirements of children within the household.

Figure 4.12: Households' copings to food scarcity (multiple responses apply)



Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Other common coping strategies include reliance on less expensive or less preferred foods (31%) and a reduction in the number of meals eaten per day (31%). That is, as an immediate response, households adjust their food consumption behaviour by reducing caloric intake or opting for foods that are less nutritious and less expensive. By implication, these adjustments are less drastic and have no adverse implications for households' cash and physical resources. This is in conformity to the assertion that households commonly reduce food intake or change diet when hit with food shortage (Corbett 1988, Fleuret 1986, Rahmato 1988 cited in Young et al., 2001).

Besides the first three coping forms discussed above, farm households also secure food assistance by borrowing food or relying on help from friends or relatives. Also, some

gather unusual foods (10%), purchase food on credit (10%) and rely on casual labour for food (7%). These measures tend to affect household resources mildly.

Further, households with limited resources tend to adopt more radical copings such as consumption of seed stock that a meant for the next season (5.6%), go the entire day without eating (4.6%) and feed household members working at the expense of non-working household members. While households' involved in such radical measures are minimal, such copings have serious implications for the health of affected household heads and their dependents. For instance, consuming seed stock to be cultivated in the next farming season will mean low food production, thereby creating a vicious cycle of vulnerability to food insecurity. Also, households who are left with no option than to starve due to as articulated by Sen (1981) – a complete disruption of their endowments (physical, social, financial, natural and human) may have serious health consequences or even end up dying; thus justifying the WFP's assertion that hunger or starvation is the number one cause of death; surpassing AIDS, malaria and tuberculosis combined. Here, food assistance and aid become an imperative in order to minimize the negative effects that come with such coping mechanisms.

Juxtaposing Figure 4.12 above with Watts' (1983, adapted by Frankenberger & Goldstein cited in Maxwell & Smith, 1992) schematic presentation of households' food shortage copings in chapter two, similar trends can be observed. Only that in this figure, out-migration is not articulated as a coping to food shortage even though for migrants-sending households, food insecurity was mentioned as a push factor. For instance, out of 48 migrant-sending households, 4 percent were of the view that inadequate food throughout the year influenced their decision to send-out household members (see Appendix 5).

4.6.4 Characterizing household food consumption: expenditure, food sources and dietary diversity

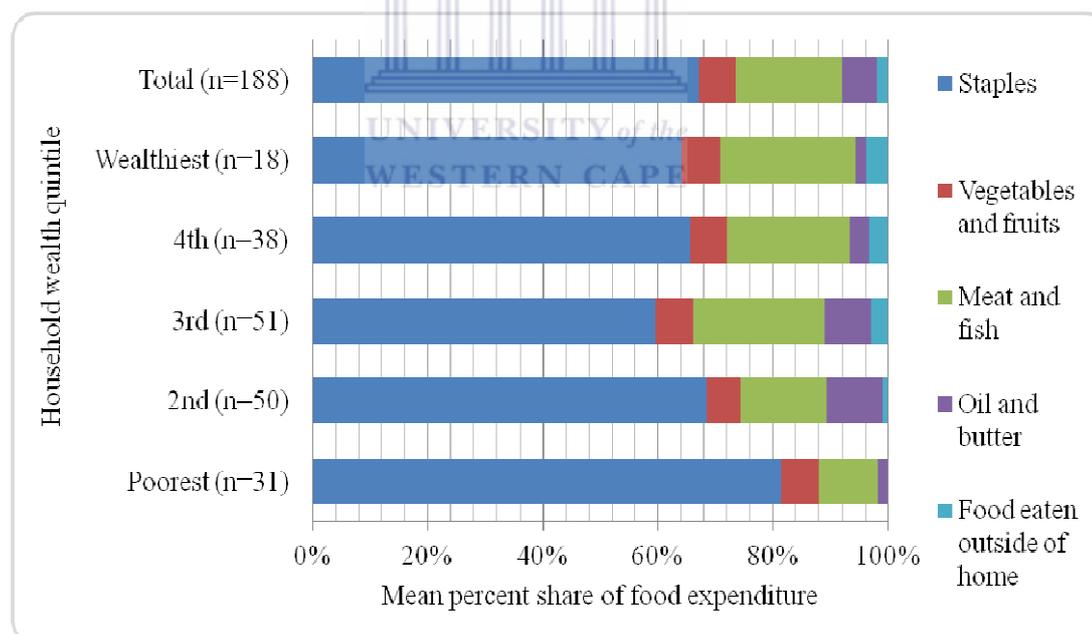
This aspect provide details on household food consumption patterns with specific reference to mean expenditure shares of various food categories, average consumption

days for various food types and a review of food sources. These are discussed as follows:

4.6.4.1 Shares of food expenditure

Figure 4.12 presents details of household expenditure on specific food items. For the 188 farm households whose food expenditures were captured, the study found out that expenditure on staples (cassava, potato, maize, millet, and rice) took-up about 67 percent of total household expenditure on food. Meat and fish accounted for 18 percent, while average expenditure on vegetables and fruits accounted for 7 percent of total monies spent on food by households. Also, 6 percent was spent on oil and butter while the remaining share of 2 percent account for foods eaten from outside the home.

