

www.udsspace.uds.edu.gh

UNIVERSITY FOR DEVELOPMENT STUDIES

**LIVELIHOOD DIVERSIFICATION AND MULTIDIMENSIONAL
POVERTY IN GHANA: SUSTAINABLE LIVELIHOOD FRAMEWORK
APPROACH**

UNIVERSITY FOR DEVELOPMENT STUDIES



DAGUNGA GILBERT

2020

www.udsspace.uds.edu.gh

UNIVERSITY FOR DEVELOPMENT STUDIES

**LIVELIHOOD DIVERSIFICATION AND MULTIDIMENSIONAL
POVERTY IN GHANA: SUSTAINABLE LIVELIHOOD FRAMEWORK
APPROACH**

BY

DAGUNGA GILBERT (B.Sc. AGRIBUSINESS)

UDS/MEC/0024/18

**THESIS SUBMITTED TO THE DEPARTMENT OF AGRICULTURAL AND
RESOURCE ECONOMICS, FACULTY OF AGRIBUSINESS AND APPLIED
ECONOMICS, UNIVERSITY FOR DEVELOPMENT STUDIES IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF
MASTER OF PHILOSOPHY IN AGRICULTURAL ECONOMICS**

UNIVERSITY FOR DEVELOPMENT STUDIES



DECEMBER, 2020

DECLARATION

Student

I hereby declare that, except for the references to the works of other researchers which have been duly acknowledged, this thesis is as a result of my own research and that no part of it has been presented for another degree in this University or elsewhere.

Candidate's Signature: Date:

Name: **Dagunga Gilbert**

Supervisors

We hereby declare that the preparation and presentation of the thesis was supervised in accordance with the guidelines on supervision of thesis laid down by the University for Development Studies.

Main Supervisor's Signature: Date:

Name: **Dr. Michael Ayamga**

Co-Supervisor's Signature: Date:

Name: **Dr. Gideon Danso-Abbeam**

Head of Department's Signature: Date:

Name: **Dr. Hamdiah Alhassan**



ABSTRACT

The study was set to investigate the impact of livelihood diversification on household's multidimensional poverty in Ghana using the seventh round of the Ghana Living Standards Survey (GLSS7). Drawing its roots from the Sustainable livelihood framework approach, the study first identified the extent of livelihood diversification, the drivers of livelihood diversification across three quantiles of livelihood diversification index, the level of multidimensional poverty as well as the determinants of multidimensional poverty in Ghana. Results from the margalef index revealed that the Northern belt recording the least in terms of the extent of both crop and income diversification. The simultaneous bootstrapped quantile regression showed that both push factors, pull factors and location variables influence livelihood diversification at various quantiles in Ghana. Meanwhile, multidimensional poverty was relatively high in the country with the northern belt identified as the poorest belt followed by the middle belt and then the Coastal belt. Finally, while the impact of crop diversification was found to reduce multidimensional poverty at the lower and middle quantiles of diversification, income diversification was found to reduce multidimensional poverty at the higher levels of diversification. The study thus recommended that; households need to specialize after some level of diversification on-farm while non-farm income diversification activities should be encouraged since its impact outweigh specialization. Secondly, multidimensional poverty could be good a tool in measuring our progress in the achievement of the SDGs than the monetary approach given the limitation of the monetary approach. And finally, livestock rearing, encouraging saving group formation, extension service delivery as well as employment are vital policy instruments in fighting multidimensional poverty in Ghana.



ACKNOWLEDGEMENTS

“But thou shalt remember the Lord thy God: for it is he that giveth thee power to get wealth, that he may establish his covenant which he swore unto thy fathers, as it is this day” (Deuteronomy 8:18 KJV). I am forever grateful to the Almighty God for making this scripture come true in my life by making this thesis a success. I say thank you, Lord Jesus. Amen.

My heartfelt gratitude goes to my supervisors; Dr. Michael Ayamga and Dr. Gideon Danso-Abbeam for their constant guidance, advice, constructive criticism and encouragement which led to the success of this work. Your timely response and unprecedented appetite for the success of this thesis has been tremendous and I am much grateful for that. You have not only supervised my work but have also modelled me for my academic journey. May the good Lord bless you.

I appreciate also the efforts of the former Head of Department who started with us, Dr. Joseph A. Awuni for his constant encouragement and contribution towards this thesis. You have always been available to listen and have made significant inputs that led to the success of this thesis. You have been a father and role model. I also congratulate and thank the current Head of Department, Dr. Alhassan Hamdiyah for her constant advice and zeal to see us graduate successfully. To all the lecturers of Agricultural and Resource Economics department for their advice, counsel, and encouragement given to me which led to the success of this research especially Mr. Isaac Gershon K. Ansah, Dr. Joseph Amikuzuno, Prof. Samuel A. Donkoh and Dr. Ehiakpor Sedem Dennis among others, I say very big thanks to you all.



I also wish to express my heartfelt gratitude to the German Academic Exchange Services (DAAD) for the financial support given me for my master's study. I must say that, your offer of scholarship has been the back bone for the success of this research as it gave me a sound mind to concentrate and remain focused. I am most grateful.

Special thanks also go to my lovely wife, Mrs. Rose Lamisi Dagunga for her support and understanding during this period of study. And to the entire family; my Dad, Mr. Matthew Dagunga, mom, Madam Augustina Dagunga and Sister Juliana for your love and sacrifices given me this far in my life. May the good Lord bless you and grant you all long life for me.

I also thank the Ghana Statistical Service for making the GLSS7 data available which was used for this thesis. I am very appreciative. To my study mates, Vida Bisilki, Marfo Emmanuel and all the class mates, you are wonderful people. To all who have contributed in any way to the success of this research, I am very grateful. May the good Lord continually bless and keep you. Amen.



DEDICATION

I dedicate this work to my Dad, Mr. Matthew Dagunga and my mom, Mrs. Augustina Sinnim whose responsibility have made me who I am today.



TABLE OF CONTENTS

Content	Pages
DECLARATION	i
ABSTRACT	ii
ACKNOWLEDGEMENTS	iii
DEDICATION	v
CHAPTER ONE	1
INTRODUCTION	1
1.1 BACKGROUND	1
1.2 Problem Statement	4
1.3 Research Questions	7
1.4 Research Objectives	7
1.5 Justification	8
1.6 Organization of the Study.....	9
CHAPTER TWO	10
LITERATURE REVIEW.....	10
2.1 Chapter Outline	10
2.2 The Concept of Livelihood Diversification.....	10
2.3 Drivers of Livelihood Diversification: Pull versus Push Factors.....	13
2.4 Livelihood Diversification versus Specialization.....	15
2.5 Empirical Review on the Impact of Livelihood Diversification	19
2.6 The Concept of Poverty.....	21
2.7 Theories of Poverty: Cultural versus Structural Theory	24



2.8 Measures of Poverty	27
2.9 Monetary Poverty versus Multidimensional Poverty	29
2.10 Poverty in Ghana: A review of policies from the colonial to post-independence era	32
2.11 Empirical Review on Multidimensional poverty in Ghana.....	35
2.12 Empirical Review on the Determinants of Poverty.....	37
CHAPTER THREE.....	41
METHODOLOGY.....	41
3.1 Chapter Outline	41
3.2 Study Area, Data Source and Sampling Technique	41
3.3 Conceptual Framework	43
3.4 Analytical Framework.....	47
3.4.1 The Margalef Index (MI).....	47
3.4.2 The Bootstrapped Simultaneous Quantile Regression.....	49
3.4.3 The Alkire Foster Multi-dimensional Poverty Index (MPI).....	52
3.4.4 The Probit Model.....	55
3.4.5 The Inverse Probabilty Weighted Regression Adjustment (IPWRA) Model	55
3.5 Definition of Variables, Measurement and Apriori Expectations	57
3.5.1 Apriori Expectation for the Pull factors of Livelihood Diversification...59	
3.5.2 Apriori Expectation for the Push Factors of Livelihood Diversification.64	
3.5.2 Apriori Expectation on the Determinants of Multidimensional Poverty .65	
CHAPTER FOUR.....	70



RESULTS AND DISCUSSION	70
4.1 Chapter Outline	70
4.2 Summary Statistics of Pull and Push Factors of Livelihood Diversification	70
4.3 Extent of Livelihood Diversification in Ghana	75
4.4 Drivers of Livelihood Diversification in Ghana.....	79
4.4.1 Drivers of crop Diversification	82
4.4.2 Drivers of Income Diversification in Ghana.....	86
4.5 Level of Multidimensional Poverty in Ghana	92
4.5.1 Percentage Deprivations of Households in the various Indicators	93
4.5.2 Multidimensional Poverty in Ghana	96
4.5.3 Contribution of each domain to multidimensional poverty by belt	100
4.5.4 Contribution of each domain to multidimensional poverty by location	101
4.6 Drivers of Multidimensional poverty in Ghana.....	103
4.7 Impact of Livelihood Diversification on Multidimensional Poverty	111
CHAPTER FIVE.....	116
CONCLUSIONS AND RECOMMENDATIONS	116
5.1 Chapter Outline	116
5.2 Key Findings of the Study.....	116
5.3 Conclusions	118
5.4 Policy Recommendations.....	120
Appendix	139



LIST OF TABLES

Table 2.1 Profile of Monetary and multidimensional poverty incidence based on some key variables in Laos	31
Table 2.2: Monetary poverty versus Multidimensional poverty in Ghana over some selected regions	32
Table 2.3: Rural farmer's perspective on who is poor	35
Table 3.1: Components of MI formula by dimensions of livelihood diversification.....	49
Table 3.2: Dimensions, indicators, deprivations cutoffs and weights of household MPI.....	54
Table 3.3: Definition of Variables, Measurement and Apriori Expectations	58
Table 4.1: Descriptive Statistics of Pull and Push factors of Livelihood Diversification.....	73
Table 4.2: Extent of Livelihood Diversification in Ghana.....	78
Table 4.3 Quantile Regression Estimates of the Drivers of Livelihood Diversification	80
Table 4.4 Percentage Deprivations of Households in the various Indicators	95
Table 4.5 Multidimensional Poverty Situation in Ghana.....	97
Table 4.6 Drivers of Poverty in Ghana	104
Table 4.7: Impact of Livelihood Diversification on Multidimensional Poverty in Ghana	114



LIST OF FIGURES

Figure 3.1 Map of Ghana (Old and New)42

Figure 3.2: Sustainable Livelihood Framework.....45

Figure 4.1: Contribution of each domain to multidimensional poverty in Ghana .101

Figure 4.2: Contribution of each domain to multidimensional poverty by location.....102



LIST OF ACRONYMS

ATT	Average Treatment effect on the Treated
CDA	Coastal Development Authority
DAAD	German Academic Exchange Services
DfID	Department for International Development
ECOWAP	ECOWAS regional agricultural policy
FASDEP	Food and Agricultural Sector Development Policy
FGT	Foster, Greer and Thorbecke
GLSS	Ghana Living Standards survey
GPRS	Ghana Poverty Reduction Strategy
GSS	Ghana Statistical Service
HDR	Human Development Report
IPWRA	Inverse Probability Weighted Regression Adjustment
KJV	King James Version
LEAP	Livelihood Empowerment against Poverty
MDA	Middle Development Authority
MDGs	Millennium Development Goals
METASIP	Medium Term Agricultural Sector Plan
MI	Margalef Index
MPI	Multidimensional Poverty Index
NDA	Northern Development Authority
NGHDR	Northern Ghana Human Development Report
OECD	Organization for Economic Co-operation and Development



OPHI	Oxford Poverty and Human Development Initiative
PFJ	Planting for Food and Jobs
PGI	Poverty Gap Index
SDGs	Sustainable Development Goals
SLF	Sustainable Livelihood Framework
UN	United Nations
UNCTAD	United Nations Conference on Trade and Development
UNDP	United Nations Development Programme



CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND

The fight against poverty is a global priority. It is at the forefront of every economy, especially for most developing countries like Ghana. The seriousness ascribed to poverty alleviation has made it the number one global concern in the Sustainable Development Goals (SDGs). Development and poverty alleviation are inseparable concepts ((Kanbur, 1991; Chambers, 2006)). For most agrarian economies like Ghana, where the majority of households depend on agriculture, developing the agricultural sector is essential if poverty must be alleviated amidst the adverse effect of climate change (UNCTAD, 2015). In the light of this, several interventions have been implemented by both government and development partners aimed at developing the agricultural sector to eradicate poverty as well as cope with climate change at all regional and local levels. In Africa, the ECOWAS regional agricultural policy (ECOWAP) seeks to increase food production and income generation that will contribute to reduction in poverty levels. In Ghana, several policies have been implemented targeted at eradicating poverty through the agricultural sector as the engine for growth. For instance, the Ghana Poverty Reduction Strategy (GPRS I) was set up to achieve stability in the economy and eradicate poverty where development of rural infrastructure was seen as the key to economic growth between the 2003 and 2005. The GPRS I was replaced by the Growth and Poverty Reduction Strategy (GPRS II). The GPRS II, among others sought to accelerate agricultural growth through land reforms and enhanced access to credits by smallholder farmers



as well as the strengthening of extension delivery to ensure the adoption of modern but medium technology which was minimally achieved. This was followed by the Food and Agricultural Sector Development Policy (FASDEP I) aimed at strengthening the private sector as the engine of growth. The FASDEP also failed because of a number of reasons, which includes the poor targeting of the smallholder farmers. The FASDEP I was also replaced by the second Food and Agricultural Sector Development Policy (FASDEP II). In FASDEP II, the Medium-Term Agricultural Sector Plan (METASIP) was developed to boost agricultural growth. METASIP aims at achieving 6% agricultural growth annually and 10% as well as transforming the smallholder farmer to engineer rapid economic growth which was not also fully achieved. The current Planting for Food and Jobs (PFJ) programme by the current government is aimed at increasing farm productivity while providing jobs for the people. Most of these policies identified the fact that the agricultural sector must be given priority to ensure growth and poverty alleviation.

Also, many empirical works have often been tailored towards investigating farmer's productivity, efficiency and their adoption of agricultural innovations (Donkoh, et al., 2013; Amos, 2007; Iddi et al., 2018). While this policy discourse has been relevant for the development of the agricultural sector, there has been a recent increasing consensus on the development of the rural non-farm economy since farmers engage in multiple activities aside farming (Nkegbe et al., 2018 ;UNCTAD, 2015). In other words, concentrating solely on on-farm agricultural development is probably not enough to engineer the desired growth nor curb the menace of poverty. UNCTAD, (2015) indicated that two-thirds of smallholder farmers do not have the needed



resources to “farm their way out of poverty” and for that matter, eradicating poverty will require the creation of multiple employment opportunities outside farming, including agribusiness, industry and services. Many farm households diversify their livelihood activities either on-farm, off-farm and/or non-farm. Livelihood diversification could be defined as the process by which households construct a diverse portfolio of activities and social support capabilities to survive and to improve their living standards (Ellis, 1998, p. 4).

Livelihood diversification could be seen as a conscious process through which households engage in order to smoothen income, handle risks as well as respond to opportunities for improving wellbeing. No wonder the Northern Ghana Human Development Report, (2018) recommended that, there is the need to focus on crop diversification and income diversification as well as a shift to non-farm activities in order to address the developing challenges of northern Ghana. Diversification serves as an income accumulation mechanism for farm expansion and the purchase of farm inputs (Ellis & Biggs, 2001; Lay & Schüller, 2008). Evidence from Harvey et al. (2014) and Dagunga et al. (2018) indicates that farm households diversify their livelihood in order to adapt to various idiosyncratic risks such as weather variability, climate change, production, economic and institutional risks and uncertainties. Laube et al. (2012) revealed that farm households diversify their livelihoods as means of adapting to the changing climate. Antwi-boasiako (2012) also showed that farm households in Ghana diversify their livelihoods as a means of improving their standards of living.



Given the development potential of the non-farm economy through livelihood diversification and as recommended by the 2018 Northern Ghana Human Development report, it is necessary to examine the linkage between livelihood diversification and multidimensional poverty in the country which is the current priority on global and regional agenda. This study is therefore set to unravel the divers of livelihood diversification as well as multidimensional poverty and show how livelihood diversification contributes to eradicating household multidimensional poverty in Ghana.

1.2 Problem Statement

In 2010, the economy of Ghana attained lower-middle-income status after achieving an average economic growth of 7% per year since 2005. The inflow of revenue from off-shore oil revenue beginning from 2011 coupled with an impressive decline in monetary poverty from 51.7% to 24.2% of the population between 1992 and 2013 respectively made Ghana among the countries in Africa to hit Millennium Development Goal 1 (MDG1) target (Cooke et al., 2016). Despite the critical intervention programmes both by government and development partners in curbing poverty across the country, poverty reduction has not kept pace with the accelerated economic growth in Ghana. The Ghana Statistical Service [GSS] (2018) poverty profile reported that much still needs to be done in order to achieve the first sustainable development goal (SDG1) because extreme poverty increase from 2.2 million to 2.4 million in absolute terms between the periods of 2013 and 2017 respectively. The 2016 Ghana poverty and inequality report indicated that despite



significant interventions both by government and NGOs to improve livelihoods in efforts to achieve the Sustainable Development Goals 1, poverty still exists in most parts of the country (Cooke et al., 2016). The majority of the poor consistently lived in the rural areas relative to the urban dwellers from 2006 to 2013 (Cooke et al., 2016).

One major limitation of the above poverty analysis among others is that, it is based on monetary poverty analysis which is not sufficient. This is because poverty is a multidimensional concept comprising the severe deprivation of basic human needs including health, education and living standards (United Nations, 1995 p.57) and so monetary measures fail to capture the intensity of poverty (i.e., the percentage of deprivations households suffer). In 1997, a poor man was once interviewed in rural Kenya about poverty and his response was as follows;

“Don’t ask me what poverty is because you have met it outside my house. Look at the house and count the number of holes. Look at the utensils and the clothes I am wearing. Look at everything and write what you see. What you see is poverty.”

(Nawaran et al., 200 cited in GSS, 2013 p.1) This response of the farmer clearly reveals a multidimensional perspective as opposed to the widely used unidimensional monetary measure.

Also, in the quest to eradicating poverty in Ghana, several interventions and social protection measures have been put in place to curb the menace. Prominent among the social protection measures include the Livelihood Empowerment Against Poverty (LEAP) intending to alleviate short-term poverty as well as encourage long



term human capital development, School feeding programme and Social Security and National Insurance Trust (SSNIT). Other interventions included the fertilizer subsidy policies, including the recent one under the PFJ programme among other interventions. Despite these, the Northern Ghana Human Development Report (2018) still revealed that, the multidimensional poverty incidence varied from 46% to as high as 70% in the Volta and Northern regions respectively which were relatively higher than the estimates by Cooke et al. (2016). The limitation with the report by the former is that it was only based on northern Ghana and was not very comprehensive to be used as a policy guide for the entire country.

Nevertheless, the question amid this poverty situation and analysis is; are farm households doing something about their situation? Could livelihood diversification contribute to addressing the above issue? There have been rising empirical evidence that the best way to transform rural farm households is to identify, understand and appreciate their existing strategies and practices which will then help development workers to induce the desired change (Mudhara et al., 2016). Also, report by the World Bank (2007) and Loison (2015) stated that, promoting livelihood diversification in Sub-Saharan Africa (SSA) helps to eradicate poverty as well as contribute to economic growth. Asravor (2018) also indicated that, farm households diversify outside the farm by trading off their labour to other non-farm sectors as a rational and dependable mechanism to earn extra income. Owusu et al. (2011) found livelihood diversification to have a positive and statistically significant effect on household income and food security. However, none of these studies has shown the extent to which farm households diversify their livelihoods or how livelihood



diversification affects multidimensional poverty. Indeed, people diversify for various reasons, but one would expect that diversifying livelihood activities should create positive welfare effects. For example, one would expect that people who diversify more should have better livelihoods than those diversifying less. This means the causal links between livelihood diversification and welfare indicators such as poverty level is critical. Yet, these links have received less attention in the literature. Meanwhile, knowledge of these links is essential to guide development policy and planning.

1.3 Research Questions

- ❖ To what extent do farm households in Ghana diversify their livelihoods?
- ❖ What factors influence livelihood diversification in Ghana?
- ❖ What is the level of multidimensional poverty in Ghana?
- ❖ What are the drivers of multi-dimensional poverty in Ghana?
- ❖ How does livelihood diversification influence multidimensional poverty in Ghana?

1.4 Research Objectives

The study sought to investigate the implications of livelihood diversification on multidimensional poverty in Ghana. The Specific objectives are to;

- i. assess the extent of livelihood diversification among households in Ghana.
- ii. identify the drivers of livelihood diversification in the Country
- iii. determine the level of multidimensional poverty in Ghana
- iv. identify the drivers of multi-dimensional poverty in Ghana



- v. estimate the effect of livelihood diversification on household multidimensional poverty levels.

1.5 Justification

This study is relevant to government and Non-Governmental Organizations on how livelihood diversification could be used as a tool for agricultural development amidst varying risk and uncertainties. It is indisputable that, climate change remains a key environmental challenge facing farmers in developing countries and since most of these economies are agrarian, it is necessary to investigate possible opportunities that will improve their wellbeing such as livelihood diversification.

Secondly, the study will also provide a comprehensive view of the multidimensional poverty situation in Ghana for the first time. Though attempts have been made by some studies such as NGHDR (2018), it was not comprehensive for national policy across the Country. A comprehensive study on multidimensional poverty is very relevant to evaluate how accurate we have pursued the SDG1 on zero poverty as well as the adjustment that could be made for all-inclusive development and poverty eradication.

Moreover, the study seeks to provide insights to the poverty situations in Ghana to state institutions such as the Northern Development Authority (NDA), the Middle Development Authority (MDA) and the Coastal Development Authority (CDA) set up to spearhead the development planning across the three belts in the Country. The results from the study will bring to light the multidimensional poverty situation in these three belts and offer policy instruments that will help in its eradication.



Finally, results of the study will contribute to the global debate on livelihood diversification or specialization. The use of the bootstrapped quintile regression will give insight on the way to go, whether diversification, specialization or a mixed discourse.

1.6 Organization of the Study

The rest of the study comprises of four chapters. Chapter two reviews the related and relevant literature on livelihood diversification and poverty. At the same time, the methodology of the study is well elaborated in chapter three, where the research design, data source, the conceptual framework, as well as the analytical framework of the study are unraveled. It also includes the empirical model employed, definitions of variables used in the models as well as their apriori expectation. In chapter four, results and discussions of the findings are presented and finally, the summary of findings, conclusions, and recommendations made up the concluding chapter of the study.



CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter review the relevant and related literature on livelihood diversification and Multidimensional poverty. The concept of livelihood diversification is reviewed in Section 0 while the drivers of livelihood diversification as opined by other studies presented in section 0. The debate between livelihood diversification versus livelihood specialization is the subject of section 0 while empirical review on the impact of livelihood diversification is discussed in section 0. With poverty, the chapter first reviewed the concept of poverty as defined by the literature on the subject. Section 0 reviews the concept of poverty, section 0 dealt with the theories of poverty with focus on the cultural and structural theories, the measures of poverty is handled in section 2.8. The dichotomy between monetary poverty and multidimensional poverty is the subject of section 2.9 while section 2.10 reviewed poverty in Ghana from the colonial to post-independence era, 2.11 gave an empirical review of multidimensional poverty in Ghana. The concluding section 2.11 presents an empirical review on the drivers of poverty.

2.2 The Concept of Livelihood Diversification

The increasing concern on the development of the rural non-farm economy led many researchers to investigate the concept of livelihood diversification. Livelihood diversification is the process through which households create multiple portfolios of activities and social support capabilities in order to survive and improve their living



standards (Ellis, 2000). Livelihood diversification is not the same as income diversification as some studies make it appear. For instance Senadza (2014) used the two terms interchangeably in studying the various strategies by which rural households diversify their sources of income in developing countries. Also, Zakaria et al. (2019) studied the welfare effect of livelihood diversification among farm households in Northern Ghana where livelihood diversification was treated as a dummy variable; 1 if the household engages in other income generating activities and 0 if otherwise. This study also focused merely on income diversification and not entirely livelihood diversification. Ellis (1998, p. 5) explained that livelihood diversification differs from income diversification because former (i.e. Livelihood diversification) encompasses income diversification and other forms of diversification such as cropland diversification and labour diversification (Asravor, 2018). Hence, income diversification is only a component of livelihood diversification. Thus, most of these studies did not tell the whole story in using income diversification to explain what and why households diversify their livelihood activities. Even though both imply the multiple engagements of households on varying economic activities, livelihood diversification goes beyond just economic activities to other dimensions such as the household deployment of land and labour on other ventures. Thus, livelihood diversification is a multidimensional concept encompassing all alternative sources of activities households allocate their relatively scarce factors of production. As a result of its multidimensionality, some empirical studies have tackled from different dimensions such as non-farm diversification (e.g. (Nkegbe et al., 2018), off-farm diversification (Senadza, 2014), income



diversification ((Dagunga et al., 2018 and Agyeman et al., 2014) cropland or on-farm diversification (Asravor, 2018), among others. Asravor (2018) also considered other dimensions such as cropland and labour diversification. However, most of these studies do not adequately explain livelihood diversification.

Non-farm diversification refers to the engagement on alternative activities outside the farm. According to Dries et al. (2012), it is the development of economic activities outside the everyday farm work of cultivation of crops and rearing of animals. On-farm diversification or cropland diversification, on the other hand, refers to the process of cultivating varied crop species or rearing multiple categories of animals (Asravor, 2018). On-farm connotes diversification on the farm. Asravor (2018) grouped the non-farm sector of the Ghanaian economy into two categories which includes the wage-employed sector and the self-employed sector. The wage-employed sector is one in which households supply their labour exchange of periodic (daily, monthly etc) wages or salaries. Self-employed sector on the other hand, refers to individuals or households executing their businesses, which could be on table tops or kiosks (Asravor, 2018). In northern, most women are usually involved in agro-processing businesses such as the processing of groundnuts into paste, shea nuts into butter, retail or wholesale rice trading while the men are mostly involved in transportation services, livestock production and trading as well as occasional migration to the southern part of the country in search of relatively greener pastures (Asravor, 2018 ;Antwi-Agyei et al., 2014).

Similarly, off-farm diversification is the engagement in alternative economic activities outside one's farm (i.e. off one's farm). Each of these dimensions tackles



an aspect of livelihood diversification. FAO (2015) indicated that the rural households diversify their livelihood as a dynamic mechanism to handle risk and also earn extra income for improved wellbeing. Empirical studies by Asravor (2018) showed that the Northern belt of the country diversifies lessor as compared to the southern belt. Meanwhile, Owusu et al. (2011), Dzanku (2015) and Senadza (2014) both confirmed evidence of increasing diversification of livelihoods among resource-poor households in northern Ghana.

2.3 Drivers of Livelihood Diversification: Pull versus Push Factors

Though households diversify for varying reasons, several studies on diversification (Barrett et al., 2001; Agyeman et al., 2014; Dagunga et al., 2018) have classified the drivers of livelihood diversification into two broad categories viz; pull factors and push factors ('demand-pull' and 'distress-push' factors, respectively). Hence, households are pulled to allocate their labour or capital on a livelihood activity if the return is higher than the cost. Also, a household could be pushed into other economic activity to overcome the risk of failure from a single source. Lay, J. & Schüler (2008) refer to these factors as opportunity-led and survival-led factors for diversification. Thus, the pull factors for livelihood diversification are favorable factors (opportunity-led) that induce farm households to diversify their livelihood activities while the push factors are unfavorable conditions that push (survival-led) farm households to engage in multiple activities outside the farm (Dimova & Sen, 2010; Bezu & Holden, 2014).



With the pull factors for livelihood diversification, social capital, years of education, farm size, household productive assets, extension contacts, membership of farmer-based organizations, attendance to field demonstrations, credit accessibility, savings groups and nearness to markets are identified by most pieces of literature on the subject (Dries et al., 2012; Polman & Slangen, 2008; Ackah, 2013; Agyeman et al., 2014; Dagunga et al., 2018; Asravor, 2018). Ostrom (2000) defined social capital as “the shared knowledge, understandings, norms, rules, and expectations about patterns of interactions that groups of individuals bring to a recurrent activity”. Trust and social networks are the two main aspects of social capital. According to Polman & Slangen (2008), a low level of social capital could adversely affect the probability for household livelihood diversification. Hence these pull factors are opportunity-led factors that lure farm households to diversify their livelihood activities.

Push factors on the other hand refers to the harsh conditions that ‘pushes’ households to diversify their portfolio of activities either to survive or to overcome inevitable shocks or risk. Among them includes migration into big cities which is common in Northern Ghana, especially during the dry season (Lay & Schüler, 2008; Asravor, 2018). Economic instability like price fluctuation is another push factor that causes farm households to diversify (Asravor, 2018). Most agricultural products are perishable, and a decline in their prices will cause menace if farmers do not adapt to smart techniques to overcome such shocks. An outbreak of pest and diseases, climate change such as drought, land fragmentation, asset depletion-self are other push factors for livelihood diversification (UNCTAD, 2015)



Aside from these opportunity –led and survival-led reasons for livelihood diversification, other factors such as age, gender, female-headed households, and experience have been found to significantly influence livelihood diversification (Ackah, 2013; Agyeman et al., 2014). Institutional factors like per capita income are found to influence livelihood diversification. For example, Agyeman et al. (2014) found household income per capita and age of the respondent to have a negative and statistically significant effect on income diversification in the Western region of Ghana.

2.4 Livelihood Diversification versus Specialization

The literature on agricultural development could be put into two main broad categories. The first category is based on a market-based agricultural/livelihood specialization approach which emphasizes a pathway for promoting farm specialization in order to produce more so as to effectively participate in the market (Timmer, 1997; Bellon et al., 2020). Most of the policies in developing countries have had its foundation from this approach over the decade especially under the Green Revolution (Evenson & Gollin, 2003). The second category is a market-based agricultural/livelihood diversification, which focuses on a paradigm shift from monoculture towards multiple crop varieties in order to meet varied market demand all year round. This will subsequently lead to a shift of resources from one crop to a multiple mix of crops and/or livestock as well as non-farm activities to increase household income and profit (Asante et al., 2018; Bellon et al., 2020).



According to Czyżewski & Smędzik-Ambroży (2015), livelihood specialization is the process of reducing the scope of diversity or increasing the production of a given selected product or activity, while maintaining the production of the remaining products at the unchanged level. Hence, in agriculture, a specialized farm is the one which produces for sale and meets the farm household's needs. This implies that, the fewer the portfolio of activities farm households engage in, the more specialized they are likely to be and vice versa. Full or perfect specialization is therefore the process of engaging in a single activity for one's livelihood.

The argument on which structural development path (i.e. Livelihood diversification or specialization) to be followed by agrarian economies like Ghana could be traced back from Arthur Lewis structural change theory (Lewis, 1958) to Lucas (1988). Most of these structural change theories focuses on the transition from subsistent agriculture to an industrial and more urbanized economic system. In Africa, where the majority of the people engage in agricultural activities with poorly developed industries, there is the un-quenching need for the structural transformation of the sector. One school of thought to this evolution is to move from rudimentary agriculture to a large scale more specialized and market-driven system. However, another school of thought focuses on the structural transformation of an economy into more diversified non-agricultural (non-farm and industrial) activities which will lead to productivity growth and increase commercialization (Emran & Shilpi, 2015). In rural areas, where majority of the people depend on agriculture for the livelihood, diversification within and outside of agriculture is relevant for eradicating poverty and improving the welfare of the people.



Proponents of livelihood specialization argue that it helps to increase the scale and quality of production (Juszczak, 2009). Zielinski (1985) states that livelihood specialization helps in the economization of efforts leading to increase in productivity and efficiency. Also, Stepien (2007) opined that specialization helps to benefit from comparative advantage and increase the competitiveness of such livelihood activity. Czyżewski & Smędzik-Ambroży (2015) studied specialization and diversification of agricultural production in the light of sustainable development in Poland and concluded that specialization of agricultural production leads to higher economic performance than diversification.

On the contrary, literature has recommended the need for livelihood diversification over-specialization due to the risk and uncertainties associated with agriculture amidst the existing climate change (Ellis, 2000; UNCTAD, 2015 ;Dagunga et al., 2018). Food and Agriculture Organization (FAO) policy supports livelihood diversification with the belief that it could be an effective strategy for dealing with challenges relating to food and nutrition security and poverty alleviation (FAO, 2012; Michler & Josephson, 2017). Therefore, most of the country-level case studies conducted by the FAO recommend ways to increase livelihood diversification (crop diversity) even though there is no quantitative evidence available to support the effectiveness of those policies (Kaguongo et al., 2013). In addition, reports by the International Food Policy Research Institute (IFPRI) have argued that farming households would need diversification to increase agricultural income (Tafesse et al., 2015). Michler & Josephson (2017) studied the dynamics of agricultural diversity and poverty in Ethiopia in the light of whether to diversify or specialize, and found



that livelihood diversification was significant in reducing a household 's likelihood of being poor. In particular, they found that a 10% increase in crop diversity reduces the probability of poorness by 18% and reduces the likelihood of poor households remaining in poverty by 18%. They, therefore, concluded that rural households are correlated with poverty reduction through agricultural diversification, not by specialization.

Although most of the literature on livelihood specialization is focused on the Ricardian theory of comparative advantage, which focuses on raising the livelihood portfolio with the best returns, the literature on diversification of livelihoods is focused on portfolio theory, which predicts that risk-averse households can minimize production risk through diversification of livelihoods, and therefore the optimum (Rosenzweig, 1988; Michler & Josephson, 2017). Bellon et al. (2020) tried to reconcile the two approaches to livelihoods in northern Ghana and found that crop diversification is positively related to both own-consumption of food crops and income derived from sold crops, thus suggesting that a positive association suggests a relative gain from diversification of livelihoods over specialization. This was however not comprehensive since crop diversification index was modelled based on the conditional mean function of the linear regression. It also failed to show the extent to which livelihood diversification is beneficial to households over specialization-whether infinitely or a mix of both after some threshold which still leaves a vacuum for more studies on the subject.



2.5 Empirical Review on the Impact of Livelihood Diversification

For most developing countries many longitudinal studies have been undertaken to examine the effects of both crop diversification and income diversification, like Ghana.

Salam et al. (2019) used 153 randomly sampled households from three districts of Bangladesh to assess the extent of various income diversification strategies on rural household welfare using instrumental variable approach and found that, engagement in other forms of non-farm activities together with farming had a significant and positive effect on the household's welfare. The drawback of this study is that the sample at district level is too small to generalize for a nation as a whole. Asfaw et al. (2019) examined the correlation between diversification strategies and household welfare where total household income was used as a proxy for welfare using panel data from Malawi, Niger and Zambia to use total household income as a proxy for welfare. The findings indicate that the effect on the poorest (people at the bottom of the distribution) of both diversification strategies was generally higher and decreases and/or turns to be negative, heading towards the top end of the income spectrum, for all three countries studied. Ebenezer & Abbyssinia (2018) found livelihood diversification to be insignificant in explaining household multidimensional poverty levels using annual General Household Survey of South Africa carried out in 2014. The livelihood diversification in their study was binary, where households that earns income from other sources were coded one and zero if otherwise. This was not comprehensive to be generalized for livelihood diversification. In Nigeria,



Babatunde & Qaim (2010) found off-farm income diversification by farm households to significantly result in higher household calorie supply.

In Ghana, Bellon et al. (2020) examined the benefits from diversification relative to specialization using a case study, from an agricultural research-for-development project in northern Ghana and found that livelihood diversification was more beneficial than specialization as it significantly improves the welfare of the smallholder farmers in the Country. While this study was relevant in answering the question of diversification or specialization, it failed to unravel the extent to which livelihood diversification is beneficial over specialization. Also, the study was not comprehensive enough to generalize for the whole country because it was only for northern Ghana. Owusu et al. (2011) found out that households that engages in other non-farm work experiences significant gains in income and household food security than those that do not in Ghana. Likewise, livelihood diversification proxy by number of livelihood activities was found to have a significant positive effect on household food consumption in rural Ghana (Mensah, 2014).

Nkegbe et al. (2018) also attempted to investigate whether participation in non-farm activities (a diversification portfolio) and agricultural commercialization were complements or competitors using the sixth round of the Ghana Living Standards Survey (GLSS6). The results revealed that the two were complements since non-farm participation resulted increased the probability of selling farm produce as well as the quantity sold. It must, however, be noted that the focus of their study was only based on non-farm participation and not entirely livelihood diversification.



2.6 The Concept of Poverty

There is no single definition of poverty. Lister (2004) stated every definition of poverty is ascribed to its cultural and historical roots. Chambers (2006) indicated that the definition of poverty depends on “who ask”, “how it is understood” and “who answers” to the question of poverty. Following Santos (2017), the traditional view of poverty could be categorized into two main broad categories that has been given considerable support from the literature namely; absolute poverty and relative poverty perspectives.

The absolute poverty definition has its roots from the earlier scientific studies of the subject since the 20th century and based on the subject of subsistence implying the minimum an individual or household requires in order to survive (Santos, 2017). With this dimension of poverty, people are said to be poor if they are below the subsistence level. In order words, they lack the minimum required to live on and to sustain their own lives. The basic premise of absolute poverty, as noted by Santos (2018) is that it is possible to define what people need in order to survive and then ensure that everyone receives that and not otherwise. Hence, what is required of policy makers and governments is to ensure that every individual have such minimal conditions of accessibility to food and shelter. The level of poverty is defined in terms of an amount of money (US\$ 1.25 or US\$ 2.0 per day), or in terms of a certain amount of calories in a diet among other variables that could be defined necessary for people to survive. Thus, absolute poverty is the situation of being unable or only barely able to meet the subsistence essentials of food, clothing, shelter, and basic health.



The relative concept of poverty, on the other hand, emanated after a numerous critic arose about the absolute poverty argument (Santos, 2017). The basic argument of the relative income approach is that, that sought to curb absolute poverty insignificant in making the poor better (Alcock, 2006). The relative poverty argument does not only focus on subsistence but also the needed conditions for one to participate in activities that are primary in a given society relative to others of the same society. According to Townsend (1979, p. 31), persons, families and groups in the community are in poverty when they lack the means to obtain the types of food, engage in activities and have the living standards and facilities that are normal in the societies to which they belong. So relative poverty can be said to be a phenomenon of inequality and refers to one's standard of living defined in relation to the position of income or distribution of expenditure of others.