Figure 4.13: Wealth quintile by percent share of expenditure on household food items



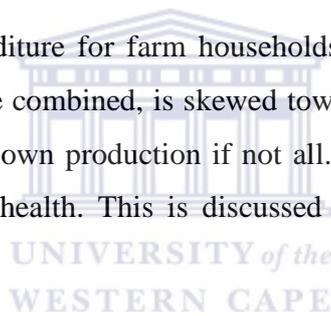
Source: Own computation based on WFP's Ghana 2012 CFSVA survey

From the wealth quintile perspective, it is observable that food expenditure for those belonging to the poorest quintile is over 80 percent as compared to almost 65 percent for the wealthiest. However, mean expenditure shares for vegetables and fruits are

relatively the same across the board. This may be due to the fact that vegetables and fruits are home grown and so therefore comes at cheaper costs.

Also, mean expenditures on protein sources, that is, meat and fish is relatively the same for the third, fourth and wealthiest quintile (a little over 20%). This, however, dwindles for the second quintile (14%) and poorest quintile (10%). Such minimal shares may be attributable to the fact that meat and fish require cash purchases and are expensive, thereby limiting the ability of the poor to spend more of their meager resources. This is made more evident in the share of food expenditure spent on food eaten outside of the home. For the poorest quintile, this is zero and about a percent for households belonging to the second quintile. What this points to is the fact that a household wealth to a large extent determines whether a household eats food from the home or outside.

Evidently, the food expenditure for farm households who constitute the poor, that is poorest and second quintile combined, is skewed towards staples, greater proportion of which is accessed through own production if not all. This has serious implications for households' nutrition and health. This is discussed extensively in subsection 4.6.4.2 below.



4.6.4.2 Average days of food types consumed by households

To further understand households' food consumption pattern and dietary diversity, data on days of food consumed by households a week before the CFSVA Ghana 2012 survey was examined. As shown in Table 4.13 below, the mean days of cereals, tubers and root crops consumption over the week is 7 for the entire sample, diversified households and non-diversified households alike, which means that farm households feed on staples everyday of the week.

Table 4.13: Average days of food types consumed per week by diversification status of households

Food type	NDHHs (n=101)	DHHs (n=95)	Total (n=196)
	Mean days	Mean days	Mean days
Cereals, tubers and root crops	7	7	7
Meat and fish	3	4	3
Pulse	1	1	1
Vegetables	6	6	6
Oil	3	3	3
Fruits	1	1	1
Sugar	3	3	3
Milk or other dairy	0	1	0

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

This is so because such foods are readily accessible through their own production and also the fact they are affordable in terms of prices. Next to cereals, tubers and roots crops consumption is vegetables, which is consumed 6 days of the week for the total sample, NDHHs and DHHs.

It is observable from the above table that protein consumption over the week is minimal for the total sample and for NDHHs, 3 days for meat and fish and no milk consumption at all in both cases. For DHHs, however, meat is consumed 4 days of the week and only a day for milk consumption. By implication, the nutritional value of foods eaten by DHHs is relatively higher than that consumed by NDHHs. Nonetheless, fruit is consumed in only a day throughout the week across the board.

From the above findings, two key inferences can be drawn. The first relates to the lack of adequate protein consumption by farm households within the Bole district, which implies that a limitation of dietary diversity could be a significant trigger of malnutrition particularly amongst household members below the ages of 15 years – children. That is, while food availability and access are essential, nutrition, which falls

under the third element of food security, food utilization (Woller, et al., n.d.), is equally an important measure to incorporate in discussing household food security. More specifically, the need to ensure improved dietary diversity of farm households through nutrition sensitization programmes for instance becomes an imperative.

In an attempt to verify the correlation between the food consumption score of households and the average number of days of food consumption for the various food types listed in Table 4.13, interesting results were obtained. The average number of days households consumed meat and fish per week demonstrated the strongest correlation, 0.8933 at a significance level of $p=0.0000$. Also, average days of sugar and milk consumed per week showed strong positive correlations of 0.6245 and 0.5097 respectively, both at significance levels of $p=0.0000$. Again, fruits and pulses yielded moderate correlations of 0.4113 (at $p=0.0000$) and 0.0.3980 (at $p=0.0000$).

The second point relates to the potential contribution multiple livelihoods can make towards the improvement of households' food consumption in quantity and quality terms. For example, a Pearson correlation test computed between the households' non-farm share of total income and the average days of consumption of milk and meat and fish revealed significant relationships. In the case of average days of meat and fish consumption over the week, a somewhat weak but positive correlation coefficient of 0.2063 was realized at the 1% significance level. Results for the average number of days households consume milk or any dairy product showed a correlation coefficient of 0.2150, also at the 1% significance level. Even though these relationships are moderately weak, they at least signal that incomes earned from multiple livelihoods covariate weakly with the average number of days households consume either milk or meat and fish over the week.

4.6.4.3 Sources of food for farm households

Understanding food (in)security situations at the household level also requires an in-depth analysis of food sources. The study found out that the bulk of food consumed by

households is accessed from two main sources: cash purchases (54%) and farm households' own production (43%).

Table 4.14: Mean shares of households' food sources by poverty status

Food sources (mean shares)	Total (n=196)	Poor households (n=85)	Non-poor households (n=111)
Own production	42.5	45.2	40.6
Fishing, hunting, gathering	0.7	0.6	0.8
Credit purchases	1.6	1.4	1.8
Cash purchases	54.4	52.0	56.3
Exchanges	0.5	0.5	0.4
Gift	0.2	0.4	0.0
Others (begging, etc.)	0.1	0.0	0.1
Total	100.0	100.0	100.0

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

More so, the fact that about 43 percent of food consumed come directly from farm households' own production seeks to confirm the subsistence nature of farming within the case district.