It expedient to note that each of these perspectives of poverty have their strengths and weaknesses. For this reason, Alcock (2006, p. 68) suggested that adopting only one of them is not the entirely appropriate and for that matter, in any analysis or measurements of poverty, it is crucial to emphasize on the advantages or strengths (Santos, 2017).

The other view of poverty that has received attention in recent literature is the Senian approach based on which others multidimensional poverty measures have been developed. With this approach, poverty is viewed as a concept of deprivation in terms of capabilities, as proposed by Sen (1983). The Senian approach ended the dichotomy between the absolute-relative poverty syndromes considering that both aspects are important, though insufficient, to understand what the meaning of poverty



is. Sen (1983) explained that poverty does not depend solely on a uni-dimensional absolute or relative dimension, but rather on an absolute standard of living, which can involve both an absolute deprivation of a person's capabilities and a relative deprivation of access to goods, income and wealth.

In addition, Chambers (2006) divides the meanings of poverty into four classes, somewhat similar to the conventional theories of total deprivation or the Senian perspective; Income poverty (or its common proxy, Consumption poverty); material lack or want: this includes minimal or low-quality properties (such as housing, clothes, furniture, personal transportation, radio, etc.). It also includes inadequate access to the facilities; Capability deprivation, referring to what people can or cannot do, or could or could not be. This goes way beyond material deprivation to include human attributes, such as skills and physical ability, as well as social self-respect; multidimensional deprivation, with material lack or want, as only one of several mutually reinforcing dimensions.

Poverty is described by the World Bank (2009) as an inability or failure to achieve socially acceptable living standards. The need for basic human needs such as clean water, nutrition, health, clothing and shelter is not provided. Poverty is "a denial of options and resources, a violation of human integrity," according to the UN. It means lack of fundamental potential for meaningful social participation. It means that you don't have enough to feed and clothe a family, that you don't have a clubs or education, and that you won't have the land to grow your food crops or work to earn your living. This includes uncertainty, impotence and alienation of men, families and



classes. That means vulnerability to violence, and often it means living in an environment that is marginal or vulnerable, without access to clean water or sanitation.

It should be remembered that the majority of these poverty definitions have different dimensions. Although poverty is calculated at a wider level with many dimensions from a broader viewpoint, the majority of studies in developing countries like Ghana often concentrate more on a single-dimensional monetary poverty using income or consumption measures (income poverty). Ravallion (2010) indicated that monetary poverty is widely used to help to make comparisons of poverty levels among countries and over time when those living below the level of income are classified as poor (the poverty line).

2.7 Theories of Poverty: Cultural versus Structural Theory

Over the past decades, several theories have evolved in an attempt to explain poverty in welfare economics. These theories try to explain poverty in terms of national, cultural, structural or some kind of social distinctions. Among these theories, two types of poverty theories have been identified in relation to individuals, households and their socio-cultural environment namely; structural and cultural poverty theories (Aboagye-Attah, 2019).

Lewis (1958) was the first person to bring to light the concept of cultural poverty. Lewis argued in his famous work “Five Families: Mexican Case Studies in the Culture of Poverty” that the poverty was systematic such that, children became caught up with certain behaviours and attitudes that ensured their inability to escape



poverty. Thus, viewing poverty as an individual phenomenon (i.e., the traits of the poor are found in themselves). Other studies have indicated it to be the valuatinal, attitudinal, and behavioural patterns of the poor which prevent them from being socially mobile which traits include laziness, lack of education, and ignorance making the poor people basically remain the same people every year (Elesh, 1973; Aboagye-Attah, 2019).

Meanwhile other renowned researchers like Rainwater (1966), Clark (1965)) and Elesh (1973) as seen in Aboagye-Attah (2019) explain poverty in relation to the state in which the poor live: poor education, poor health, unemployment, lack of social amenities, underemployment and so on. This is referred to as structural poverty. According to this theory, the poor are defined by their socio-economic settings and for that matter their poverty status can be changed if these anomalies they find themselves changes (Aboagye-Attah, 2019). For instance, the unemployed can change their status overnight if they acquire a high-income job and so would not remain poor forever. Both the cultural and structural theories agree that poverty is cyclic, and that it can be transferred to many generations of the same family.



With the proponents of the Cultural theory, if a mother-centred family finds itself isolated from the larger society for instance, they are likely to be infused with feelings of alienation, inferiority complex and dependence and it is more likely that the younger ones from such lineage would be conditioned with the same poverty traits (Lewis, 1958; Aboagye-Attah, 2019). Hence, the poverty status of the family would be transmitted to the next generation and so the main problem therefore lies within the poor family and the attributes of the individual characters. However, according to the structural theory as illustrated by Elesh (1973), the unfriendly or hostile structural conditions perpetuate the poverty cycle. The wellbeing of an individual depends more on the social systems. For example, the educational and labour system would depend the extent of a person being poor or not. These systems are often hostile to the interests of the poor. And notably, the individual attributes of the poor are not only dependent on them.

Both structural and cultural poverty theories have implications for policies in the alleviation of poverty of households. According to Elesh (1973), these two theories serve as rationale for policy efforts.

Aboagye-Attah (2019) stated that the main problem of the cultural theory is to prevent the continuity of the cycle of poverty by directly working against the values, norms and behaviours that support it. It is believed that the syndrome would continue unless it is directly attacked.

On the other hand, the policies for solving structural poverty focus on the socio-economic systems and factors. Structural changes in employment, agriculture, education, health among others. This is because the reason for poverty is believed to



be associated with the structural conditions and rigidities that keeps poor people poor. The role of government is then to focus on how to it can make these systems easily accessible to the poor to help them leap out of poverty (Aboagye-Attah, 2019). Lewis (1958) argues that efforts at eliminating poverty would exceed a single generation and that structural changes are “absolutely essential and of the highest priority” (Cited in Aboagye-Attah, 2019).

2.8 Measures of Poverty

There are different ways in which poverty has been measured in many empirical research and policy documents. Among them are the poverty threshold or poverty line measure, headcount index, poverty gap index also known as the standard Foster Greer and Thorbecke (FGT) poverty index (Foste et al., 1984), Sen’s poverty index and the Alkire Foster Multidimensional Poverty Index (MPI).

The poverty threshold or poverty line is the minimum level of income deemed adequate in a given country. The common international poverty line has in the past been roughly \$1 a day but was later by the World Bank in 2008 to \$1.25 per day at 2005 purchasing-power parity (PPP). The headcount index is the most widely used poverty measure. It measures the proportion of the population that is counted as poor and can be expressed as;

$$\text{Headcount Index} = \frac{\text{No. of poor people}}{\text{Total Population}} \quad 2.1$$

The weakness of this measure is that; it fails to take into account the incidence or the depth of poverty and for that matter does not wholly tell how poor the poor are.



Poverty gap index measures the intensity or depth of poverty. It shows the average poverty gap in the population as a proportion of the poverty line. The poverty gap index is an improvement over the poverty headcount index, which counts all the people below the poverty line, in a given population, and considers them equally poor. Poverty gap index estimates the depth of poverty by considering how far, on the average, the poor are from that poverty line. This index is also known as the Foster, Greer and Thorbecke (1984) Index and is given as;

$$PGI = \frac{1}{n} \sum_{i=1}^q \left(\frac{z - y_i}{z} \right) \quad 2.2$$

Where Z is the poverty line and y is the welfare measure, $z - y_i$ is the proportionate shortfall below the poverty line, α Measures the degree of poverty and PGI is a measure of the depth or incidence of poverty below the poverty line.

It is important to note that, the poverty line measure, the headcount index, the poverty gap index are all monetary measures of poverty which though is necessary but not sufficient (Sen, 1992). *The Sen's Poverty index* is related to the poverty gap index which considers both the extent of poverty and the intensity of poverty. The Sen's Poverty index is given as;

$$P_{SEN} = H * G_z + PGI * (1 - G_z) \quad 2.3$$

Where H is the headcount ratio and Gz is the income Gini coefficient of only the people below the poverty line and PGI is the poverty gap index.

The Multidimensional Poverty Approach: The idea of multidimensional poverty was first presented by Townsend (Townsend, 1979) and further developed by Chambers



(Chambers, 2006). In the final declaration of the World Summit for Social Development in 1995, the United Nations concluded that:

“Poverty has various manifestations, including lack of income and productive resources sufficient to ensure sustainable livelihoods; hunger and malnutrition; ill health; limited or lack of access to education and other basic services; increased morbidity and mortality from illness; homelessness and inadequate housing; unsafe environments; and social discrimination and exclusion. It is also characterized by a lack of participation in decision-making and in civil, social and cultural life.”

(United Nations, 1995). This description stresses the multidimensionality of poverty and combines notions of absolute and relative poverty. Recently, the Oxford Poverty and Human Development Initiative (OPHI) developed an international measure of poverty called the Multidimensional Poverty Index or MPI for the United Nations Development Programme’s Human Development Report in 2010. It is also called the **Alkire Foster Multidimensional Poverty Index (MPI)** is more detailed and takes into account multiple deprivations household’s faces. The index transcends the traditional focus on income to reflect the multiple deprivations that a poor people faces with respect to three dimensions namely; education, health and living standard. The index is further explained in section 3.3.3 later.

2.9 Monetary Poverty versus Multidimensional Poverty

An assessment of many countries' progress towards achieving the Millennium Development Goals (MDGs) revealed that, although the objective of halving the population living on less than USD 1.25 a day was achieved, social inequalities



remained stable or increased (Karver et al., 2012; Vandemoortele, 2011). For example, the first Millennium Development Target was achieved in Ghana ahead of 2015, but inequality and extreme poverty is found to have increased in most parts of the country (GSS, 2018; Cooke et al., 2016). This raises the question of whether ending poverty that is described as living on less than USD 1.25 a day is an adequate goal for the post-2015 development agenda (i.e. the sustainable development goals). The plethora of literature on poverty has operationalized poverty either as monetary poverty (Consumption based) or multidimensional. Laderchi et al. (2003) suggested that assessment of monetary poverty is the most commonly used indicator of poverty to date. Nevertheless, the literature is increasingly discussing the conceptual and methodological shortcomings of monetary interventions, and the need for alternative and complementary methods that go beyond the normative economic goal of fulfilling needs and desires (Bader et al., 2016; Alkire, 2005).

Bader et al. (2016) found out that the monetary poverty measure 's main shortcoming relates to the tacit presumption that income acts as a way of achieving individual achievements. Some scholars disagreed with this statement with the argument that not all products and services can be bought or given a monetary value on the markets (Bourguignon & Chakravarty, 2003; Thorbecke, 2007; Tsui, 2002). Moreover, given that individuals or households have sufficient income to meet their basic needs, such income as a whole is not necessarily what they decide to spend it on (Thorbecke, 2007; Bader et al., 2016).

This shortfall in monetary poverty against multidimensional poverty motivated researchers such as Bader et al. (2016) to begin investigating the differences between



monetary poverty and multidimensional poverty in Lao using the Lao expenditure and consumption survey conducted by the statistics Bureau between 2007 and 2008. The results showed a varying poverty incidence between monetary poverty and multidimensional poverty incidence. While about 27.4 % were below the national poverty line, as high as 35% was recorded for the multidimensional poverty incidence. Bader et al. (2016) further used Lao Statistics Bureau (2013) Expenditure and Consumption survey and the detailed disparities between the monetary poverty and multidimensional poverty incidence is shown in Table 2.1 below;

Table 2.1 Profile of Monetary and multidimensional poverty incidence based on some key variables in Laos

Variable	Monetary Poverty	Multidimensional Poverty	Change in Incidence
<i>Household Head</i>			
Male	0.28	0.32	+4
Female	0.25	0.28	+3
<i>Area</i>			
Rural	0.32	0.37	+5
Urban	0.17	0.19	+2
<i>Altitude</i>			
lowland	0.20	0.22	+2
Midland	0.29	0.34	+5
Upland	0.43	0.51	+8

Source: Blader et al. (2016)

It is clear from table 2.1 that, some disparities exist between the two poverty measures.

In Ghana, the Northern Ghana Human Development Report presented some poverty incidence for some selected regions in the Northern part of Ghana. Comparing these values with that of the Ghana Statistical service report monetary poverty incidence



within the same period, a wide range of disparities exist. The Poverty incidence of both measures are tabulated below;

Table 2.2: Monetary poverty versus Multidimensional poverty in Ghana over some selected regions

Region	Monetary Poverty	Multidimensional poverty	Δ Incidence
Volta	33.3	46.2	+12.9
Brong Ahafo	34	50.5	+16.5
Northern	50.5	70.2	+19.7
Upper East	44.4	51.6	+7.2
upper West	70.7	60.5	-10.0

Source: NGHDR Field Survey (2014) and GSS (2014)

The question is which one should be used to guide development policy and planning? These differences between the monetary and multidimensional poverty incidence calls for a relook at how we define and measure poverty. This is because, it could result in policy inconsistency as well as underestimate or overestimate the level of poverty in a given area.

2.10 Poverty in Ghana: A review of policies from the colonial to post-independence era

Before 1957, most of the policies for poverty eradication in Ghana were geared towards the “taste” of our colonial masters. Kuu-ire (2009) called these set of policies as the nationalist policies which were pioneered by the colonial masters because it was only favourable to some group of persons or places. Hence development was mostly towards areas with cash crops such as Cocoa, rubber and Palm oil for export, areas with timber and minerals like gold were prioritized than those without (Bening, 1975). Schools, health care and proper roads were constructed at places with gold, bauxite, diamond and manganese for which reason the belt northern is said to



experienced low levels of development as compared to the south (Kuu-ire, 2009). A significant number of residences in the southern part were able to amass wealth in order to educate their children in good schools both in Ghana and abroad. Empirical studies by Saaka (2001) and Kuu-ire (2009) revealed that, this colonial strategy widen the poverty gap between the northerners and southerners leading to mass migration of northerners to the south in order to supply labour in the production of these crops in order to survive and to support their families. Dittoh (2008) indicated that, the high levels of poverty gap in the northern part of the country are associated with the uneven colonial policies.

After independence in 1957, the first president of the republic focused on agrarian policy reforms aimed at curbing poverty. The state farmers and brigade systems under that was referred as the “Grow what you eat policy” was introduced seeking to make the country self-sufficient and boost domestic production thereby reducing the import bill on government (Kuu-ire, 2009). In northern Ghana, the policy emphasized the production of cereals, roots and tubers and livestock rearing. These coupled with the industrialization plan led to the setting up of factories like the Nasia Rice Mill, the Pwalugu Tomato factory and the Zuarungu Meat Factory. These factories offered employment to majority of Ghanaians and empowered farmers to grow more to feed the industries. Afterwards, subsequent governments have implemented policies aimed at tackling poverty in the country of which the agricultural sector is often the main target. Example is the Operation Feed Yourself (OFY) and Operation Feed Your Industries (OFYI) under the rural development programme between 1969-1971. This among others engineered the setting up of



irrigation facilities in northern Ghana such as the Northern Regional Integrated Agricultural Programme (NORRIP) and Upper Regional Agricultural Development Programme (URADEP). These led to the creation of certain irrigation sites such as the VEA, Tono and Botanga irrigation schemes which are still significant in improving the livelihood of households against the menace of poverty.

Towards 1980s, severe prices hikes set in which led to the introduction of the structural adjustment programme by the Bretton woods institutions (IMF and World bank) which sought to liberalize the economy for trade. This also widened the poverty gap even more (Abugre, 1993). Towards, the 1985, some reforms were made aimed at stabilizing the economy. Among them was the introduction of the national best farmer awards to encourage production and the Vision 2020 which sought to put the country into a middle-income status by 2020.

Between 2001 to 2005, the Ghana Poverty Reduction Strategy (GPRSI) was introduced followed by the Growth and Poverty Reduction Strategy (II) from 2006 to 2009. The aim for these policies were to eliminate poverty and ensure growth in the country. One of the steps taken was the Highly Indebted Poor Country (HIPC) which brought certain benefits like debt forgiveness, infrastructural development like the Nurses CHIPS compounds, schools and toilet facilities. The Livelihood Empowerment Against Poverty (LEAP) was also introduced to support vulnerable groups in our societies to meet their basic needs). Afterwards, the Food and Agricultural Sustainable Development Plan (FASDEP I & II) and the current Planting for Food and Jobs (PFJ) programme which all sought to achieve rural and inclusive development by transforming and modernizing the agricultural sector as



engine for growth and empowering rural livelihood against poverty. Currently three development authorities; Northern, Middle and Coastal development authorities were created in 2017 to address the development challenges of northern Ghana, the middle belt and the coastal belt.

2.11 Empirical Review on Multidimensional poverty in Ghana

In Ghana, consumption expenditure related to basic calorie and non-food items are used to calculate the poverty line and the incidence of poverty which are the monetary measures discussed earlier above. This approach is not sufficient because it includes consumption expenditures that can be welfare-reducing (UNDP Ghana, 2018).

Table 2.3: Rural farmer's perspective on who is poor

MEN	WOMEN
A very poor person <ul style="list-style-type: none">• Is someone who has no place to sleep• Has no wife, children and property and is looked down upon by others.• Has no farm• Beggars for money	A very poor person <ul style="list-style-type: none">• Has no sandals or shoes to wear.• Has no seed to plant with the onset of the rains;• Has no bullocks or donkeys to plough the fields like others
A poor person <ul style="list-style-type: none">• Does not eat regularly• Is weak and cannot work• Has land but does not have the financial resources or labour to cultivate it.	A poor person <ul style="list-style-type: none">• Eats twice a day but not to satisfaction

Source: NGHDR Focus Group Discussions (2014)



Hence if a household spends large amounts of money on health and funerals leading to an increase in total consumption expenditure that places it above the poverty line, such household will be classified as non-poor even though these expenditures may result in burdensome debt. Table 2.3 above shows the responses from a focused group discussion conducted by the Northern Ghana Human Development Report (NGHDR) in the upper east region on rural farmer's perspective of who is poor.

These responses clearly showed that rural farmers themselves perceive poverty to have both income and non-income dimensions. For that matter the monetary measure of poverty alone does not tell the whole story.

Empirical analysis of the non-monetary poverty measure in Ghana showed that the overall national multidimensional poverty index (MPI) incidence of poverty was estimated at 42.7%. This is higher than the national income poverty measurement of 28.5% derived from the GLSS 5 in 2006 (GSS, 2013). Also, the poverty incidence for each region was higher than the regional estimation from the income poverty measurement. With the exception of the Greater Accra Region, the incidence of MPI poverty was overwhelmingly higher in rural areas compared to urban areas. The contribution of rural deprivation to national poverty was estimated at 72.3%, but higher for the three northern regions: Upper West Region (92.6%); Upper East Region (87.3%) and; Northern Region (80.8%) (GSS, 2013).

The 2010 population and housing census on non-monetary poverty in Ghana showed that about 83.9% of households in the Upper East region were deprived of primary school education. Also, 21.3% were of school –aged children had no education up to



class 8 while 1.7% (3,048 households) experienced child mortality under 5 years in the region (GSS, 2013). Meanwhile, of the percentage of those who were deprived of primary school education, about 82.1% were from rural areas while the remaining 17.9% were from urban areas. Also, of the number of households with school-aged children not educated up to class 8, 84% of them were from rural areas. And finally, 80.2% of the child mortality under 5 years occurred in the rural areas as compared to the urban areas. This suggest that, poverty is more of a rural problem than urban in the Upper east region.

2.12 Empirical Review on the Determinants of Poverty

The literature on the determinants of poverty vary across locations, populations and poverty measures. Bogale et al.(2005) investigated the determinants of monetary poverty in rural Ethiopia using the Foster, Greer and Thorbecke poverty index and found that rural poverty was strongly associated to entitlement failures understood as lack of household resource endowments to crucial assets such as land, human capital and oxen. Other variables such as the age of the household head and per capita income was found in their study to have a negative influence on poverty while household size had a positive effect on poverty (Bogale et al., 2005).

Mukherjee & Benson (2003) investigated the determinants of poverty in Malawi and concluded that, higher levels of educational attainment, especially for women, and the reallocation of household labor away from agriculture and into the trade and services sector of the economy will prove effective in reducing poverty in Malawi.



Fields et al. (2003) examined the dynamics of household per capita incomes using longitudinal data sets from Indonesia, South Africa, Spain and Venezuela. Evidence from their study shows that age of the household head, gender, change in the number of children, household location, employment status of the head and change in employment status of the head are significant determinants of poverty. Haddad & Ahmed (2003) also studies the determinants of total, chronic, and transitory poverty in Egypt using quantile regression and found that the number of years of schooling of adult household member reduces the forms of poverty with huge effect on chronic poverty. The value of land and livestock were found to reduce chronic poverty while large number of children under 15 and household size increases both total and chronic poverty.

In Ghana, several studies poverty studies have been conducted to envisage household consumption poverty situation as well as its drivers. For instance, Sackey (2005) studied the determinants of consumption poverty from an asset based perspective and found both physical, financial and economic assets to have significant influence on the probability of household poverty. Physical assets like agricultural land ownership were found to have a negative and significant influence on household consumption poverty. Financial assets like credit accessibility and personal savings were also found to have a negative effect on the probability of household being poor. Meanwhile other variables such as livestock rearing, household size and the head of the household head was found to have a negative influence on the probability of a household being poor.



On multidimensional poverty, Ataguba et al. (2012) examined the determinants of multidimensional poverty in Nigeria and found large family size, low level of education, poor employment, location dummy and poor health to be key positive determinants of household multidimensional poverty. Another studies by Adeoti (2014) found the age of the household head, sex of the household head, household size and education to be significant determinants of household multidimensional poverty in rural Nigeria. Specifically, male headed households were more multidimensionally poor than female headed. Household's heads whose age were above 60 years had a positive influence on the probability of multidimensional poverty while those below 60 years had a negative influence. Increase in household size as well as low level of education were found to have a positive influence on household multidimensional poverty.

In Ghana, few studies have been carried out on the subject of multidimensional poverty and most of them are not comprehensive enough to make generalizations for the whole country. For instance, Sulemana (2016) investigated the determinants of multidimensional poverty in the East Gonja district using a cross-sectional data collected over 310 households and the results showed that that religion, land ownership, area of land cultivated, monthly household income and access to an urban market significantly influence the level of poverty in the area. Christianity had a negative influence on the probability of multidimensional poverty. Land ownership as well as area of land cultivated was also found to negatively influence the probability of being poor. Monthly income as well as access to markets were also found to be negative determinants of the probability of multidimensional poverty.



Donkoh (2010) also examined the determinants of poverty in Ghana using GLSS 5. Employing the probit model, he found that the level of education, ownership of durable assets and international remittances are negatively related to poverty while dependent size and remoteness from the national capital exacerbate poverty

A recent study by Aboagye-Attah (2019) in Ghana employed the probit regression model to analyse selected socioeconomic variables and their degree of correlation with poverty status using the sixth and seventh round of the Ghana Living Standards Survey and found that education, literacy, locality and household size are strongly correlated with poverty. Education, savannah zone, locality, sex of household heads and literacy were significant variables in his estimates. Male headed households were found to have high probability of being poor than female headed households.

Finally, a study by Ibrahim et al. (2019) also examined the determinants of both monetary and non-monetary poverty in the upper west region of Ghana using 395 randomly sampled households and found varying determinants of poverty. For instance, on the demographic factors, he found that the gender of a household head matters more for non-monetary poverty than monetary poverty while household size and educational level robustly relate to only monetary poverty. Age of the household head had a weak influence on only multidimensional poverty. Only location dummies are significant drivers of both monetary and non-monetary poverty. On the socio-economic drivers, access to microcredit, savings and gainful employment of individually were found to reduce household poverty while improving welfare.



CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter discusses the study area, data sources used for the study, the conceptual framework guiding the study and the analytical framework within which the objectives were achieved. Section 0 discusses the study area and data sources used for the study. The conceptual framework is discussed in section 0 while the analytical framework which shows the various models and techniques of analysis is the subject of section 0. Finally, definition of variables used in the models, their measurements and apriori expectations form the concluding section 0.

3.2 Study Area, Data Source and Sampling Technique

The study is carried out in Ghana. Ghana is located on the Gulf of Guinea, only a few degrees north of the equator which gives it a warm climate. Ghana spans an area of 238,535 km² (92,099 sq mi), and has an Atlantic coastline that stretches 560 kilometres (350 miles) on the Gulf of Guinea in Atlantic Ocean to its south. It lies between latitudes 4°45'N and 11°N, and longitudes 1°15'E and 3°15'W. The country was previously made up of 10 regions but is now made up of 16 regions following a referendum that was carried out on the 27th December, 2018. The figure below shows the regions of Ghana before and now from left to right respectively.



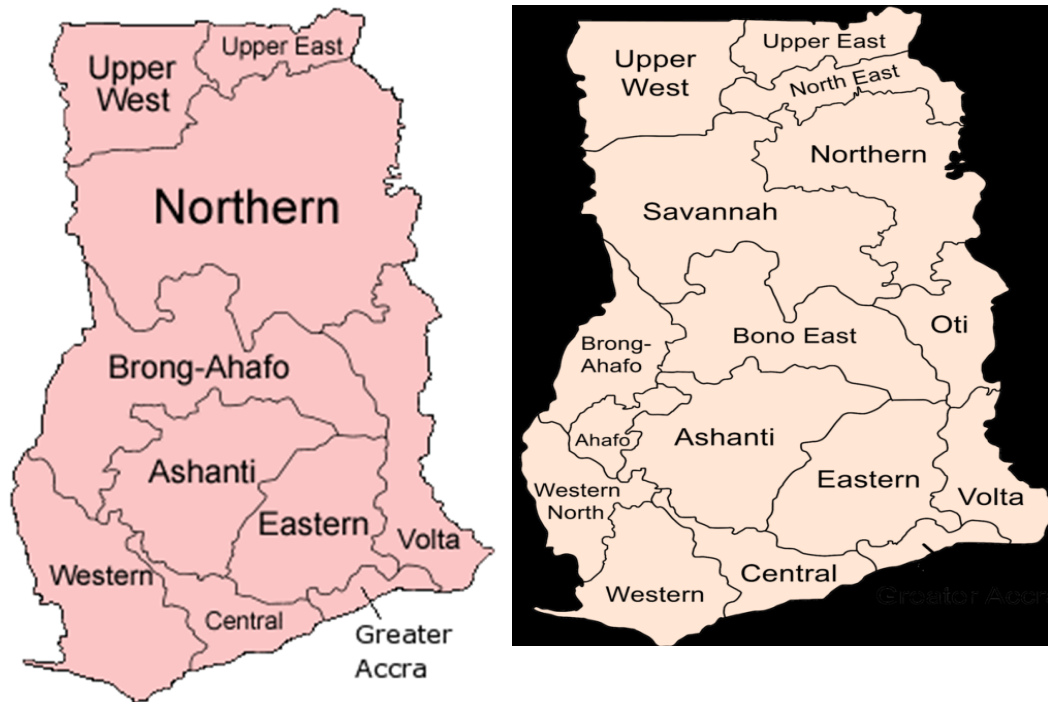


Figure 2.1 Map of Ghana (Old and New)

The study uses secondary data from the seventh round of the Ghana Living Standards Survey (GLSS 7) of the Ghana statistical service conducted in 2016/2017 over 14,009 households (i.e. before the division into 10 regions). This is a periodic rich data taken by the Ghana Statistical Service (GSS) to understand the living conditions of the country and also to help in development planning and policy. The GLSS data is designed to provide indicators which are nationally and regionally representative of the country (GSS, 2020). A two-stage stratified sampling design was used where 1000 enumeration areas was first selected to form the Primary Sampling Units (PSUs). The enumeration areas were further divided into rural and urban localities where a complete listing of households was done which made up the Secondary Sampling Units (SSUs). At the second stage, 15 households were systematically



selected from these PSUs to give a total sampling size of 15,000. However, 14,009 households responded which represented 93.3% response rate. In order to consider the spatial distribution of household livelihood diversification and multidimensional poverty across the agro-ecological zones, the analysis of the data was done according to the three ecological zones/belts. In 2017, the government of Ghana through the Ministry of Special Development Initiatives (MSDI) established three development authorities to spearhead the development of the three ecological zones namely; the Northern development authority (NDA) to take care of the development in the northern belt (i.e. Upper East, Upper West and Northern region), the Middle belt Development Authority (MDA) to fast track the socio-economic transformation of the middle belt (Eastern, Ashanti and Brong Ahafo regions) and the Coastal belt development authority (CDA) to address the development challenges within the coastal belt (Central, Western, Volta and Greater Accra regions). These three belts formed the basis of analysis to unravel the case for each of these ecological zones.

3.3 Conceptual Framework

The conceptual framework of the study is derived from the sustainable livelihood framework (SLF) as presented in the Figure 2.2 below. The SLF focuses on how people use livelihood assets (human, natural, financial, social, and physical) in a context of shocks, trends and seasonality to diversify into other livelihood portfolio of activities geared towards the improvement of their standard of living. . The choice of strategies is mediated by structures (e.g. Government, NGO's) and processes (e.g., Laws, policies, culture, institutions) and results in livelihood outcomes, such as



income, well-being, or food and livelihood security (Carney, 1998; Ellis, 2000). Hence, in this study, we looked at how rural households use their livelihood assets in the context of their push (Shocks, and seasonality) and pull factors (Institutions that pull households to diversify and how that translates to a reduced households poverty levels. The notion of assets is central to the sustainable livelihoods framework. Contrary to the conventional understanding of poverty as simply a lack of income, the sustainable livelihoods approach considers the assets that poor people need in to sustain an adequate income to live and so is represented by the asset pentagon in the center of the framework. Based on the assets, households can choose a livelihood diversification strategy in the context of the factors that either “pushes” them or “pulls” them to determine their livelihood outcome.



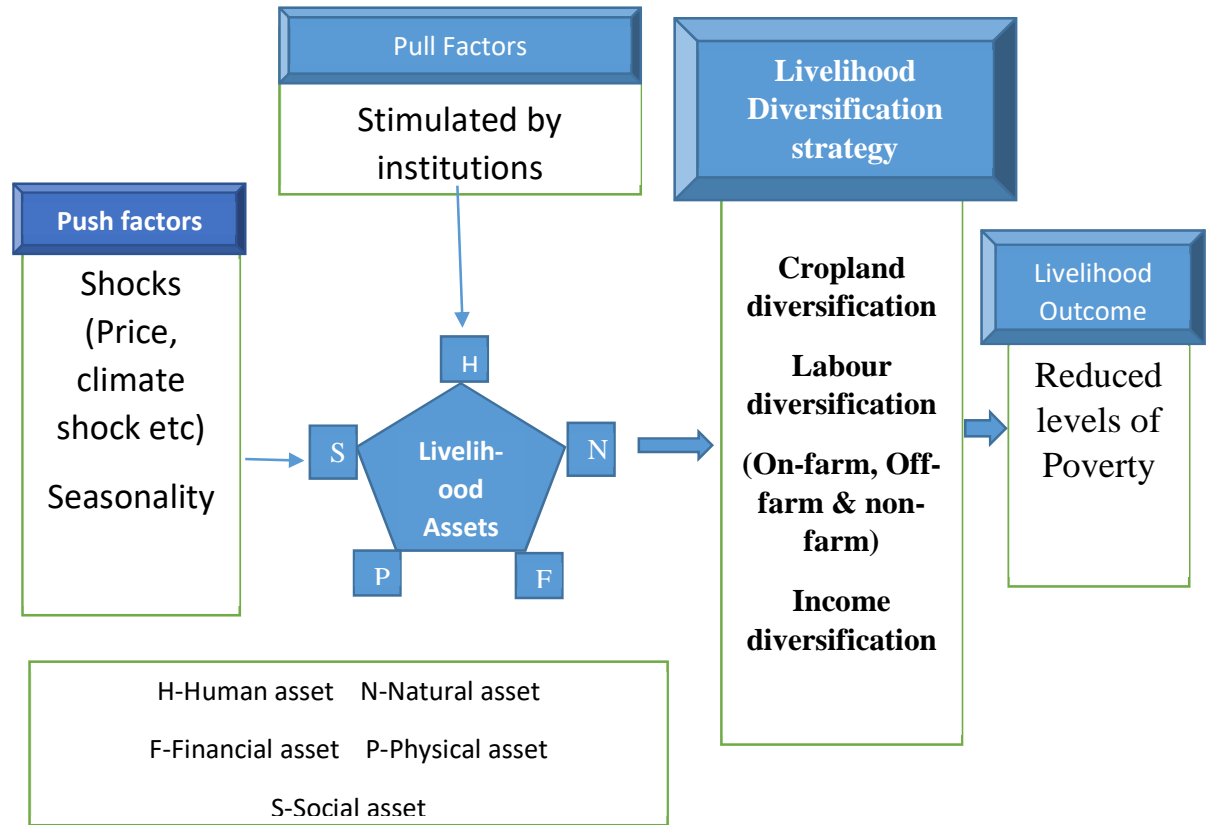


Figure 2.2: Sustainable Livelihood Framework

Source: Modified from DFID (1999)

The literature on sustainable livelihood framework (SLF) has identified five essential assets that every person needs to make a living. These include; Human asset/capital (H), Natural asset/capital (N), Financial asset/capital (F), Physical asset/asset/capital (P) and Social asset/capital (S). Human asset/capital consist of the skills, knowledge and good health. Aniah et al. (2016) indicated that the main human resources/capital that can enhance improved livelihoods in rural Ghana include organized trainings, education, health



status, farming experiences and household size or family labour. Social asset/capital encompasses the linkages to technical support and social resources such as networks and associations in the communities like farmer-based associations, village saving and loan associations, religion, cooperative groups, among others which could either be formal or informal. Informal associations like Community Based Organizations (CBOs), saving groups, communal labour groups and Faith-Based Associations (FBAs) have been found to exist in the most parts of Ghana (Aniah et al., 2016; Knutsson, 2016) . The natural resource stocks that people can draw on for their livelihoods includes land or farmlands, forests (for fuel and timber), water (Availability of water for irrigation) and air. Physical asset/capital refers to the basic infrastructure that people need to make a living, as well as the tools and equipment that they use. For example, transport/road networks, communication systems, shelter, schools, health centers, water and sanitation systems, and energy. Aniah et al. (2016) also found the existence of irrigation facilities and ownership of radios, donkey cart, television or mobile phones by a household as key physical assets in many parts of rural Ghana. Finally, financial capital includes savings (in whichever form), access to financial services like credit, liquid assets (livestock, poultry, jewelry), pension and remittances.

Given the livelihood assets of households, they could choose to diversify on their land by farming varied types of crops and livestock on their farms (on-farm diversification) or supply labour on other people's farms (off-farm diversification), while others engage in non-farm businesses such as wage employment, self-employment and transfers for income (income diversification). These dimensions



define livelihood diversification as it captures a multidimensional perspective of the concept, which lead to reduced or worsened household multidimensional poverty.

Agyeman (2013) revealed that the unique feature of the sustainable livelihood approach is the appreciation that the root of development is livelihoods. Thus, the study combined livelihood theory to investigate how households diversify their portfolio of activities in the context of constraints and opportunities to curb poverty in every form.

3.4 Analytical Framework

The study is grounded on five main analytical frameworks to underpin the objectives. The first objective on the extent of livelihood diversification will be unraveled using the Margalef index, the drivers of livelihood diversification will be determined using the simultaneous bootstrapped quantile regression, the level of multidimensional poverty in Ghana will be identified using the Alkire Foster Multidimensional poverty index, the determinants of multidimensional poverty in Ghana will be estimate with the binary probit model while the impact of livelihood diversification on multidimensional poverty will be estimated using the inverse probability regression adjustment.

3.4.1 The Margalef Index (MI)

There is a wide range of indices used to measure diversification among farm households as well as ecological species. These include the Simpson index of diversification, the Shannon-diversity index and the Herfindahl index of diversity Schwarze & Zeller (2005) among others. In Ghana, many studies such as Agyeman



et al. (2014), Dagunga et al. (2018) and Aneani et al. (2011) have used the Simpson index of diversification with the justification that it takes into account both the number and distribution of sources of diversification. Notwithstanding, its wide usage, the Simpson index of diversification has the shortfall of assigning excess weight to the dominant two or three strategies at the expense of other strategies (Asravor, 2018). Moreover, most of these studies only focused on income diversification to the neglect of cropland diversification and labour diversification. FAO (2015) indicated that the Margalef index has a goodness of fit better than the other indices. Shah & Pandit (2013) also stated that the Margalef index is independent of the sample size and is best used for comparing the richness of different diversity options than the Simpson index. This study, therefore, adopted the Margalef index to measure the extent of livelihood diversification in Ghana. Specifically, crop diversification index and income diversification index is computed for Ghana. The Margalef index is given as;

$$D_i = \frac{S_i - 1}{\ln(N_i)} \quad 2.1$$

where N_i is the total number of household-managed units of diversity options in the sample, and S_i is the number of household-managed units of diversity for the i th household. The Margalef index is calculated for the dominant household resources (land) in the country and the overall income diversity. Some studies such as FAO (2015) have separated labour diversification from income diversification. The problem with the separation of labour diversification from income diversification is that it may result in double counting which may assign more weight on the intensity



of diversity. This is because households mostly supply labour for income, and hence, capturing the hours of labour on wage employment enterprises as well as the amount of income from the same wage employment activity may result in double counting. For this reason, the study has modified the dimensions into two (cropland and income dimensions of diversification). This helps to capture a multidimensional perspective of household livelihood diversification behavior (Barrett & Reardon, 2000). Table 3.1 shows the Margalef Index formula's components by dimensions of livelihood diversification.

Table 3.1: Components of MI formula by dimensions of livelihood diversification

Dimension	S	N
		Total area planted over all crop
Cropland	Total number of crop types planted	types
Income	Total number of household income sources	Total household gross income from all income sources

Source: Modified from FAO (2015)

3.4.2 The Bootstrapped Simultaneous Quantile Regression

Quantile regression is an estimation procedure which helps to show the relationship between a set of explanatory variables and the explained variable over the entire distribution of the outcome variable (Koenker & Bassett, 1978). The quantile regression could be estimated for several points or quantiles of the outcome variable simultaneously allowing for differences between the coefficients for different



quantiles (Buam, 2013). This will be used to identify the drivers of livelihood diversification at various quintiles. It is based on the premise that different factors affect livelihood diversification at various levels. Hence, the factors that affect the top three-fourth of farmer's diversity options could vary from the bottom one-fourth of diversity options. Also, the factors that influence the lower quantile of crop diversification could vary from that of the income diversification. Previous studies such as Agyeman et al. (2014) and Dagunga et al. (2018) have modelled the determinants of income diversification using the mean conditional function of the standard linear regression model. However, Buam (2013), indicated that the standard linear regression model establishes the relationship between the set of regressors and the outcome variable based on the conditional mean function which provides a partial view of the relationship as it cannot describe the relationship at different points in the conditional distribution of the outcome variable. Quantile regression is said to be more robust to non-normal errors and outliers and provides a richer characterization of the data, allowing us to consider the impact of a covariate on the entire distribution of the dependent variable and not the conditional mean (Buam, 2013). Unlike the linear regression that is hinged on the assumption of normality, quantile regression maintains a modeling advantage over linear regression as it pertains to non-normally distributed data.