The remaining food sources as presented in Table 4.14 include those from credit purchases, fishing, hunting and gathering, exchanges, gifts and others such as begging and borrowing. It can also be observed that for poor households, their mean share of food from own production is slightly higher (45.2%) than mean share for non-poor households (40.6%). However, the reverse is observed for cash purchases, with non-poor or wealthy households mean food consumed exceeding that of poor households by 4.2 percent. Evidently, purchases (cash and credit) constitute the main source of food for farm households in the three scenarios presented in Table 4.14. This has the tendency of increasing the vulnerability of farm households to food insecurity and malnutrition especially in the event of high food prices since such a situation, would put

further pressure on household incomes, thereby limiting the quantity as well as the quality of foods households can purchase.

The above findings further underscore the relevance and interconnectedness of the two key principles to the food security agenda: food availability and accessibility. That is, an effective way of promoting food security at the household level requires a combination of both elements.

4.7 Farm households' access to food and non-food support

For poor and vulnerable farm households with limited endowments and low capacity to diversify livelihoods, coping with food shortages can be a challenging affair. In situations of this nature, access to safety-nets, either by governments or NGOs comes in handy. Within the context of this study, data captured in the CFSVA survey revealed that only a small proportion of farm households benefited from such schemes.

For instance, less than 2 percent of farm households (3) targeted in this study benefited from some form of food assistance. This comprised of school feeding and food for work support. None of the households benefited from relief (free food distribution) and supplementary feeding programmes targeted at infants, children and lactating and pregnant women. In the case of non-food support, only one (1) male-headed household benefited from such support. None of the households indicated benefitting from the government-sponsored Livelihood Empowerment Against Poverty programme.

The implication of this is that coverage of safety-net programmes such as LEAP and GSFP is limited. Also, the fact that no farm households indicated benefitting from the LEAP even though the case study district is a beneficiary raises concerns about the targeting of the programme. Thus, given the fact that food crop farmers especially include the poorest of the poor, in northern Ghana, critical policy actions would need to be marshaled by government and NGOs, especially in a case where some 4.6 percent of household heads and their dependents have to go the entire day without eating during food shortages.

4.8 The impact of livelihood diversification on household food security

This section establishes the actual relationship existing between livelihood diversification and household food security by running a multiple regression using the OLS estimator. Results from the multiple regression analysis are presented in Table 4.15. Of the 196 farm households observed, 193 were included in the overall regression estimates. As shown in Table 4.15, the adjusted R^2 obtained is 0.3124. Also, the F-value is 11.9 at the 1% significance level. From this, it could be inferred that the independent variables included in the model reliably predicts the dependent variable.

As part of diagnostic analysis, VIF was computed in Stata to examine the presence of multicollinearity in the model. The VIF for all explanatory variables ranged from 1.06 to 1.43, resulting in an average VIF of 1.17 (see Appendix 10). What this test result shows is that since the VIF values are less than 10 for all explanatory variables and for that matter the average, there is no proof of multicollinearity in the regression model.

From the table, household characteristics such as age of household head, dependency ratio and household size were found to be insignificant predictors of household food security. For instance, the high food price variable failed to exert a significant effect on food consumption despite yielding a coefficient of approximately -0.95. This is interpreted to mean that for households who experience increases in food prices, their food consumption level reduces by a negligible 0.95. While this finding may be attributed to the fact that only a small proportion of households within the sample experienced high food prices, it important to mention that the result deviates from views by Assenso-Okyere et al. (1997) Misselhorn, (2005) and Kuwornu et al. (n.d) who argue that high food prices tend to constrain household food consumption or food security.

From Table 4.15, household wealth index, farm size under cultivation, educational attainment level of household head and number of livelihood activities demonstrated the expected effects, all at the 1% significance level. Household wealth yielded a coefficient of 7.48 on the average, meaning that a unit increase in household wealth, the FCS is predicted to be 7.48 higher. This confirms the positive relationship that the two-

way scatter plot presented as Figure 4.7 showed. What this implies is that being wealthy, as defined in this study, guarantees to some extent, improved household food security while the reverse, which is being poor, tends to adversely affect food consumption levels for these households. This justifies claims by, for instance, Devereux and Maxwell (2001), FAO, IFAD and WFP (2002) and Oppenheim and Stuart (2013) that low incomes or poverty constitute one of the fundamental causes of food insecurity particularly amongst farm households.

Table 4.15: Results from multiple regression model using OLS

Explanatory Variables	Household food security (food consumption score)		
	Coefficients	Standard errors	t-values
No. of livelihood activities	7.0120***	1.6330	4.30
Wealth index	7.4750***	1.3524	5.53
Dependency ratio	0.0682	0.8986	0.08
Farm size	0.5425***	0.1576	3.44
Household size	-0.0455	0.2207	-0.21
Educational attainment	4.860***	1.9616	2.48
High food prices	-0.9486	1.9201	-0.49
Age	-0.0640	0.0832	-0.77
Constant	31.1138***	5.6190	5.54
Adjusted R ²		0.3124	
F-value		11.90***	
No. of observations		193	

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: *** denotes significance at the 1% level.

Also, the size of farmland cultivated by households resulted in a marginal effect of 0.54. That is, a unit increase in farm size is predicted to add only 0.54 to household food consumption level. While the effect size is negligible, it points to the fact that increasing the farm size of smallholder households in particular makes a contribution to assuring household food security.

In the case of education, the regression result revealed that increasing the educational attainment of household heads by one level (say from primary to secondary) is predicted to bring an additional 4.86 to household food consumption. That is, household heads with higher levels of education tend to be more food secure than household heads with minimal or no formal education. It is therefore not surprising that for households who had attained vocational, secondary or post secondary education, their food security prevalence was approximately 86 percent as compared to 67 percent for households with no formal education at all. Simply put, education is an important underlying factor for improving household food security amongst farm households in the Bole district and the entirety of northern Ghana. This result lends support to WFP's (2009a) assertion that education plays an indispensable role in assuring household food security. It is also in conformity with previous studies by Assenso-Okyere et al. (1997) in West Africa and Misselhorn (2005) in southern Africa.

As expected, the livelihood diversification variable (number of livelihood activities) exerted a significant impact on household food consumption with approximately 7.01 points *ceteris paribus*. By implication, increasing households' livelihood activities or income sources by one (1) is expected to generate a total return of 7.01 points to household food consumption. When this result is disaggregated by sex of household head, a significant relationship is observed for MHHs at the 1% significance level (see Appendix 11).

That is, for households headed by a male, every unit increase results in livelihood activity increases their food security level by 6.98, almost the same effect for the combined sample. For households headed by females, a positive but insignificant impact was observed. This can be attributed to a variety of reasons. First of all, the

sample size for FHHs included in this study is small (comprising only 9 percent of the sample), which may have affected the predictive power of the independent variable (number of livelihood activities) to generate the expected impact on household food security.

Secondly, this finding may be attributed to the kind of activities FHHs undertake in general. For instance, disaggregating additional livelihoods in Table 4.3 by gender of household head revealed that whereas MHHs had a wider scope of activities to engage in including casual and regular employments, those of women are skewed towards low-income generating activities such as livestock rearing, petty trading and fishing. None of the women who were heading households was engaged in either casual or regular employments. This is particularly true for most rural communities in Ghana, where FAO (2012) for instance found out that FHHs participate less in wage employments as compared to MHHs. In effect, men tend to engage in activities that yield more earnings than women. For example, whereas average non-farm income for FHHs was found to be GH¢107.50 (US\$65.58), earnings by their male counterparts was about thrice, GH¢290.34 (US\$177.11). By extension, for FHHs included in this study, livelihood diversification may not prove a significant predictor on their food security levels.

It is worth-noting that the significant relationship observed between livelihood diversification and household food security for the combined sample is in agreement with existing literature particularly those reviewed in this study (Barrett et al., 2001; Reardon et al., 2001; FAO/World Bank, 2001 cited in Khatun and Roy, 2012; Ellis & Allison, 2004). Furthermore, the finding confirms empirical studies by Nghiem (2010), Babatunde and Qaim (2010) in the Kwara State of Nigeria and Hanazaki et al. (2012) in the Caiçara of Coastal Brazil. Specific to Ghana, results obtained from this study validates the work of Owusu et al. (2011) conducted in the Savelugu-Nanton district, also located in the northern region of Ghana. Using non-farm income as a proxy variable for livelihood diversification, they established a positive significant relationship between non-farm income and food security.

On the whole, this chapter, through a combination of descriptive and inferential statistics, has brought to the fore key issues that border on farm households' livelihoods, what induces them to participation in non-farm employments and their extent of participation as well as their poverty status. Also, information on stresses and shocks farm households encounter, incidence of food insecurity at the district level and sub-quintiles as well as the impact of livelihood diversification on households' food security have been analyzed and discussed accordingly. In the chapter that follows, the summary of key findings from the analyses and discussions, verification of study hypotheses as well as recommendations are presented.



CHAPTER FIVE

SUMMARY OF KEY FINDINGS, RECOMMENDATIONS AND CONCLUSION

5.1 Introduction

Based on findings and discussions presented in the preceding chapter, this chapter touches on the salient findings obtained from descriptive as well as inferential statistics. This cuts across fields such as socio-demographic characteristics, livelihood systems and diversification amongst farm households, determinant of households' decision to diversify livelihoods, households' resilience to shocks and stresses and highlights of food insecurity incidence and underlying factors. The chapter also verifies the study hypotheses. Inferring from the key findings, lessons and policy recommendations relevant for mainstreaming sustainable livelihood opportunities as well as improving household food security amongst farm households are detailed out.

Subsequently, key research trajectories that are central to the two concepts studied are proffered. The chapter concludes with an overview of the study in its entirety.

5.2 Summary of Key Study Findings

The study, as demonstrated by results and discussions presented in chapter four brought to light key lesson-learning findings, some of which have crucial policy implications. These findings are outlined in the fields below.

Socio-demographic characteristics

The study revealed that the majority (86%) of household heads were married. The study also revealed that households are headed by older persons with mean age of 51 years. Households are characterized by large family sizes with an average household size of 9.2 persons. Educational attainment amongst farm households is generally low, with 4 out of every 5 farm household head having no formal education. In the case of females

heading households, the study found out that none of them had any form of formal education.

Livelihood systems and diversification amongst farm households

Of 196 farm households, approximately 51 percent depend solely on crop farming while the remaining 49 percent are engaged in multiple livelihoods. The extent of diversification amongst MHHs is slightly higher than that of FHHs, 49 percent for the former and about 44 percent for the latter. Two main channels of diversification exist for these households: enterprise-based activities (livestock production, trading and fishing) and wage employments (casual and regular). The former is preferred, with only 4.3 percent of farm households engaged in wage employment as an additional livelihood. In addition to these activities, farm households migrate to secure wage employments.