The model was first introduced by Koenker & Bassett (1978). The quantile regression model is expressed as;

$$y_i = X_i' \beta_{\theta}, \quad \text{Quant}_{\theta}(y_i / X) = X_i' \beta_{\theta}, \theta \in (0,1) \quad 2.2$$



Where $Quant_{\theta}(y_i / X)$ denotes the quintile θ of livelihood diversification (cropland or income diversification) index (y_i) conditional on the vector of regressors (X). Following Koenker & Bassett (1978) and Arabsheibani et al. (2003), the regression quintile θ can be defined as the solution of the problem,

$$\min_{\beta} \frac{1}{n} \left[\sum_{i: y_i \geq X_i' \beta} \theta |y_i - X_i' \beta_{\theta}| + \sum_{i: y_i < X_i' \beta} (1 - \theta) |y_i - X_i' \beta_{\theta}| \right] = \min_{\beta} \frac{1}{n} \sum_{i=1}^n \rho_{\theta}(u_{\theta}) \quad 2.3$$

Where $\rho_{\theta}(\cdot)$ is known as the “check function” and is defined as

$$\rho_{\theta}(u_{\theta}) = \begin{cases} \theta u_{\theta} & \text{if } u_{\theta} \geq 0 \\ (1 - \theta) u_{\theta} & \text{if } u_{\theta} < 0 \end{cases} \quad 2.4$$

The estimated coefficients of the quantile regression are interpreted by considering the partial derivative of the conditional quantile with respect to a particular explanatory variable. Thus, it equates the marginal change in the θ th conditional quantile due to a marginal change in the regressor.

Petscher & Logan (2014) indicated that quantile regression was semiparametric in nature and makes no assumptions about the distribution of the errors as it was specifically designed to model data where unequal variance exists. Wenz (2019) however argued that, a deviation of asymptotic standard errors may occur if the error terms are heteroscedastic as it is in the case of the linear regression model. Hence, the Bootstrapped estimated procedure will be adopted to obtain to overcome this shortfall thereby help in obtaining a more accurate standard errors and confidence interval (Yaffee, 2002 ; Wenz, 2019).



3.4.3 The Alkire Foster Multi-dimensional Poverty Index (MPI)

There is a growing consensus that the conventional uni-dimensional measure of poverty of the standard Foster, Greer and Thorbecke (FGT) poverty indices are not sufficient as traditionally understood (Sen, 1992). The study uses the *Alkire Foster Multi-dimensional Poverty Index (MPI)* used in the 2010 Human Development Report to examine multiple deprivations that make people poor. The MPI provides information on both incidence and intensity of poverty and was used to measure households' levels of poverty, which is more related to the sustainable development goal 1 on ending poverty in *all its forms and dimensions* everywhere. The MPI consists of three primary dimensions with ten indicators. The dimensions include Health (nutrition and child mortality), Education (years of schooling and school attendance), and Living Standards (Cooking fuel, water, electricity, floor, and asset). These dimensions fit directly into the sustainable livelihood frameworks discussed in section 3.3. Following Alkire et al. (2015), the MPI could be constructed based on the definitions in Table 3.2

Using these indicators, the study followed the methodology developed by Alkire & Foster (2011) to estimate both the poverty incidence (multi-dimensional Head count ratio [H]) and intensity (A) of poverty measured by the average deprivation score of multi-dimensionally poor people. A person is said to be **multidimensional poor (MPI poor)** if they are deprived in at least one third of the weighted indicators (i.e. the cut off for poverty (k) is 33.33%) (OPHI, 2017). The proportion of the population that is multidimensional poor is the incidence of poverty or headcount ratio (H) and



the average proportion of indicators in which poor people are deprived is described as the intensity of poverty (A).

The MPI is the product of incidence and intensity:

$$A \times H \qquad 2.5$$



Table 3.2¹: Dimensions, indicators, deprivations cutoffs and weights of household MPI

Dimension of Poverty	Indicator	Deprived if...	Weight	Related to
Education	Years of Schooling	No household member aged 10 years or older has completed five years of schooling.	1/6	SDG4
	Child School Attendance	Any school-aged child is not attending school up to class 8(<i>Any school aged child is not attending school at all.</i>)	1/6	SDG4
	Child Mortality	Any child has died in the family in the five-year period preceding the survey	1/6	SDG3
Health	Nutrition	Any adult aged 70 or younger or any child for whom there is nutritional information is malnourished.(<i>If BMI<19 or BMI>33</i>)	1/6	SDG2
	Electricity	The household has no electricity from the national grid	1/18	SDG7
Living Standards	Improved Sanitation	The household's sanitation facility is not improved or it is improved but shared with other households.(<i>If household Indiscriminately dump waste</i>)	1/18	SDG6
	Improved Drinking Water	The household does not have access to improved drinking water or safe drinking water is equal or more than a 30-minute walk from home, roundtrip.(<i>There are quality problems to household drinking water like taste or odour or colour</i>)	1/18	SDG6
	Flooring	The household has a dirt, mud, sand, dung or 'other' (unspecified) type of floor.	1/18	SGD9
Living Standards	Cooking Fuel	The household cooks with dung, firewood or charcoal.	1/18	SDG7
	Asset ownership	The household does not own more than one radio, TV, land, livestock, telephone, bike, motorbike or refrigerator and does not own a car or truck.	1/18	SDG9

¹ The bolded-italized words in brackets are modified measurements used in this study to define the deprivations for some indicators.



2.4.4 The Probit Model

The probit model was used to estimate the determinants of multidimensional poverty in Ghana. Following the Oxford Poverty and Human Initiative report (2017), a household is considered to be poor if it is deprived in 33% (i.e. one-third) of the weighted indicators. Since the dependent variable is dichotomous where a household is either poor or not, we first assume y^* to be an underlying continuous latent variable that makes a household poor, the latent variable could be modeled as;

$$y^* = X\beta + \varepsilon \quad 2.6$$

Where X is a vector of household socio-economic and institutional variables postulated to influence household's multidimensional poverty. Hence $Y_i = 1$ if $y^* > 0$ and $Y_i = 0$ if $y^* < 0$

The probit model is then given as;

$$P_i = \Phi(y^*) = \Phi(X\beta + \varepsilon) = P_i = F(X\beta + \varepsilon) \quad 2.7$$

Where F is the standard normal cumulative distribution function which can be written as

$$F(X\beta) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{X\beta} e^{-\frac{z^2}{2}} dz \quad 2.8$$

3.4.5 The Inverse Probability Weighted Regression Adjustment (IPWRA) Model

The impact of livelihood diversification on multidimensional poverty was estimated at the various quintiles using the Inverse Probability Weighted Regression Adjustment (IPWRA). This is because IPWRA has the ability to account for potentially biased estimates (ATT) that might emanate from propensity score models



in the presence of misspecification (Robins et al., 2007; Wooldridge, 2007). Also, the data used in the study was rich enough such that all unobservables could be accounted for with IPWRA as compared to IV approaches such as endogenous switching regression which has the shortfall of difficulty in finding strong instruments (Imbens & Wooldridge, 2009). Hence, IPWRA can ensure consistent results as it permits the treatment and the outcome model to account for misspecification due to its double-robust property. The livelihood diversification was dummied at the various quintiles where a respondent takes the value of 1 if it falls within the i th quintile, and zero otherwise. Hence, the net impact of diversification at the various quintiles was estimated. Imbens & Wooldridge (2009) stated that estimating the average treatment effect on the treated (ATT) involves a two step process. Given the outcome equation

$$Y_i = \alpha_i + \beta_i x_i + e_i \quad 2.9$$

Where Y_i is the multidimensional poverty level, x_i is a vector of livelihood diversification index at the i th quantile and β_i is a vector of parameters to be estimated. The propensity score is first generated from the selection equation as $P_s = P(x; \gamma)$ and in the second step, a linear regression is employed to estimate the propensity scores as $P(\alpha_0; \beta_0)$ and $P(\alpha_1; \beta_1)$ using inverse probability least squares. The inverse probability least squares is expressed as

$$\text{Min}_{\alpha_0, \beta_0} \sum_i^N (Y_i - \alpha_0 - \beta_0 x_i) / p(x; \gamma) \quad 2.10$$

if livelihood diversification is zero for the i th quintile and



$$\text{Min}_{\alpha_1, \beta_1} \sum_i^N (Y_i - \alpha_1 - \beta_1 x_i) / p(x; \gamma) \quad 2.11$$

if livelihood diversification is one (1) for the i^{th} quintile.

Hence, the ATT is computed as the difference between equation (7) and (6), expressed as

$$ATT = \frac{1}{N_w} \sum_i^{N_w} [(\hat{\alpha}_1 - \hat{\alpha}_0) - (\hat{\beta}_1 - \hat{\beta}_0)x_i] \quad 2.12$$

where $(\hat{\alpha}_1 - \hat{\alpha}_0)$, are the estimated inverse probability weighted estimates for the treated household of the i^{th} quintile and $(\hat{\beta}_1 - \hat{\beta}_0)$ are the estimated inverse probability weighted estimates for the control group of that quintile. Finally, N_w is the total number of treated households. Since Livelihood diversification in this study is analyzed into two dimensions, the impact was estimated separately for cropland and income diversification.

3.5 Definition of Variables, Measurement and Apriori Expectations

Guided by economic theory and the given data, the study followed empirical studies on diversification by Ahmed et al. (2018), Asravor (2018) and Dagunga et al. (2018) to generate variables postulated to influence livelihood diversification in Ghana. In this study as shown in

Table 3.3, the factors that influence livelihood diversification is presented in two broad categories as discussed in the literature-push factor and pull factors. The



subsequent sections explains the apriori expectations for these factors for both cropland diversification and income diversification.

Table 3.3: Definition of Variables, Measurement and Apriori Expectations

Variable	Measurement	Apriori Expectation	
		Cropland	Income
Independent Variables			
Household Specific Factors			
a. Pull Factors			
Age of household head	Years	-	-
Sex of household head	Dummy(1 if male, otherwise 0)	+/-	+/-
Marital status of Household Head	Dummy(1 if married, otherwise 0)	+	+
Household Size	Count	+	+
Number of males in household	Count	+	+
Socio-economic factors			
Per capita Income	GHC	+	+
Total Farm Size	Numeric (acres)	+	-
Livestock rearing	Dummy(1 if yes, otherwise 0)	+	+
Asset Ownership	Dummy(1 if household own productive assets like land, tricycle, tractors etc)	+	+
Institutional Factors			
Savings Account	Dummy(1 if household have savings account and save with financial institutions, otherwise 0)	+	-
Health status	Dummy(1 if healthy and 0 if a household member could not do their usual activity in the past 12 months due to sickness)	+	+
Credit Accessibility/Loan	Dummy (1 if household took loan, 0 otherwise)	+	+



b. Push Factors

Migration	Dummy(1 if household member have migrated to other areas)	+/-	+/-
Conflict	Dummy (1 if affected by conflict)	-	-
Climate Shock	Dummy(1 if yes, otherwise 0)	+	-

c. Location variables

Northern belt	Dummy(1 if from the northern belt ,0 otherwise)	+/-	+/-
Middle belt	Dummy(1 if from middle belt,0 otherwise)	+/-	+/-
Rural	Dummy(1 if rural, otherwise 0)	+/-	+/-

3.5.1 *Apriori Expectation for the Pull factors of Livelihood Diversification*

The study postulated, household specific factors (Age of household head, sex of the household head, marital status of household head, household size and the number of males in the household), socio-economic factors (Household income per capita, productive asset ownership, total farm size of the household, and livestock rearing) and institutional factors (saving groups, Credit accessibility the health status of the household) to be the pull factors for livelihood diversification. These factors are expected to have created opportunities that will motivate farmers to engage in multiple portfolio of activities in order to improve their standard of living.

The Age of household head is measured in years and is expected to negatively influence livelihood diversification. This is because the older one becomes the less likely to engage in multiple livelihood activities. The younger the household head, the more likely he or she will be strong to engage in multiple economic activities



whether on-farm, off-farm or non-farm. FAO (2015) found the age of household head to have a significant negative effect on both cropland diversification and labour diversification in rural Malawi and a similar intuition is expected for this study.

The study is aimed at also examining the role of gender by looking at the main decision maker of households and how they tend to diversify their livelihood activities and hence the sex of the household head was also considered. This is a dummy variable (where a household is coded 1 if male headed and 0 otherwise). The study hypothesized sex to have a mixed-effect (positive or negative). A positive result is expected if the household head, being a male could undertake more demanding activities and vice versa. On the other hand, a negative could also result because most women are able to engage in petty trading than men, which will increase their overall sources of livelihood activities. Ahmed et al. (2018) found male headed households to have a significant positive effect on livelihood diversification in rural Bangladesh. Ahmed et al. (2018)) ascribed the results to the fact that men have access and social acceptance for lots of employment opportunities than women. However, it could be overstatement to assume same in rural Ghana.

Marital status of household is also expected to have a positive effect on both cropland diversification and income diversification (livelihood diversification). This is because, marriage increases the number of labour for the household and both husband and wife can engage in different economic activities to improve their livelihood. Even though Dagunga et al. (2018) and Agyeman et al. (2014) found marital status to be insignificant in influencing income diversification in the Garu and Tempene



districts, their study was based on only 400 sampled households and also did not take into consideration cropland diversification and so, marital status could be considered as a human asset based on which farm households can allocate to other economic activities.

Household size is another background variable that is considered in the study and is measured by the total number of people eating from the same pot. It is classified as a push or pull factor to livelihood diversification bases on the circumstances for the household. It will act as a push factor where larger households have more mouths to feed which will induce such households to consider other livelihood activities to support their living conditions both on the farm and outside the farm. It may also be a pull factor in situations where majority of them belong to the active labour force and can supply labour to other livelihood areas. Hence household size is expected to have a positive influence on both cropland diversification and income diversification.

The number of males in the household is expected to have a positive effect on both cropland and income diversification. This is because most males are believed to engage in physically demanding livelihood activities and so the study postulates that, households with more males will have higher probability of diversifying both on-farm and non-farm enterprises.

The household per capita income used in this refers to the total household income adjusted for adult equivalent. Following OECD (2011), household per capita income was calculated by dividing household income by the square root of household size. This is a socio-economic factor and is expected to positively influence livelihood



diversification because if the income is high and evenly distributed per individual, each could undertake into multiple productive ventures that will increase the overall portfolio of livelihood activities undertaken by the household. Even though Agyeman et al. (2014) found household income per capita of farm households in the Western Region to have a negative relationship with the degree of income diversification.

Total farm size is a socio-economic factor that is considered in this study and is also measured in acres of farmland cultivated by the household. One would definitely expect that, households with larger farm sizes will be more likely to diversify their livelihood activities on farm and so a positive apriori expectation for cropland diversification. This is because, such households can both diversify the types of crops grown in their farm land (Cropland diversification) and can also divide the farmland into different crop enterprises. However, a negative result is expected for income diversification because, households with larger farm size may trade off their time on non-farm enterprises for on-farm activities.

Another socio-economic factors that was considered in this study was as to whether the household engage in the rearing of livestock or not. This was measured as a dummy variable where a household is assigned a value of 1 if the household rears livestock and zero if otherwise. This is expected to have a positive influence on both cropland diversification and income diversification. This is because, households that engages in livestock rearing can engage in mixed cropping and as such can use the manure from the livestock to grow a varied range of crops. Also, such households



can sell the livestock at any point in time in order to invest in other non-farm income generating activities.

Ownership of productive assets is another socio-economic factor measured as dummy (1 if household own productive assets like land, tricycle, tractors etc). It is expected that a household with productive asset ownership will have a positive influence on both cropland diversification and income diversification. The reason been that, such household can use those assets to engage in other productive activities either on the farm or outside the farm and thus increases their probability of livelihood diversification.

Ownership of savings account is considered as an institutional factor measured as dummy where a household is assigned a value of 1 if they own a saving account with any financial institution or group and 0 otherwise. This is expected to have a positive effect on both cropland diversification and income diversification. This is because farm households can withdraw from their savings to invest in other beneficial opportunities that will improve their wellbeing.

The household health status is was also included and is measured as a dummy variable where a household is coded 1 if healthy and zero if household member could not do their usual activity in the past 12 months due to sickness. This is expected to have a positive influence on livelihood diversification because, one needs to be healthy in other to work. The ability of an individual to engage in multiple income generating activity depends on the health status of such individual. Similarly, we



expect that healthier households will have greater probability for both cropland diversification and income diversification.

Accessibility to loans used in this study is measured as a dummy where a household is coded 1 if the household have accessed a loan from financial institutions and zero if otherwise. This is expected to have a positive effect on farmers' welfare because with the loan, their capital is increased and they can invest in multiple activities to increase output and earn income from different sources.

3.5.2 Apriori Expectation for the Push Factors of Livelihood Diversification

The push factors considered in this study includes migration, conflict and climate shock. These factors are expected to necessitate households to diversify their livelihood activities for survival and improved wellbeing.

Migration is a push factor that was considered in this study and is measured as dummy (1 if household member have migrated to other areas and 0 if otherwise). It could have a positive or negative effect on livelihood diversification based on the circumstance of that household. A negative effect is expected when there are more active labour force abroad than home to be supplied by the household on multiple economic activities leading to lesser probability of diversification. On the contrary, migration could also have a positive effect on livelihood diversification because individuals especially from the North can travel to the south to engage in better livelihood activities. Such household in itself has diversified in that wise and will thus receive remittances from them abroad.



Another push factor considered was conflict. This is also a push factor stipulated to affect livelihood diversification. It is measured as a dummy variable where a household is coded 1 if affected by conflict or tension and 0 if otherwise. Conflict zones poses fear on the individuals and there is no incentive for hard work since all assets could be destroyed during period of conflict.

The study also considers climate shock to be one of the postulated push factors for livelihood diversification and this is measured as dummy (a household is assigned a value of 1 if they were affected by shocks like flood and 0 if otherwise). We postulate that farm household's faces climate shock will have higher probability of diversification than those that are not aware in order to survive amidst the climate change. This is because livelihood diversification is identified as one of the major ways to adapt to climate change and hence the expected positive effect.

Aside these pushes and pull factors explained above, location variables were also included to investigate the role of ones location on livelihood diversification both for the three ecological zones and the rural-urban location dynamics as well. Location is random because, there have been evidence of diversification in these areas. For instance, Laube et al. (2012) and Dagunga et al. (2018) have proven evidence of diversification in the Upper east region while Agyeman et al. (2014) also revealed livelihood diversification in the Western region among others.

3.5.2 Apriori Expectation on the Determinants of Multidimensional Poverty

The study also followed empirical studies on poverty such as Aboagye-Attah (2019), Sulemana (2016) and Bogale et al. (2005) to generate socio-economic and



institutional variables postulated to have influence on the probability of being multidimensionally poor. The socio-economic variables considered included the sex of the household head, the age of the household head, the marital status of the household head, the total farm size of the household, household size, livestock rearing, migration and climatic shock while the institutional variables were household accessibility to loans, household savings, extension services and employment status.