Regarding crop farming, the bulk of the households are smallholders (64.3%), cultivating 5 acres or less of farmland. About 76.5 percent of households headed by women are smallholders as compared to 63 percent for those headed by men. About half of farm households cultivate yam as their main food crop, followed by cereal production - maize, millet, sorghum. Also, 11 percent produce groundnut as their main crop. While vegetable farming has prospects for dry season gardening, it is least practiced amongst farm households. About 60 percent of farm households reported no improvement in harvest for their main crops for the crop year under review. Constraints to crop production in order of severity included inadequate rains, lack of cash, labour and fertilizer, poor soil fertility, and floods. In all of these, smallholders constituted the largest, obviously due to low incomes.

From the above, three main income sources can be categorized: crop farming (100%), complementary livelihoods (48.5%) and remittances (9.2%). Average non-farm income, with remittances inclusive, accounts for almost a quarter of total household income. The most expendable household item is food, with a mean share of 42 percent of total household expenditure. Incidence of poverty is 40.8 percent for male headed

households, 72 percent for female-headed households and about 37.6 percent across the board, indicating a staggering gender disparity in terms of wealth.

Determinants of livelihood diversification

Household wealth, high food prices, farm size and experience of soil infertility significantly predicted households' decision to diversify livelihoods. Household size and access to improved drinking were found to be significant but not with the expected sign. Household characteristics such as dependency ratio, age and gender of household head were found to be insignificant predictors of households' decision to participate in additional livelihoods.

Livelihood diversification and households' resilience to shocks and stresses

Difficulties farm households encounter include inadequate money, worker death, ailments, high food prices and late rains. Coping strategies adopted in response to these difficulties included livestock sales, borrowing money from friends and relatives, bulk purchases when it come to food consumption and a host of other copings. Of households who experienced some form of difficulty, about two-thirds had recovered partially, 22 percent had recovered completely and about 10.5 had not recovered at all. Using a Pearson chi square test, a significant association was found between livelihood diversification and household resilience.

Incidence of food insecurity amongst farm households

The incidence of household food insecurity is high amongst NDHHs, about 38 percent as compared to 20 percent for DHHs. Across the board, 29 percent of households within the sample were found to be food insecure. Also, about 52 percent of food insecure households were within the poorest wealth quintile as compared to approximately 9 percent for food secure households. A Pearson correlation test revealed a fairly strong relationship between household food consumption level and wealth at the 1% significant level.

About two-thirds of FHHs were found to be food insecure as compared to a quarter for MHHs. Approximately 31 percent of smallholder farm households was found to be food insecure. Food insecurity incidence is high amongst households headed by persons without any formal education (about 33%) as compared to 14% for household heads who have attained vocational, secondary or post secondary education. Amongst farm households, food insecurity is a rural phenomenon, with an incidence of 30 percent as compared to 17 percent for urban farm households.

Food scarcity amongst households is severe during the planting seasons (over 80 percent), that is, between the months of June and July. This may be attributable to low food availability from the previous year's harvest, with inadequate storage facilities being a key concern. The most common food coping strategies adopted by farm households include reduction in adult food consumption (32%), reliance on less expensive foods (31%) and reduction in the frequency of times food is eaten (31%). Others include purchase of food on credit, reliance on casual labour for food and eating unusual foods. On the extremes, some farm households consume seed stock saved for future use, go the entire day without eating and even sometimes feed other working households at the expense of non-working members.

Household expenditure on staples such as maize, rice, yam and millet is approximately two-thirds, followed by meat and fish (18 percent). The share of expenditure on food eaten outside the home is about 2 percent. Amongst the poorest households, shares of expenditure on staples and meat and fish are 80 percent and 10 percent respectively as compared to 65 percent and 20 percent for those within the wealthiest quintile. Average number of days households consume meat and fish within the week is slightly higher for DHHs (4 days) than NDHHs (3 days). Number of days households consume meat and fish as well as milk are strongly correlated with households food consumption levels, 0.8933 and 0.5097 respectively (both at the 1% significance level).

The two most important sources of food amongst farm households include cash purchases (54%) and own production (43%). Other sources include fishing, hunting and gathering, credit purchases, exchanges and gifts.

Impact of livelihood diversification on household food security

Household wealth, farm size, education attainment of household head and number of livelihood activities (including remittances) significantly demonstrated positive impact on household food consumption at the 1% significance level. Other household characteristics such as gender, age of household head, dependency ratio, household size and high food prices were found to be insignificant predictors of household food consumption.

The OLS regression results showed that a unit increase in livelihood activity improves household food consumption by 7 points. A disaggregation of this result by sex of household head revealed that whereas livelihood diversification generates positive significant impact on food consumption for male-headed households, that of female-headed households was found to be insignificant.

5.3 Verification of study hypotheses

By drawing on the WFP's CFSVA Ghana 2012 survey, the Bole district dataset to be precise, this study sought to investigate three main hypotheses. These are verified as follows:

Hypothesis 1: Farm households' engagement in multiple livelihoods improves food security levels

By using food consumption score as a proxy for modeling household food security and number of livelihood activities (including remittances) as proxy for quantifying livelihood diversification, the study found out that increasing household livelihood or income source by a unit culminates into approximately 7 points as returns to households food consumption, other things being equal. Thus, for households who engage in additional livelihoods, the likelihood of improving their food security levels is high to some extent. The result obtained is significant at the 1% level, therefore confirming the hypothesis that farm households' engagement in multiple livelihoods improves food security levels.

Hypothesis 2: Impact of livelihood diversification on food security is higher for male headed-households than for female headed-households

Disaggregation of household food security impact of livelihood diversification (as shown in Appendix 11) by gender revealed a significant effect for MHHs and an insignificant relationship for FHHs. The insignificant result observed for households headed by females can be attributed to the small sample size. It is also possible that for FHHs included in this study, their participation in additional livelihoods is limited, thereby failing generate any significant effect on food security. Thus, the hypothesis that impact of livelihood diversification on food security is higher for MHHs than for female-headed households is confirmed.

Hypothesis 3: Farm households' engagement in multiple livelihoods is associated with households' resilience levels

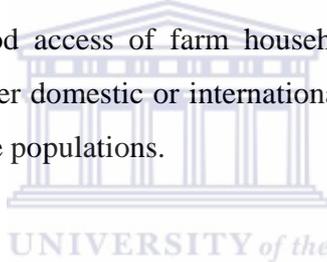
Using households' recovery rate from difficulties as proxy for resilience and dummy for livelihood diversification (DHHs=1 and NDHHs=0), a chi square value of 8.4905 was obtained at the 5% significance level. Based on this finding, the hypothesis that farm households' engagement in multiple livelihoods is associated with households' resilience levels is validated.

5.4 Key Lessons and policy recommendations

This section examines the implications of key findings outlined above by proposing policy actions critical for enhancing the food insecurity-reducing effect of livelihood diversification. This is presented at two levels: the first highlights key case study lessons relevant for improving household food security through livelihood diversification. The second aspect prescribes policy recommendations that transcend livelihood diversification to include support for promoting sustainable agriculture. The rest of the section is devoted to suggestions for further research.

5.4.1 Lessons learned from the case study

- An over-reliance on agriculture as the ‘magic bullet’ for reducing food insecurity in Bole, northern Ghana or even in SSA could be far-fetched.
- Diversifying livelihoods alone cannot guarantee improved food security for all farm households particularly the vulnerable who have low capacity to participate in non-farm activities.
- Achieving improved and sustainable food security for farm households would therefore require a mixed-bag of support for food production, non-farm enterprises and safety-nets.
- Farm households with limited or no diversification tend to be more vulnerable to food insecurity than for those who are highly diversified.
- While building sustainable livelihoods remain central to increasing food availability and food access of farm households, need-based food assistance programmes, whether domestic or international, can help increase food security levels for vulnerable populations.



5.4.2 Leveraging livelihood diversification to improve household food security in northern Ghana: Policy recommendations

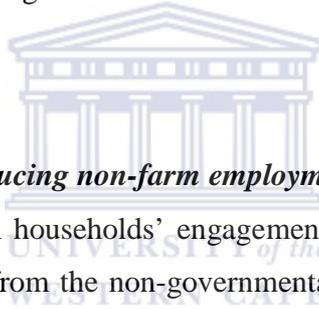
As results from this study have demonstrated, engaging in multiple livelihoods brings a lot of leverage to guaranteeing food security for farm households, the majority of whom are rural dwellers. Based on this, the following key recommendations are proffered.

Encouraging livelihood diversification through increased support for smallholder agriculture: the starting point

While literature reviewed in this study point to the unattractiveness of subsistence farming as one of the fundamental reasons for which farm households engage in non-farm employments, it is equally true that increasing support for smallholder agriculture has the potential to generate multiplier effect on non-farm enterprises. As shown by this study, changing farm households’ status from being smallholders to large-scale farmers

induces them to diversify livelihoods. In other words, displacing smallholder agriculture through increased access to land, new technologies and information, irrigation facilities and credit would result in a transformation of subsistence farming into a more commercialized one, which then translates into increased incomes for farm households. With such gains, households will be able to improve their food consumption levels as well as have enough to save and later use the savings accumulated to invest in non-farm ventures.

Aside the benefits that would accrue to households, increased crop productivity resulting from such support, would assure increased food availability at the national level. Specific to northern Ghana, the Savannah Plan for Accelerated Growth being implemented by the Savannah Accelerated Development Authority in the about 38 districts and other disparate agriculture-based interventions should channel resources in this regard.



Creating the milieu for inducing non-farm employments

Central to stimulating farm households' engagement in diversification is the need for government, with support from the non-governmental and private sectors to create the right environment. In rural districts such as the case study, access to economic infrastructure such as roads, electricity, irrigation and market centers are limited; in some cases, these facilities are non-existent. These infrastructural backlogs serve as disincentive to private sector investments, thereby depriving farm households of such opportunities. As a result, government, with support from the NGOs sector should make provision for these needs.

Harnessing local non-farm employment opportunities

From this study, non-farm activities engaged in by farm households are skewed towards livestock production, fishing, and petty trading. In rural districts such as Bole, there exist huge potential for eco-tourism. According to the 2010 Bole district Human Development Report (UNDP, 2010), there are numerous tourism sites that remain unexplored. Developing these sites with support from the Ghana Tourist Board and

other actors would induce farm households in taking up such non-farm opportunities. With this, income from non-farm activities increases, thereby improving food consumption as well as non-food consumption for farm households. Also, such a move has the tendency of spurring the development of rural enterprises, creating a multiplier effect of some sort. It is therefore recommended that policies that are necessary for facilitating the development of such employment avenues be mainstreamed.

Re-orientating rural development policies and programmes to reflect non-farm enterprises

As part of efforts to mainstream non-farm enterprises for farm households, existing rural development policies would need reformation and up-scaling. While the recently expired Rural Enterprises Project II provided a significant impetus for the development of micro-small and medium enterprises, it was only operational in 66 districts. It is therefore recommended that REP is sustained and up-scaled. This should be fashioned in a manner that incorporates modalities which target farm households directly. Also, the implementation of the Savannah Plan for Accelerated Growth in northern Ghana should feature programmes and projects that encourage farm households to engage in non-farm employments.