With the socio-economic factors, the sex of the household head was measured as a dummy variable where a household is assigned a value of 1 if male headed and 0 if otherwise. This is random and could be positive or negative depending on the household circumstance. Aboagye-Attah (2019) and Donkoh (2010) found male headed households in Ghana to have higher probability of being poor relative to the female headed households. This study takes a more comprehensive multidimensional poverty approach and a negative or positive result could be found.

The age of the household head could also have a mixed effect on multidimensional poverty in Ghana. This is because the probability of one being poor does not necessarily come from the age of the individual but rather the resource endowment of the household and the kind of activity they do. Hence a negative or positive sign could be revealed.

The marital status of the household head is could also have a negative or positive influence on the probability of multidimensional poverty. One may argue that, a negative influence should be expected because, the household will have more



resources and can work to improve their living standards. While this could be true for monetary poverty, it is also true that such households are more likely to experience deprivation in child mortality which could also increase their probability of being multidimensionally poor.

The total farm size owned by the household was measured in acres and is expected to have a negative influence on multidimensional poverty. This is because, households with larger farm size can farm different variety of cash and food crops and in larger scale which can increase their revenue as well as household food supply thereby reducing their probability of being poor. Bogale et al. (2005) found the total land holding of households to have a negative influence on monetary in rural Ethiopia. A similar finding is also expected in this study.

Household size is measured as the number of people eating from a common pot. It is could have a mixed results depending on the characteristics of the members. For instance, a household with most of them within the active working class will have a lessor probability of being poor as compared to one with most of them being infants or aged.

Livestock rearing was another socio-economic variable included in the poverty model. This was measured as a dummy variable where a household is coded 1 if they engage in livestock rearing and 0 if otherwise. This is expected to have a negative influence on multidimensional poverty. This is because, the livestock could be sold at any point to generate revenue for the household. Also, manure from the dung of



the livestock could be used to fertilize their farms which will go a long way to increase the farm output. Hence a negative result is expected with livestock rearing.

Migration was also measured as a dummy variable and could either have a negative or positive influence on multidimensional poverty. The sign may depend on the role of the individual and the remittances received by the household from such individual(s). Individuals who leave their homes and send nothing home may create a loop which worsens the probability of the household being multidimensionally poor as compared to one who supports the family while away from home.

Climate shock is measured as a dummy variable where a household is coded 1 if affected by climate shock such as flood or pest/disease outbreak. This is expected to have a negative influence on the household multidimensional poverty status. The reason being that, households that are affected by these climate shocks are likely to lose their assets such as crops or arable land to the shock as well as sell out other assets in order to cope with the shock and so a positive result is expected.

With the institutional factors considered in this study, household accessibility to loans was considered. This was also measured as a dummy variable where a household is coded 1 if they have taken loan in the past 12 months and 0 if otherwise. This is expected to have a negative influence on household multidimensional poverty because, such households can invest in other productive enterprises to improve their standard of living.



Savings groups measured as a dummy where a household is coded 1 if the household save with financial institutions or village Susu groups and 0 if otherwise was also considered. This is also expected to have a negative influence on multidimensional poverty. The reason being that, such households can invest using their savings to improve their living standards. Also, the savings could also serve as a shock absorber as the household can rely on their savings in case of any disturbance or financial shock that may confront the household. Hence, we expect that savings will have a negative influence in explaining the probability of multidimensional poverty.

Another institutional factor that was considered in this study is agricultural extension service also measured as a dummy variable where a household is coded 1 if they have access to agricultural extension service and 0 if otherwise. This is expected to have a negative influence on multidimensional poverty because, households that have access to agricultural extension services are more likely to practice useful production technologies that can increase output and their welfare as compared to households that do not.

The last institutional factor considered in this study is the employment status of the household. In this study, a household was code 1 if the household have a member who is formally employed and receives salary and 0 if otherwise. The study thus postulates that, households with someone formally employed are less likely to be multidimensionally poor as compared to those that do not have formal employment or salaried job. This is because, the informal sector in Ghana is poorly developed and is not able to absorb most of the active labour force, hence majority of those not working in the formal sector are employed. Ibrahim et al. (2019) found households who are fully employed to have a negative relationship with monetary poverty in Ghana.



CHAPTER FOUR

RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the empirical results of the study. The summary statistics of the household-demographic characteristics, socio-economic variables, institutional variables, stipulated to influence livelihood diversification, are discussed in section 4.2. The extent of livelihood diversification is discussed in section 4.3, the drivers of livelihood diversification at various quantiles were also estimated and forms the subject of section 4.4 while the multidimensional poverty situation of Ghana is described in section 4.5. The determinants of multidimensional poverty is the subject of section 4.6. Finally, in the he concluding part (section4.7), the study assessed the impact of livelihood diversification on multidimensional poverty levels in Ghana using the inverse probability weighted regression adjustment model.

4.2 Summary Statistics of Pull and Push Factors of Livelihood Diversification

Table 4.1 presents the summary statistics of variables stipulated to influence livelihood diversification in Ghana under the two broad pull and push factors of livelihood diversification. The result showed that the average age of household head in the country is about 46years with each household head years varying about 15 years from the average. The Northern belt recorded the highest average age of a household head of 47 years and the middle belt the least average of 45 years. About 68.8% of the household's heads were males while the remaining 31.2% were females. The majority (55%) of the household heads were married. The



corresponding proportion of household heads that were married in each of the three belts were 72.3%, 46.6% and 48.8% for Northern, Middle and Coastal belts respectively. The average household size in Ghana was found to be about four people with a standard deviation of about 2 members from the average. On average, there are about two males in every household in Ghana, with each household varying about two males from the average.

With the socio-economic variables considered, the results showed an average per capita income of GH¢204.05 with a considerable variation of GH¢1694.60. The average per capita income for the Northern belt was lowest of about GH¢129.70 with a deviation of about GH¢893.54. In contrast, the Coastal belt had the highest average per capita income of GH¢265.02, which was slightly higher than the average for the full sample and with a high standard deviation of GH¢2353.70. Almost every household (99.4%) owned a productive asset like land, livestock, donkey cards and Tricycle motors. On average, a household in Ghana owns about 4.47 acres. The high standard deviation of 139.85 acres for full samples reveal the heterogeneous nature in which land is distributed across the different ecological zone. A detail disaggregation according to the three belts revealed that the immensely larger farm sizes were from the Coastal belt where the average farm size of a household was found to be 10.45 acres and the next household farm size could vary of about 224.39 acres. The average farm size of household in the Northern and Middle belts were found to be 4.16 acres and 2.16 acres, respectively. This results confirmed the empirical studies of Asravor (2018) who found that the majority of farmers in Northern Ghana to have an average farm size of 3 acres. The level at



which households' rear livestock was found to be about 28.9%. However, the average for the Northern belt was higher than that for the full sample of about 46.3%. The proportion of households in the Middle and Coastal belts that engage in livestock rearing were almost the same of about 21.9% and 21.5%, respectively.



Table 4.1: Descriptive Statistics of Pull and Push factors of Livelihood Diversification.

Variable	Full Sample	Northern Belt	Middle Belt	Coastal Belt
	Mean(SD)	Mean(SD)	Mean(SD)	Mean(SD)
a. Pull Factors				
Household Specific factors				
Age of household head	46.20(15.80)	47.13(16.49)	45.36(15.82)	46.28(15.48)
Sex of household head	0.688	0.784	0.646	0.65
Marital status of Household Head	0.551	0.723	0.466	0.488
Household Size	4.27(2.93)	5.49(3.41)	3.60(2.42)	3.90(2.60)
Number of males in household	2.07(1.69)	2.68(1.95)	1.74(1.43)	1.87(1.54)
Socio-economic factors				
Per capita Income	204.05 (1694.60)	129.70 (893.54)	199.14 (1254)	265.02 (2353.7)
Asset Ownership	0.994	0.996	0.994	0.992
Total Farm Size	5.47 (139.85)	4.16 (16.45)	2.11 (4.97)	10.45 (224.39)
Livestock rearing	0.289	0.463	0.219	0.215
Institutional Factors				
Savings Account	0.307	0.195	0.343	0.364
Health status	0.240	0.296	0.172	0.255
Credit/loan Accessibility	0.107	0.126	0.077	0.119
Location variables				
Northern Belt	0.341			
Middle Belt	0.317			
Southern belt	0.386			
Rural	0.5704	0.778	0.504	0.465
b. Push Factors				
Migration	0.085	0.071	0.069	0.109
Conflict	0.4584	0.446	0.422	0.498
Climate Shock	0.46	0.431	0.402	0.530

NB: SD represents standard deviation



This was expected because, most parts of the middle and coastal belts are sandwiched within the forest zone where the activities of Fulani men are minimal as compared to that in the Northern belt.

With regards to the institutional variables, about 30.7% of the households had a savings account and saved with financial institutions. The Coastal belt recorded a higher proportion of households who save with financial institutions of about 36.4% while the Northern belt had the lowest of 19.5%. The study also considered the health status of the household, which is a function of the households' ability to allocate labour to various livelihood activities. Health status was measured as a dummy where the household is assigned a value of 1 if household member could not do their usual activity in the past 12 months due to sickness. The results showed that most of the ill health households were found in the Northern belt followed by the Coastal and then middle belt.

About 29.6% of the households in the Northern belt had at least a member who was not able to do their regular activities in the past 12 months due to illness as compared to 17.2% and 25.5% in the Middle and Coastal belts, respectively (i.e About 70.4%, 82.8% and 74.5% of the households were healthier respectively). The number of households with an ill member was higher for the Northern belt than the average for the full sample of 24%. The proportion of households which received credit or accessed a loan was generally found to be low of about 10.7% for the full sample and 12.6%, 7.7% and 11.9% for the Northern, Middle and Coastal belts, respectively. This suggests that either households are increasingly unable to provide the collateral



requirements for loans or loans are becoming unattractive to households, probably due to higher interest rates on loans or prolonged bureaucratic processes involved in securing loans. About 34.1%, 31.7%, and 38.6% of the sampled households were from the Northern belt, the Middle belt, and the Coastal belt, respectively. Meanwhile, majority of the households were from rural areas. About 57% of the households were from rural areas, while the remaining 43% were from urban areas.

With regards to the push factors that were considered in this study, about 8.5% of households have members migrated to other locations. This is far lower than the expected but could be associated with how it was measured (i.e. household had members who did not live at the same place since birth). About 45.8% of the households were affected by conflict or tension of conflict. The Coastal belt recorded the highest proportion (49.8%) of households who were affected by conflict followed by Northern at a rate 44.6%, and then Middle belt which recorded the least proportion of 42.2%. With regards to climate shock such as flooding, the Coastal belt had about 53% of their households being affected. This is followed by the Northern belt of 43.1% and the Middle belt the lowest of about 40.2%.

4.3 Extent of Livelihood Diversification in Ghana

The results of the Margalef index, which shows the level of livelihood diversification is presented in



Table 4.2. The results showed both the crop diversification index as well as the income diversification index for the full sample and the various belts under consideration. The mean of the Margalef indices for both crop diversification and income diversification are greater than zero, which implies increasing diversification of households in Ghana. In other words there is zero specialization of farm households. With the crop diversification, the Margalef index showed that, the average level of crop diversification in the Northern belt was the least followed by the Coastal belt and the middle belt recorded the highest extent of crop diversification. Even though one would have expected that with the larger average farm size of 10.45 acres in the Coastal belt with higher standard deviation of 224.39 acres, there would have recorded the largest in terms of crop diversification, the study results reveals otherwise. This could thus imply that, farmers in the Coastal belt farm in larger quantities of few crop types as compared to farmers in the middle belt. In other words, they may grow few cash and food crop types and specialize or concentrate in farming such in larger quantities while those in the Northern belt farm many different crop types but in smaller quantities. Also, in the Northern belt, land is continuously fragmented, and farmers need to diversify their crops to adapt to climate change. Interestingly, the results showed that crop diversification is a rural priority than Urban in all the three regions. Rural households diversify more than urban dwellers. This could be associated to the fact that most rural areas have vast land for farming. Also, agriculture in Ghana is the main economic activity of the rural dwellers UNCTAD (2015). Also, infrastructural development in urban land displaces the land for agricultural purposes. This compels most urban households to



rather engage in minimal agricultural activities like backyard gardens with less crop diversification.

With regards to the income diversification, the Coastal belt recorded the highest average diversification index followed by middle belt and then the Northern belt recording the least. It should, however, be noted that the higher average diversification index in Coastal belt does not automatically imply a low level of household income as the index only shows the spread of the income sources and not the volume or amount of income from these sources. The relatively high level of income diversification in the Coastal belt over the middle and Northern belt could be because most of these areas are located at the belt of the sea where fishing and other non-farm activities are pronounced.



Table 4.2: Extent of Livelihood Diversification in Ghana

Category	Crop Diversification		Income Diversification	
	Mean	Std. Deviation	Mean	Std. Deviation
Pooled	1.380	1.474	0.412	0.319
Northern belt	1.198	1.122	0.357	0.335
Rural	1.209	1.117	0.361	0.344
Urban	1.102	1.165	0.321	0.215
Middle belt	1.675	1.691	0.428	0.269
Rural	1.842	1.613	0.455	0.272
Urban	1.629	1.938	0.359	0.248
Coastal belt	1.376	1.658	0.438	0.341
Rural	1.391	1.542	0.479	0.326
Urban	1.303	2.132	0.343	0.358

People coastal areas like Tema in in the Greater Accra region and Cape Coast in the Central regions of Ghana usually engage in fishing activities as compared to those in the middle and northern belts. Also, many parts of the Coastal and middle belts are well developed and serves as a hub for trading and other non-farm activities including self-employed ventures, wage employment activities among others as compared to the northern belt. Hence, while in the Northern belt, they diversify more in terms of different crop types to farm size, they have low portfolios to diversify their income



source. Contrary to this, the coastal belt diversifies less in terms of crops but more concerning income. Interestingly, just like the results of the crop diversification index, income diversification was also found to be more of a rural practice than urban. This is true for Ghana because the development structures such as industries in urban centers are not or are poorly developed to ensure a wide range of income portfolios sources to urban dwellers. As such, while rural dwellers can earn income from agriculture, they engage in other non-farm activities like wage employment and self-employed activities.

4.4 Drivers of Livelihood Diversification in Ghana

The results of the Simultaneous bootstrapped quantile regression estimates, which shows the drivers of livelihood diversification in Ghana at the various quantiles is presented in table 4.3. It was necessary to estimate the drivers at the various quantiles to give a more detailed case of the concept of livelihood diversification. This will also offer insight into the proponents of livelihood specialization that opined that a limited portfolio of activities but rather a more focused approach in order to gain optimum results (Czyżewski & Smędzik-Ambroży, 2015).

The Pseudo R-squared for the lower middle and higher quantile were 0.21, 0.27 and 0.22 respectively which shows that the independent variables were able to explain over 20% of the variation in crop diversification while that for income diversification were 0.26, 0.32 and 0.25 for the lower, middle and higher quantiles respectively.





Table 4.3 Quantile Regression Estimates of the Drivers of Livelihood Diversification

Variable	Crop Diversification			Income Diversification		
	Percentile					
	25 th (Lower)	50 th (Middle)	75 th (Higher)	25 th (Lower)	50 th (Middle)	75 th (Higher)
A. Pull Factors						
Farmer specific factors						
Age of household head	-0.027(0.007) ^a	-0.003(0.001) ^a	-0.006(0.001) ^a	0.001(0.0005) ^a	0.004(0.001) ^a	0.004(0.005)
Sex of household head	0.028(0.026)	0.097(0.044) ^a	0.062(0.089)	-0.049(0.024) ^a	-0.012(0.004) ^a	-0.033(0.017) ^b
Marital status of Household Head	0.071(0.031) ^a	-0.016(0.040)	-0.041(0.075)	-0.013(0.003) ^a	-0.015(0.005) ^a	-0.014(0.009)
Household Size	0.155(0.069) ^a	0.018(0.011)	0.001(0.143)	0.009(0.004) ^a	0.004(0.007) ^a	0.012(0.002) ^a
Number of males in household	0.005(0.011)	-0.009(0.013)	-0.014(0.025)	0.001(0.0005)	0.002(0.007) ^a	0.004(0.003) ^b
Socio-economic factors						
Per capita Income	0.003(0.001) ^a	0.002(0.001) ^a	0.002(0.003)	-0.002(0.0003) ^a	-0.002(0.004) ^a	-0.001(0.0003) ^a
Total Farm Size	0.003(0.006)	-0.007(0.004) ^b	0.002(0.0001) ^a	0.001(0.0001) ^a	0.002(0.0001) ^a	0.002(0.007)
Livestock rearing	0.145(0.019) ^a	0.099(0.025) ^a	0.028(0.308)	0.071(0.031) ^a	0.196(0.008) ^a	0.262(0.010) ^a
Asset Ownership	0.324(0.211)	0.500(0.218) ^a	0.774(0.184) ^a	0.051(0.018) ^a	0.039(0.022) ^b	0.074(0.027) ^a
Institutional Factors						
Saving Account	0.056(0.008) ^a	0.036(0.068)	0.006(0.074)	-0.022(0.008) ^a	-0.051(0.008) ^a	-0.059(0.022) ^a
Health status	0.070(0.029) ^a	0.064(0.042)	0.079(0.032) ^a	0.0043(0.004)	0.020(0.002) ^a	0.025(0.014) ^b
Credit accessibility/loan	-0.064(0.026) ^a	-0.083(0.037) ^a	-0.089(0.031) ^a	-0.002(0.003)	-0.005(0.003) ^b	-0.016(0.018)
B. Push Factors						
Migration	0.078(0.053)	0.188(0.076)	0.407(0.164) ^a	-0.004(0.011)	-0.005(0.055)	0.018(0.024)
Conflict	0.028(0.025)	0.041(0.044)	0.084(0.017) ^a	-0.005(0.003)	-0.005(0.003)	-0.015(0.010)
Climate Shock	-0.035(0.019) ^b	-0.118(0.045)	-0.087(0.067)	-0.0015(0.004)	0.002(0.001) ^b	0.007(0.008)
C. Location variables						
Northern belt	-0.020(0.017)	0.093(0.040) ^a	0.343(0.087) ^a	-0.114(0.028) ^a	-0.251(0.011) ^a	-0.146(0.010) ^a
Middle belt	0.221(0.038) ^a	0.486(0.068) ^a	0.329(0.069) ^a	0.013(0.006) ^a	0.001(0.006)	-0.013(0.009)



Rural dummy	0.105(0.042) ^a	0.140(0.040) ^a	0.009(0.116)	0.034(0.004) ^a	0.040(0.004) ^a	0.034(0.006) ^a
Constant	0.163	0.233	1.516	0.189	0.266	0.367
<i>Number of Observations(N)=14009</i>						
	<i>25Pseudo</i>	<i>50Pseudo</i>	<i>75Pseudo</i>	<i>25Pseudo</i>	<i>50Pseudo</i>	<i>75Pseudo</i>
	<i>R²=0.21</i>	<i>R²=0.27</i>	<i>R²=0.22</i>	<i>R²=0.26</i>	<i>R²=0.32</i>	<i>R²=0.25</i>

a and b represent 1% and 5% significance level respectively

These rates are relatively higher and the model could be said to be of good fit. Also, the study first performed a density plot as well as ladder of powers to investigate the distribution of the dependent variables; crop diversification index and income diversification index, the results is shown in the appendix which reveals that the dependent variables were non-normal which justify the use of the quantile regression.

The results on the drivers of livelihood diversification are discussed under the two main parts viz; crop diversification and income diversification. Other studies like FAO (2015) includes another dimension called labour diversification but that has been excluded in this study in order to avoid double measurement that might capture labour allocated for crop production or for income generation

4.4.1 Drivers of crop Diversification

Results from Table 4.3 reveal that household-specific factors (the age of household head, sex of household head, marital status of household head and household size), socio-economic factors (per capita income, sharecropping, total farm size of the household, livestock rearing and asset ownership), institutional factors (ownership of savings account, household health status and accessibility of loan by the household) as well as location variables significantly influence crop diversification in Ghana. The age of the household head had a negative influence on crop diversification across the three quantiles. This was expected because the older household heads will not be strong enough to engage in multiple crop farming which is most often demanding and rigorous. This finding is also in line with the findings of FAO (2015) who found the age of household head to have a significant negative effect on crop diversification in rural Malawi. The sex of the household head was only significant at the second quartile (50th percentile) but not the first (25th percentile) and the third (75th Percentile). This implies that male-headed households diversify more than female-headed households at the 50th percentile. In other words, the male headed households do not engage much at lower levels of crop diversification and extremely higher levels of crop diversification. Perhaps they blend both diversification and specialization. The marital status of the household head had a positive and significant effect on crop diversification at the lower quantile. This suggest some sought of specialization after some level of crop diversification. Indeed one would have expected that household heads that are married would have a greater probability of engaging into different portfolio of crop varieties, the study



results suggest that they also increase their scale of production after some level of diversity. Household size also have a positive and significant influence on crop diversification at the lower quantile. This is consistent with the results of Asravor (2018) who found household size to positively influence cropland diversification in Northern Ghana. While the findings of Asravor (2018) was based on the mean conditional function of the dependent variable, this study reveals that the influence on crop diversification is at the lower quantile of diversity and not the entire distribution of diversification. The number of males in the household did not have any significant influence on crop diversification.

The household income per capita was found to have a positive and significant effect on crop diversification at both the lower and middle quantiles of crop diversification. This was expected because the higher the income per individual in the household, the more likely they are to engage into different crop activities. The total farm size of the household was found to have a negative effect on crop diversification at the middle and higher quantiles but not significant at the lower quantile. This is contrary to the apriori expectation because one would have expected that farm households with larger farm sizes could allocate more parcel of land for different crop activities. Once the estimate is for pooled sample, it could mean that, households that farm in larger quantities have a greater probability of increasing the scale of production for few crop types (crop specialization) as compared to those with smaller farm size. Thus, most of those households with larger farm sizes may focus more on producing cash crops like cocoa, cashew etc as compared to those with smaller farm sizes who focus more diversified cash and food crops. Even though Makate et al. (2016) found



land holding size to positively influence household decisions for crop diversification in Zimbabwe, crop diversification decision was binary and could not have been said to tell the whole story regarding the reality at the various quantiles. Another socio-economic factor considered was whether the household engages in livestock rearing or not. This was found to have a statistically positive influence on crop diversification at the lower and middle quantiles. This was expected because households that engage in livestock rearing can sell out their animals to invest in any productive crop enterprise. Also, the livestock could serve as a shock absorber where the household can sell to smoothen consumption and to support other crop enterprises amidst the varying climatic variability. The last socio-economic factor was ownership of productive assets like, tricycle, tractors, etc.

The study results showed that households with these productive assets have a higher probability for crop diversification at the middle and higher quantiles.

The results further reveal that households that own a saving account have higher probability of crop diversification than those that do not at the lower quantile. This is probably because they can withdraw from such savings to invest in other multiple livelihood ventures. The health status of the household was also found to influence crop diversification at both the lower and higher quantiles. This was also expected because one needs to be healthy to work as opposed to households where there is at least a person who could not do their usual work due to sickness. In trying to investigate the role of receiving a loan on crop diversification, the study results showed that loan accessibility was significantly negative in explaining crop



diversification. The result suggests that households that do not take loans had a higher probability of crop diversification than those who accessed loans. Hence issuing loans to farmers might not be a good policy instrument in fostering crop diversification in Ghana.

Aside from the pull factors described above, the study postulated some push factors to influence crop diversification, which include migration, conflict and climate shock. The results showed that migration and conflicts have a positive and significant influence on crop diversification at the higher quantile. That means households with a member (s) migrating to other parts of the world as well as those who experienced conflict or tension of conflicts have a higher probability of diversifying into other crop enterprises as a survival-led strategy. The results for migration is consistent with a study by Lay & Schüller (2008) who found migration into other parts to influence on livelihood diversification. Migration is most common in the Northern belt, where farmers temporally migrate to other areas to farm during the dry season, thus increasing the portfolio of diversity for the household. Aside from that, permanent migration compels household members to engage in multiple crop enterprises for survival. With climate shock, the study result shows that most of the households that have a higher probability for crop diversification are not affected by climate shock. This may imply that households members that experience climate shocks like floods are often “knocked down” by the shock and unable to diversify.



Finally, the study included location variables to ascertain the probability of crop diversification across the three belts and between the rural and urban dwellers². The results showed that the Northern belt had a higher probability of diversification at the middle and lower quantile of crop diversity but a lower probability at the lower quantile. However, the middle belt was found to have a higher probability of crop diversification than the coastal belt at all quantiles of diversity. This result is consistent with the descriptive statistics that showed that the coastal belt was the least in terms of crop diversification. Also, rural households had a greater probability of diversifying their portfolio of crop enterprises than urban households. This was expected because the main economic activity for the majority of the rural households is agriculture. With the vast land in most rural areas, households can diversify by planting a varied range of crop types as compared to urban households. The result is also consistent with the descriptive statistics where the Margalef index for most households in the rural areas were higher than the urban centres.

4.4.2 Drivers of Income Diversification in Ghana

The drivers of income diversification at the various quantiles is shown in Table 4.3. The direction of causality of most of the independent variables for crop diversification is not the same. This justifies the use of the simultaneous bootstrapped quantile regression and the inclusion of the two main dimensions for livelihood diversification.

² The coastal belt was used as a bench mark.



For example, while the age of the household head negatively influenced crop diversification at all quantiles, the results is entirely opposite for the income diversification. The age of the household head had a significant and positive influence on income diversification at the lower and middle quantiles. This result contradicts that of Asravor (2018) who found the age of the household head to have a negative influence on income diversification in Northern Ghana. However, it agrees with Senadza (2014) who found older household heads to have a higher probability of adopting non-farm, self and wage employment diversification strategies. This could mean that as the age of the household head increases, he becomes more concern about engaging in income-generating portfolios. This is probably because age comes with extra responsibilities such as child care, educational and other expenditures.

While crop production could be demanding, there are other income-generating activities that do not require excessive exertion of physical energy. Most of the non-farm businesses like operation small enterprises and other petty trading might not require much energy as compared with farming. Again, unlike crop diversification where the male-headed households were found to have a higher probability of diversification, the results on income diversification show otherwise. The sex of the household head had a negative and significant effect on income diversification across all quantiles. This result suggest that female-headed households have more probability of income diversification across all quantiles. This is intuitive because most females have the ability to multitask and concerned with generating income for feeding the family. Moreover, women by their biological nature do not have “the



muscle' for cropland diversification compared with men, they focus more on other income-generating activities for their livelihood. This result is consistent with Senadza (2014) who found male-headed households to have lower probability of income diversification as compared to female-headed households in non-farm and self-employment diversification strategies. It is also in line with Asravor (2018) who found that female-headed households have a higher propensity for income diversification than male-headed households. The results suggest that female-headed households play a crucial role in fostering income diversification agenda. Marital status of household-head was found to have a significant and negative influence on income diversification at the lower and middle quantiles. Dagunga et al. (2018) found marital status to have no significant influence on income diversification based on the mean conditional function of the linear regression. This implies that, most of the unmarried diversify more into other income portfolios than the married at the lower and middle quantile. The result suggests that most of the married households focus more on on-farm diversification activities to provide food for the family as compared to the unmarried who may not have many mouths to feed regarding provision of food. Also, household size was found to have a significant and positive influence on income diversification across the three quantiles This is consistent with Asravor (2018) who found household size to significantly influence both cropland diversification and income diversification. The implication of this result is that households with more number of people have a higher likelihood of engaging in multiple economic activities compared with those households with smaller family size. Surprisingly, while female-headed households had a higher likelihood of



income diversification, the number of males in the household have a positive effect on income diversification³. Thus, households with many male members probably ‘compete’ for success as each one is aimed at building an independent household in the near future. They are, therefore, compelled to diversify their sources of income-generating so they can both succeed and be recognized in the household. Also, with more males in the household, they can join hands to engage in more physically demanding activities that females could not have undertaken. This usually happens in agrarian communities where men put their resources together to establish large scale farms.

With regards to the socio-economic factors, unlike that for the crop diversification, the household per capita income was found to have a negative and statistically significant effect on income diversification across the three quantiles. This result is in congruence with Agyeman et al. (2014) who found per capita income of farm households in the Western Region to have a significant but a negative relationship with income diversification. This could imply that households with more substantial per capita income diversify less as much of their income is geared towards consumption and for other households need. Also, if households have members schooling or engaging in apprenticeship where they don’t earn, such households could spend more of their income on these members than diversify into other income-generating activities. Another interesting result found in this study is the total farm

³ This is not a contradiction because, the head of the household variable related to the main decision maker of the household or the leadership structure of the household while the number of males in the household refers to the number of energetic men in the household.



size of the household. While with crop diversification total farm size was found to have a negative and statistically significant influence on crop diversification at the middle and higher quantiles, it is found to have a positive influence on income diversification at the lower and middle quantiles. This could mean that households with larger total farm size mostly specializes with few varieties of cash and food crops, increase the acreage while also engaging in other non-farm or off-farm income generating activities. Hence, such households can sell their farm produce like Cocoa or Cashew and invest in other non-farm economic activities other than on-farm to make-up for the lean or dry season where there is minimal or no harvest. Like crop diversification, households that rear livestock were found to have a higher probability of income diversification than those that do not at all the quantiles. This result is in line with Senadza (2014) who found livestock ownership to have a positive influence on non-farm wage and self-employment activities. The possible reason for this is associated to the fact that most of these livestock serves as liquid asset which could be sold at any time to invest into other income-generating portfolios. Also, livestock rearing in the Northern part of Ghana is mostly an investment portfolio, which helps the household to improve their standard of living as well as cope with any shock that may result from changing climate. With regards to ownership of productive assets (land, tricycle or tractors), the results were synonymous to that of the crop diversification. The results showed that households who own these productive assets do not only diversify more on cropland diversification but also income diversification across the four quantiles. These results complement the findings of Agyeman et al. (2014) who found productive assets ownership to have a positive and



significant effect on income diversification in the Western region of Ghana. This is rational because most of these assets serve as points of entry for a diversified income source. For instance, a household that owns a tricycle could trade with it to raise an additional source of income for the household as compared to those that do not, which is a non-farm business activity.

With the institutional factors considered in this study, the study results showed that households that have savings account have less diversified income portfolio compared to those without savings accounts. This is because farm households who do not engage in other forms of economic activities such as petty trading and wage employment do not usually operate bank accounts.

The health status of the household was found to have a positive and significant effect on income diversification at the middle and higher quantiles. This was measured as a dummy variable where a household is code 1 if healthy and 0 if a household member could not do their usual daily work in the past 12months due to illness. The positive influence of health status on income diversification could be because households with a member not been able to work due to illness will not be able to work on other non-farm income generating opportunities as compared to those that are healthier and so was expected. Moreover, households who accessed credit in the form of loans were found to have a lower probability of income diversification at the middle quantile.

The results showed a negative influence of migration and conflict on income diversification. Though not significant for all quantiles, the direction was negative for all quantiles. The climate shock variable have a positive and significant influence



on income diversification at the middle quantile. The positive effect on income diversification at the middle quantile suggest a shift from on-farm activities to non-farm income-generating activities since most of the shocks considered (flood, pest and diseases outbreak) mostly affect farmlands.

Finally, with the location variables included in this study, the results showed that households in the middle belt have lower probability of income diversification across the three quantiles as compared to those in the coastal belt. This result is true from the descriptive statistics where the average Margalef index for the Northern belt was 0.357 as compared to an average of 0.438 for the coastal belt. However, households in the middle belt were found to have a higher probability for income diversification than those from the Coastal belt (lower quantiles). Furthermore, rural dwellers were found to have higher probability for income diversification for all quantiles as compared to households in the urban areas. This implies that livelihood diversification (crop diversification and income diversification) could be said to be more of a rural phenomenon than urban in Ghana.

4.5 Level of Multidimensional Poverty in Ghana

There is a paucity of comprehensive empirical research on multidimensional poverty in Ghana. The plethora of poverty studies has over the years focused on the monetary measure of poverty which do not clearly bring to light the poverty situation. The multidimensional poverty situation in Ghana is described under the following sub-headings; the percentage deprivations of households in the ten indicators across belts,



the level of multidimensional poverty in the country and the contribution of each domain to multidimensional poverty in Ghana and across the three belts

4.5.1 Percentage Deprivations of Households in the various Indicators

The study first showed the percentage deprivations of households for the various indicators and the disaggregated percentages for the northern, middle and coastal belts. With the pooled sample, the results showed that most of the households in Ghana are deprived of cooking fuel under living standards, followed by nutrition under health and then child school attendance under education. About 93.25% of households use either firewood or charcoal or dung as fuel for cooking in Ghana. This probably be because these sources of fuel are readily available and less expensive in most rural areas. Charcoal is also mostly used in urban areas than gas and electric cookers. The disaggregated results showed that the majority of the households that were deprived in terms of cooking fuel were from the northern belt, followed by the middle belt. This situation is expected because, the northern belt has two major seasons of which bush burning, charcoal production and “firewood cutting’ are often rampant during the dry season. Some rural dwellers engage in charcoal burning as a livelihood strategy in the dry season. The middle belt is also relatively high because it is most affordable to purchase charcoal compared to gas and electric cookers. Also, as high as 86.36% of households in Ghana had someone with nutritional information to be malnourished on average. In other words, about 86.36% percentage of households had someone who is either undernourished or over nourished from the derived Body Mass Index (BMI) constructed in this study. The



majority of the households in the Northern belt had a high percentage of households with at least a malnourished person of about 91.05%, which is higher than the average. The rates of nutritional deprivation of households in the Middle and Coastal belts are 85.25% and 85.10% respectively, a little below the average for the whole country. The high rate of nutritional deprivation suggests that the country needs to focus more on nutrition security. Child school attendance was the third most deprived indicator of about 50.86% for the full sample. A household is said to be deprived of this indicator if there is any school-aged child who is not attending school at all. The rate of deprivation was higher in the Northern belt of about 77.95% as compared to the middle and coastal belts of 48.18% and 39.78%, respectively. The high rate in the Northern belt could be associated with the fact that most of the areas within the belt are less developed. Hence, some households engage their children in other economic activities like shepherding (“cowboys”) and petty trading. Almost no household in Ghana was deprived in terms of asset ownership for all belts. This means that at least a household owns more than two the following assets: radio, TV, land, livestock, bicycle, refrigerator, telephone, motorbike or car. Deprivation in child mortality (measured as yes if any child has died in the family in the five years preceding the survey) was generally low for households in the Coastal and middle belts of 0.16% and 0.18%, respectively, while that of the Northern belt was 0.64%. The relatively low level of child mortality across the three belts is consistent with the Ghana Statistical Service (2013) report which found most of the households nationally to be deprived in this dimension to be less than 2%. The slightly higher rate in the Northern belt could be associated with inadequate number of health



facilities or beliefs in traditional methods or negligence to attend prenatal checkups by pregnant and postnatal care by lactating mothers. The majority of the households did not indiscriminately dispose-of waste. Hence, the percentage deprivation in terms of improved sanitation was generally low with the Coastal belt recording a zero deprivation. The Northern belt recorded the highest percentage of deprivation in this indicator of 1.28% followed by the middle belt of 0.54%.

Table 4.4 Percentage Deprivations of Households in the various Indicators

DOMAIN	INDICATOR	DEPRIVED (%)			
		POOLED	Northern	Middle	Coastal
<i>EDUCATION</i>	Years of Schooling	33.75	32.91	33.69	34.23
	Child School Attendance	50.86	77.95	48.18	39.78
	Child Mortality	0.267	0.639	0.181	0.158
<i>HEALTH</i>	Nutrition	86.36	91.05	85.15	85.10
	Electricity	41.84	47.92	49.46	32.17
<i>LIVING STANDARDS</i>	Improved Sanitation	0.468	1.278	0.54	0.00
	Improved Drinking Water	8.96	10.86	3.62	12.68
	Flooring	23.26	34.51	27.54	13.95
	Cooking Fuel	93.25	95.21	93.12	92.39



Asset ownership	0.00	0.00	0.00	0.00
-----------------	------	------	------	------

About 41.84% of households in Ghana could be said to be deprived of electricity as they are not connected to the national grid; the remaining 58.16% are not deprived. Surprisingly, the majority of the households deprived were from the middle belt at about 49.46%, followed by the Northern belt of 47.92%. The Coastal belt was the least deprived with the deprivation rate of 32.17%. In the GSS (2013) report, it was the Volta, Brong-Ahafo and the three Northern regions whose deprivations exceeded the national rate of 36%. The results in this study suggest an improvement in the rural electrification in the northern belt as compared to the middle belt.

4.5.2 Multidimensional Poverty in Ghana

The results of the level of multidimensional poverty in Ghana is presented in Table 4.5. The results revealed that the average multidimensional poverty index (MPI) in Ghana is about 0.378 which is same as the adjusted headcount ratio. The Table further indicated that, multidimensional poverty in the Northern belt was the highest (0.475), followed by the middle belt (0.372) and the coastal belt (0.335), the least in terms of multidimensional poverty. The highest MPI for the Northern belt is consistent with the findings of Oxford Poverty and Human Development Initiative (OPHI) (2017) country briefing report. The OPHI (2017) found the Northern region to have recorded the highest MPI of 0.382 followed by the Upper East region of 0.289 and the Upper West region of 0.259, which makes up the Northern belt. The results in this study, however, has shown a rather higher multidimensional poverty in the belt than the findings of OPHI (2017) report.



The incidence of multidimensional poverty which shows the absolute headcount ratio was high for all belts with the Northern belt recording the highest incidence of multidimensional poverty of about 88.8% though it also recorded the least in terms of the intensity of 0.209. The NGHDR (2018) found the Northern region to record the highest absolute incidence of multidimensional poverty of 70.2%, this study suggests a rather higher incidence of multidimensional poverty in the belt.