More specifically, such reforms should focus on these two key areas;

- Build capacity in vocational and skills training for farm households. Whether in rural or urban areas, training and skill development is a pre-requisite for entering into the labour market and also tend to enhance one's ability to engage in diverse economic activities. Thus, relevant schemes in this regard should be rolled-out, targeting women and the youth in particular.
- Support for livestock production in particular should be mainstreamed, given the complementarities this brings to both food security and livelihood diversification, and the fact that it is a vital savings and insurance strategy for farm households in particular.

Safety-nets for vulnerable farm households

For poor farm households who do not engage in any form of diversification, coping with food insecurities could be challenging. It is recommended that food assistance schemes by NGOs and government be implemented.

Cross-cutting issues

From results ascertained, it was evident that the impact livelihood diversification generate on household food security was significant for male-headed households than for female-headed households. Improving on this situation would therefore require increased support for women. In the recommendations stated earlier, it important for women to be prioritized, for instance, when it concerns training and skills development or even increasing their access to agricultural extension services.

Also, functional education for farm households, particularly women should be strengthened in the Bole and northern Ghana as a whole. Such adult literacy programmes can help improve literacy levels of farm household heads and their members as well as enhance their capacity to engage in diverse livelihood portfolios.

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5.4.3 Expanding the frontier of research in livelihoods and food security

In addition to the above recommendations, the following areas are proposed for future research.

- Further replication of this study in areas that are reliant on cash crops such as cocoa and cashew nuts as their main source of livelihood could reveal useful trends in comparison with subsistent food crop farmers.
- While this study attempted an inter-household gender analysis of livelihood diversification, intra-household gender dynamics to livelihoods behavior and livelihood diversification will need further examination going forward, especially in northern Ghana, where patriarchal structures, have over the years tended to discriminate against women.

- One interesting finding from this study was the fact that unlike large-scale farming, smallholder agriculture tends to limit farm households ability to participate actively in non-farm employments. Detailed research action would be required in this regard.
- Also, a disaggregated analysis of the impact of specific livelihoods such as livestock production, petty trade or eco-tourism on household food security could reveal useful insights. One important area of interest would to find out how livelihood opportunities are explored by farm households.
- An important area that would require further research is how food assistance programmes in general impact on household food security on the one hand, and how it affects local livelihoods. This may be conducted on a bigger geographical scope, perhaps at regional or national levels.



5.5 Conclusion

Drawing on the World Food Programme's 2012 Comprehensive Food Security and Vulnerability Analysis survey conducted in northern Ghana, this study has demonstrated the extent to which livelihood diversification amongst farm households in the Bole district of the northern region influences household food security. Results ascertained showed that taking-up additional livelihood or income portfolio generates a positive impact on household food security level. Thus, demonstrating the importance of livelihood diversification in improving general household welfare as enshrined in the Sustainable Livelihoods Framework presented in chapter two of this thesis. Unlike female-headed households, a significant relationship was found between livelihood diversification and household food security for households headed by men.

Also, this study has shown that multiple factors underpin households' choice to participate in non-farm employments, namely wealth, farm size, household size, and high food prices. The study also revealed that household food insecurity amongst farm households is linked to poverty, education, and farm size. In effect, food availability

still remains an important aspect that needs no compromise in food security policies. Similarly, the fight against hunger in northern Ghana and sub-Saharan Africa at large cannot be won independently of non-farm employments, hence the need for policy-makers to strike a balance in their rural poverty reduction efforts.

Evidently, this study has generated a new perspective to understanding the relationship existing between livelihood diversification and household food security as well as along gender lines. It is therefore envisaged that the recommendations proffered above would be given the necessary policy attention by the Government of Ghana, local as well as international non-governmental organizations and the private sector to first, increase support for smallholder food production and second, to increase farm households' economic access to food through increased support for non-farm rural enterprises.



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APPENDICES

Appendix 1: Summary statistics of selected household variables

Variable	Definition	Observations	Mean	Std. Dev.
Food consumption score	Household food security score, ranging from 0-112	196	42.5331	15.9494
No. of livelihood activities	Number of livelihoods activities undertaken by farm households including remittances	196	1.6377	0.7135
Wealth index	Wealth of farm households based on assets and housing conditions	196	-0.2364	0.7631
Dependency ratio	The ratio of active population to inactive within the household	196	1.3307	1.1049
Farm size	Area cultivated by household in survey year (acres)	196	7.4362	7.0320
Household size	Number of household members	196	9.2295	5.1821
Educational attainment	Educational attainment level of household head (none=0, basic=1 and vocational or higher=2)	196	0.2551	0.5126
High food prices	Dummy for household experiencing high food prices (yes=1, No=0)	196	0.0255	0.1580
Male	Dummy for gender of household head (Male=1, Female=0)	196	0.9081	0.2895
Age	Age of household head in years	196	51.2449	12.0491

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Appendix 2: Crosstab of gender by marital status

Gender of household head	Marital status of household head				Total
	Married	Divorced/ separated	Widow(er)	Single	
Male	168 (94.38)	6 (3.37)	0 (0.00)	4 (2.25)	178 (100.00)
Female	1 (5.56)	5 (27.78)	12 (66.67)	0 (0.00)	18 (100.00)

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: Values in parentheses are percentages.

Appendix 3: Crosstab of educational attainment level of heads of farm households by gender

Highest educational attainment of household head	Gender of household head	
	Male	Female
No schooling	135 (75.84)	18 (100.00)
Primary school	16 (8.99)	0 (0.00)
Middle/JSS/JHS	20 (11.24)	0 (0.00)
Secondary/Technical/vocational	4 (2.25)	0 (0.00)
Higher	3 (1.69)	0 (0.00)
Total	178 (100.00)	18 (100.00)

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: Values in parentheses are percentages.

Appendix 4: Household diversification status by gender

Livelihood diversification status	Gender of household head	
	Male	Female
Diversified households	87 (48.88)	8 (44.44)
Non-diversified households	91(51.12)	10 (9.90)
Total	178 (100.00)	18 (100.00)

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: Values in parentheses are percentages.

Appendix 5: Farm households' main reason for migrating

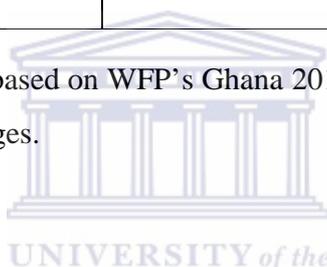
Reason	Frequency	Percent (%)
Looking for paid employment	15	31.35
Inadequate food through the year	2	4.17
Poor climatic conditions (drought etc.)	3	6.25
Insecurity (violence)	1	2.08
Education	4	8.33
Other	23	47.92
Total	48	100.00

Source: Own computation based on WFP's Ghana 2012 CFSVA survey

Appendix 6: Frequency of engagement for primary activity by household diversification status

Frequency of engagement in primary activity	Livelihood diversification status	
	Diversified households	Non-diversified households
Daily or almost daily	8 (8.42)	19 (18.81)
Regularly/predictable	82 (86.32)	76 (75.25)
Irregularly/unpredictable	5(5.26)	6 (5.94)
Total	95 (100.00)	101 (100.00)

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: Values in parentheses are percentages.



Appendix 7: Farm size categorized by wealth index quintiles

Area cultivated (categories)	Wealth index quintile				
	Poorest	2	3	4	Wealthiest
Smallholders (5 or less acres)	23 (71.88)	35 (68.63)	31 (59.62)	21 (53.85)	14 (73.68)
Medium (6-10 acres)	7 (21.88)	8 (15.69)	13 (25.00)	8 (20.51)	1 (5.26)
Large (11 or more acres)	2(6.25)	8 (15.69)	8 (15.38)	10 (25.64)	4 (21.05)
Total	32 (100.00)	32 (100.00)	52 (100.00)	39 (100.00)	19 (100.00)

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: Values in parentheses are percentages.

Appendix 8: Food insecurity by experiences of low crop production

Food security status	Area cultivated (categories)		
	Smallholders (5 or less acres)	Medium (6-10 acres)	Large (11 or more acres)
Food secure	27 (33.75)	7 (35.00)	0 (0.00)
Food insecure	53 (66.25)	13 (65.00)	15 (100.00)
Total	80 (100.00)	20 (100.00)	15 (100.00)

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: Values in parentheses are percentages.

Appendix 9: food insecurity and community level

Community/cluster	Food security status	
	Food secure	Food insecure
Banda Nkwanta	8 (10.53)	0 (0.00)
Bole	6 (7.86)	3 (15.79)
Bonbontey	2 (2.63)	4 (21.05)
Carpenter	5 (6.58)	2 (10.53)
Chache	7 (9.21)	5 (26.32)
Chibrinyoa	8 (10.53)	1 (5.26)
Kakiase	11 (14.47)	1 (5.26)
Kedenso	2 (2.63)	3 (15.79)

Latiegberi	2 (2.63)	0 (0.00)
Maluwe	6 (7.86)	0 (0.00)
Ntereso	19 (25.00)	0 (0.00)
Total	76 (100.00)	19 (100.00)

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: Values in parentheses are percentages.

Appendix 10: Multicollinearity test using VIF

Explanatory Variables	VIF	1/VIF
No. of livelihood activities	1.11	0.899968
Wealth index	1.17	0.857437
Dependency ratio	1.06	0.945087
Farm size	1.33	0.750023
Household size	1.43	0.701120
Educational attainment	1.10	0.908999
High food prices	1.08	0.927406
Age	1.08	0.923209
Mean VIF	1.17	

Appendix 11: Multiple regression results disaggregated by sex of household head

Explanatory Variables	Household food security (food consumption score)	
	Male-headed households (coefficients)	Female-headed households (coefficients)
No. of livelihood activities	6.9751*** (3.89)	6.2814 (1.36)
Wealth index	7.0611** (4.89)	12.8614** (2.49)
Dependency ratio	0.0728 (0.08)	-1.4388 (-0.45)
Farm size	0.5430*** (3.28)	1.4807 (1.43)
Household size	-0.090 (-0.37)	-0.1654 (-0.31)
Educational attainment	4.7317** (2.33)	-
High food prices	-1.8646 (-0.88)	8.6968 (1.63)
Age	-0.0369 (-0.42)	-0.24071 (-0.60)
Constant	29.7876*** (4.93)	46.0731* (2.22)
Adjusted R ²	0.2795	0.5344
F-statistic	9.48***	3.62**
No. of observations	176	17

Source: Own computation based on WFP's Ghana 2012 CFSVA survey. Note: *, ** and *** denote significance at 10%, 5% and 1% levels respectively. Values in parentheses are t-values.