Table 4.5 Multidimensional Poverty Situation in Ghana

<i>Category</i>	<i>MPI(M0)</i>	<i>Mo</i>	<i>Headcount(H)</i>	<i>Intensity(A)</i>
<i>Ghana</i>	Pool	0.378	0.747	0.506
	Rural	0.392	0.766	0.844
	Urban	0.300	0.639	0.156
	Northern	0.475	0.888	0.209
	Rural	0.491	0.912	0.834
	Urban	0.392	0.769	0.166
	Middle	0.372	0.732	0.369
	Rural	0.388	0.753	0.842
	Urban	0.285	0.621	0.158
<i>Belt</i>	Coastal	0.335	0.689	0.422
	Rural	0.347	0.708	0.851
	Urban	0.263	0.585	0.347



The pooled sample results showed that about 74.7% of households in Ghana were multidimensionally poor. However, in the sub-groupings, the majority (88.8%) of households in the Northern belt were multidimensionally poor, followed by the middle and Coastal belts of 73.2% and 68.9%, respectively. The national incidence of multidimensional poverty in this study (74.7%) is far higher than the estimated monetary poverty incidence of 23.1% in the year 2016/2017 GLSS 7 report (GSS, 2018) but consistent with the recent study by UNDP (2020) which found that, about 84.35% of multidimensional poor live in Sub-Saharan Africa . Even though the GLSS 7 report also shows higher rate of monetary poverty in the Northern belt with some rural areas recording as high as 67.7%, the multidimensional poverty incidence in this study has proven to be more than that. This is, however, expected because the MPI is the weighted product of the headcount and the intensity from several dimensions and indicators. The study also revealed that the rural multidimensional poverty was higher than the Urban for both the pooled sample and across the belts, which is consistent with the trend for the monetary poverty as outlined in GLSS7 report (GSS, 2018). The high multidimensional poverty in the rural areas was also associated with higher incidence accordingly for all belts with the rural households within the Northern belt recording the highest MPI of 0.491 and a higher incidence of 91.2%, while that in the Coastal belt recorded the least of 0.335 MPI and 70.8% in terms of incidence. It could thus be said of Ghana that, multidimensional poverty in Ghana is more of rural than urban. It is also important to note that, the intensity of multidimensional poverty was higher in the Coastal belt than the Northern and middle belt. This means that, the relatively lower proportion of households in the belt



that were multidimensionally poor, were deprived in about 42.2% of the indicators which suggest a higher inequality between the poor and the non-poor in the Coastal belt as compared to the Northern and Middle belts of 20.9% and 36.9% intensity respectively. The majority (88.8%) of households in the Northern belt were multidimensionally poor followed by the middle and Coastal belts of 73.2% and 68.9% respectively. The national incidence of multidimensional poverty in this study (74.7%) is far higher than the estimated monetary poverty incidence of 23.1% in the year 2016/2017 GLSS 7 report (GSS, 2018). Even though the GLSS 7 report also shows higher rate of monetary poverty in the Northern belt with some rural areas recording as 67.7%, the multidimensional poverty incidence in this study has proven to be more than that. The high multidimensional poverty rate is expected because the MPI is the weighted product of the headcount and the intensity from 10 indicators within three dimensions. The study also revealed that rural multidimensional poverty was higher than Urban for both the pooled sample and across belts which is consistent with the trend for the monetary poverty as outlined in GLSS7 report (GSS, 2018). The high multidimensional poverty in the rural areas was also associated with higher incidence of poverty for all belts with the rural households within the Northern belt recording the highest MPI of 0.491 and a higher incidence of 91.2%, while the Coastal belt recorded the least of 0.335 MPI and 70.8% incidence of poverty. Thus, poverty is more prevalent in rural areas than in urban areas. Moreover, the intensity of multidimensional poverty was higher in the Coastal belt than the Northern and middle belt. This suggests that the relatively low proportion of households in the belt that were multidimensionally poor, were deprived in about 42.2% of the indicators



suggesting a higher inequality between the poor and the non-poor in the Coastal belt as compared to the Northern and Middle belts of 20.9% and 36.9% intensity respectively.

4.5.3 Contribution of each domain to multidimensional poverty by belt

The study also identified the contribution of the various domains or dimensions to multidimensional poverty in Ghana. Figure presents the contributions of the various domains to multidimensional poverty for the pooled sample and across belts. The results showed that education domain contributes slightly higher to multidimensional poverty of about 35% for the full sample than the health domain of 31% and living standards domain of 34%. This trend is also true for the Northern belt and the Coastal belt but not the Middle belt. In the Northern belt, education domain contributes 37% to multidimensional poverty while living standards domain and health domain contributes 34% and 29%, respectively. However, in the Middle belt, living standards domain contributes to multidimensional poverty slightly higher than education and health domains. While living standards contributes about 36% to multidimensional poverty, health and education contributes 30% and 35% respectively. The contribution of living standards was the same for both the Northern and Coastal belts of 34% with the Middle belt contributing more at 36%. The Coastal belt and the Middle belt recorded the same level of contribution to multidimensional poverty in terms of education domain of 35%.



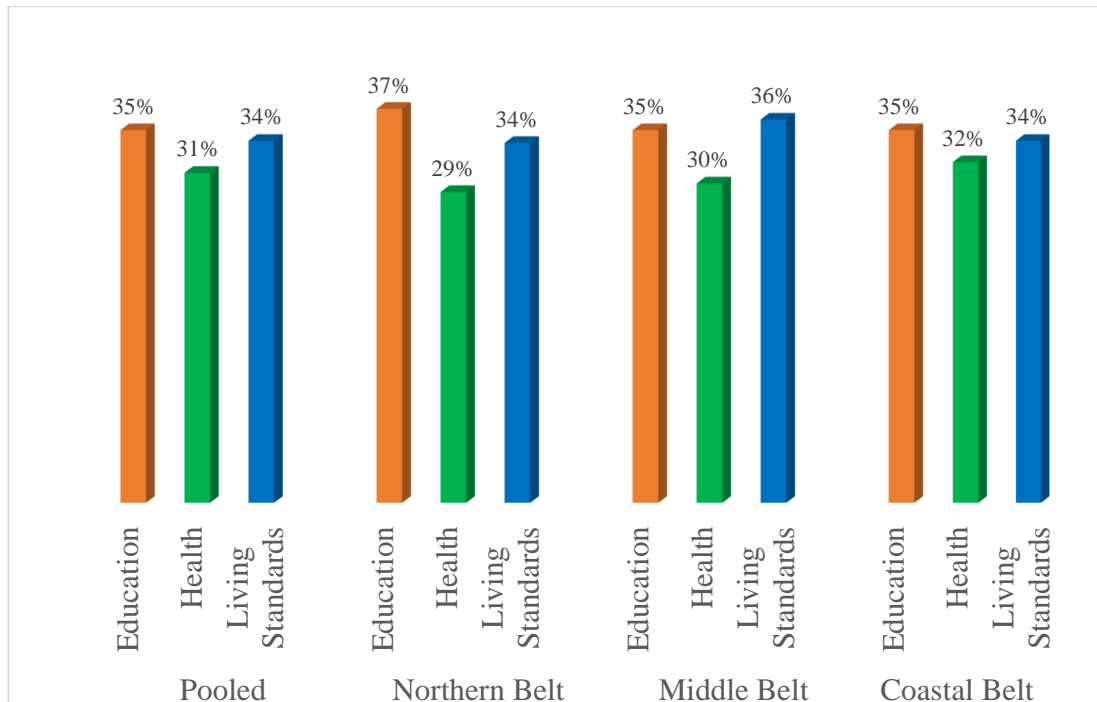


Figure 4.1: Contribution of each domain to multidimensional poverty in Ghana

4.5.4 Contribution of each domain to multidimensional poverty by location

The contribution of the three domains/dimensions to multidimensional poverty is presented in Figure . The results showed that education domain contributes more to rural multidimensional poverty at 37% as compared to 35% in the urban areas. Also, the contribution of health domain to urban multidimensional poverty was higher (33%) than its contribution to rural multidimensional poverty (30%). This suggests that most of the households in the urban areas are multidimensionally poorer than those in the rural areas. This could be associated to the diet they take which goes a long way to affect their body mass index which is used in this study for the nutritional component of this domain. Most rural households are agrarian and engage in farming and so eat from their healthier and most often organic produce as compared to the



urban areas where food items are commercialized and traders seek profits than quality.

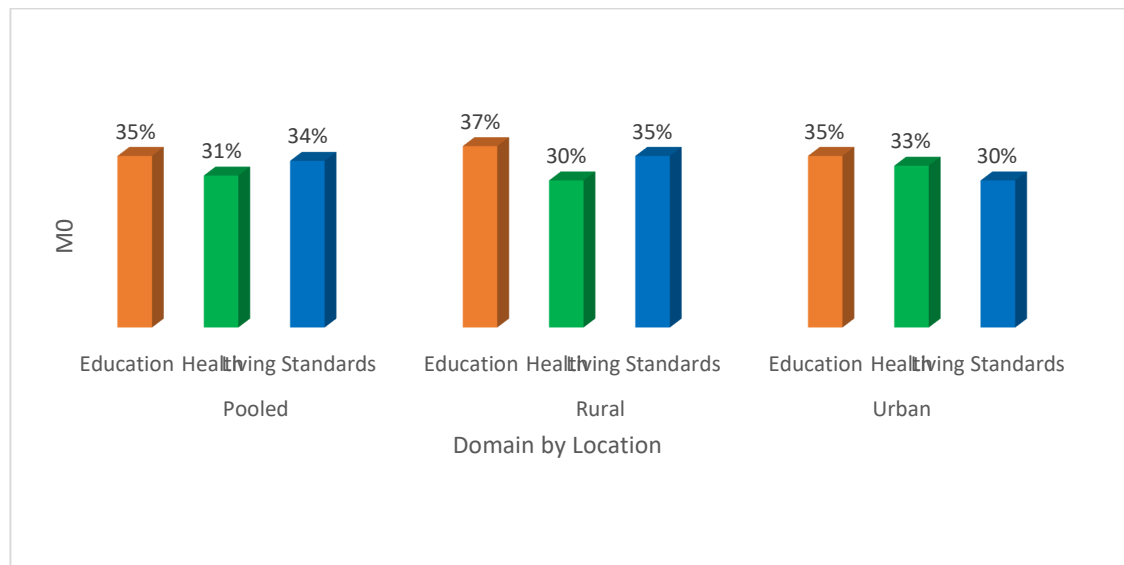


Figure 4.2: Contribution of each domain to multidimensional poverty by location

Hence while the rural household will slaughter their chicken for a meal, those at the urban centres will go for frozen chicken which are less nutritious than the former. The contribution of living standards domain to multidimensional poverty was higher in the rural areas (35%) than the urban (30%). This was also expected because households in the rural setting often resort to the use of firewood or charcoal as fuels, some rural areas lack electricity while the flooring of houses in most rural areas are often in deplorable states which are all indicators under this domain and hence the relatively high contribution of this domain to multidimensional poverty in rural areas.



4.6 Drivers of Multidimensional poverty in Ghana

The study further investigated the factors that influence multidimensional poverty in Ghana with details on the specific drivers for the three ecological zones; Northern, Middle and Coastal belts. Here, a household was coded 1 if deprived in 33% of the weighted indicators and zero if otherwise (OPHI, 2017).

Results from

Table 4.6 presents the probit estimates of the drivers of multidimensional poverty in Ghana. The results show that, both household socio-economic as well as institutional variables affect multidimensional poverty status in Ghana.

The sex of the household head was found to affect multidimensional poverty for the Northern and Middle but not the Coastal belt. The pool sample was not also significant. Hence, the results imply that, female headed households in the Northern and Middle belt had higher probability of being multidimensionally poor than male headed households within the belts.



Table 4.6 Drivers of Poverty in Ghana

Variable	Pool	Northern	Middle	Coastal
Socio-economic Variables				
Sex of household head	0.002(0.029)	-0.389(0.079) ^a	-0.112(0.049) ^a	0.018(0.068)
Age of household head	0.0003(0.0007)	0.0029(0.0018)	0.015(0.0014) ^a	-0.010(0.002) ^a
Marital status of household head	0.376(0.029) ^a	0.474(0.074) ^a	0.085(0.052)	0.209(0.067) ^a
Total farm size	0.0014(0.0008) ^b	-0.0014(0.0013)	-0.051(0.006) ^a	-0.006(0.315)
Household size	0.079(0.005) ^a	0.173(0.014) ^a	0.160(0.011) ^a	0.031(0.011) ^a
Livestock rearing	-0.489(0.027) ^a	-0.297(0.063) ^a	0.280(0.055) ^a	0.793(0.059) ^a
Migration	-0.318(0.032) ^a	-0.132(0.086)	0.128(0.054) ^a	0.142(0.075) ^b
Climate shock	0.137(0.023) ^a	0.025(0.059)	-0.154(0.043) ^a	0.063(0.056)
Institutional Variables				
Accessibility to loans	-0.025(0.038)	0.222(0.095) ^a	-0.161(0.078) ^a	-0.017(0.085)
Savings groups	-0.887(0.039) ^a	-0.990(0.093) ^a	-0.931(0.064) ^a	-0.709(0.101) ^a
Extension service	-0.459(0.027) ^a	0.183(0.0674) ^a	0.105(0.155)	-0.506(0.064) ^a
Employment status	-0.119(0.008) ^a	-0.096(0.018) ^a	0.058(0.014) ^a	-0.061(0.022) ^a
Constant	0.725	0.098	1.179	1.408
<i>Number of</i>				
Observations(N)	14009	4147	4448	5414
Pseudo R2	0.2087	0.2788	0.23	0.2852
LR chi 2(12)	0.000	0.000	0.000	0.000

a and b represent 1% and 5% significance level respectively



This is contrary to the findings of Aboagye-Attah (2019) and Donkoh (2010) who both found male headed households to have higher probability to consumption poverty in Ghana. The results is however consistent with Sekhampu (2013) who found female-headed household in South Africa had higher probability of being poor than male headed households. This could be associated to the fact that, most female headed households in the Northern and Middle belts are often widows who mostly struggle for their own survival as compared to male heads. This was only true for the Northern and Middle belt but not the coastal belt.

The age of the household head was also found to have a mixed influence on multidimensional poverty in the middle and coastal belt but not the Northern belt. Sulemana (2016) found age to have a negative effect in explaining the probability of household's multidimensional poverty in the East Gonja district within the Northern belt. While increase in age had a positive effect on the probability of being poor in the middle belt, an increase in age was found to negatively affect the probability of poverty in the Coastal belt. This could be associated to structural differences between the middle belt and the coastal belt. Generally, the more one gets older, the less he/she will be able to engage in more demanding activities to improve their standard of living. This could thus imply that, the elderly in the Coastal belt either have more energy to engage in economic activities or their children are more concern about them. Also, the Coastal belt covers more developed cities than the middle belt, hence elderly household heads in those areas can still engage in other economic activities aside farming to improve their standard of living.



The marital status of the household head was found to have a positive influence multidimensional poverty across the three belts. The direction of causality was also the same for both pool sample and across the belts. The results showed that, the married household heads in Ghana have higher probability of being multidimensionally poor than the unmarried. This could be because of the alarming responsibilities to goes into marriage. Though one would have expected that, most married men could have secured jobs, become more responsible and thereby have higher probability of being non-poor, the results showed a contrary view. Perhaps most of the married households in Ghana are not gainfully employed or have produced more children than their resources could carter for thus increasing their probability of being multidimensionally poor.

The total farm size owned by the household was also found to have a negative influence on multidimensional poverty for the pool sample and the middle belt. Though a negative direction was revealed for both the Northern and Coastal belts, it was not significant. This is consistent with Bogale et al. (2005) who found land holding per adult equivalent to have a negative influence on household poverty in rural Ethiopia. It is also in congruence with the findings of Sulemana (2016) who found the area of land cultivated by households to have a positive influence on the probability of being non-poor. The positive results in this study implies that, an increase in farm size of households in Ghana especially households in the middle belts, increases decreases their probability of being multidimensional poor. This is rational because, such households can plant different cash and food crops in larger



quantities both for the family and the market thereby, decreasing their probability of being poor.

The size of the household was found to have a positive influence on household multidimensional poverty both for the pool sample and across the three ecological belts. This is consistent with the findings of Bogale et al. (2005) and Sackey (2005) who found household size to have a positive influence on household poverty in rural Ethiopia. This implies that, households with larger number of people are more likely to be multidimensional poor than those with fewer numbers. This is because, larger household size, imply more mouth to feed of which most households are unable to afford. It could also mean, increased population which can lead to increase in unemployment and poverty in the long run as is found in this study. Hence controlling population growth through limited household size could be a leeway in fighting reducing the probability of multidimensional poverty in Ghana.

Livestock rearing was also considered in this study where a household is coded 1 if the engage in livestock rearing and zero if otherwise. The results of the study showed a mixed influence. While livestock rearing had a negative influence on household multidimensional poverty status in the pool sample and the Northern belt, it had a positive influence on the middle and coastal belts. This results however makes economic meaning and was expected because the Northern belt is characterized by vast lands where the activities of Fulani herdsman are pronounced that in the middle and Coastal belts. Most parts these belts are forested and does not allow for the rearing of livestock in larger numbers. Most of the livestock sold in the markets of



the middle and coastal belts are mostly transported from the Northern belt to those markets. It is therefore not surprising that, households in the Northern belt that engage in livestock rearing have lesser probability for multidimensional poverty unlike those in the middle and coastal belts.

Migration was found to have a negative influence on household multidimensional poverty situation for the pool sample. A negative direction was also revealed for the Northern but insignificant. On the contrary, migration had a positive influence on multidimensional poverty in the Middle and Coastal belts. The positive results of migration on multidimensional poverty in the middle and coastal belts could imply that, the cost of these people migrating to other areas is expensive than the remittances they pay home. The reverse of this was however true for the Northern belt, suggesting that those who migrates pay better remittances home than if they were home and hence the mixed effects.

Climate shock was also found to have a negative effect on household multidimensional poverty for the pool sample. The direction was positive though insignificant for the Northern and coastal belts but not so for the middle belt. A significant negative effect of climate shock on household multidimensional poverty situation for the middle belt was identified. The positive effect of climate shock on household multidimensional poverty for the pool sample was expected because, the shock will destroy the household assets such as farmlands and other necessities for survival. Meanwhile, the negative effect of climate shock in the middle belt suggest



some form of push mechanism exerted on households to prepare against the shock as well as improve their living standards.

With the institutional factors considered in this study, household accessibility to loans from financial institutions was found to have a negative influence on the probability multidimensional poverty status for the pool sample as well as the middle and coastal belts. The results were however positive for the Northern belt. The negative effect of loans implies that, households in the Middle and Coastal belts that receive loans are less likely to be poor as compared to those who do not take loans. This could be because households in those areas have more investment options both on-farm and off-farm where the loans could be channeled for a better return. For example, with the bimodal rainfall pattern recorded in these areas, they are able to farm cash crops like cocoa, plantain and cashew which have higher returns from which they can repay their loans and still have enough to depend on. This is not the case for households in the Northern belt. Most of the households in the Northern belt that take loans could be tempted to consume it rather than invest because, of the limited investment options for them. It is the belt that records a uni-modal rainfall pattern in the country and most of the agricultural land is less fertile to support some of these cash crop production and at the same time the land tenure system within the belt results in the continuous fragmentation of the land.

Also, households that save with financial institutions or belong to savings groups were found to have lower probability of being poor than those who do not save. This was true both for the pool sample as well as across the ecological zones. This is



because savings serve as a cushioning mechanism which helps to invest in other activities as well as respond to unforeseen events that could threaten the poverty status of the household. Hence households that save have lesser probability for multidimensional poverty.

Agricultural extension service delivery had a negative and significant effect in explaining the probability of household multidimensional poverty situation for the pool sample and the coastal belt. The results was however positive for the Northern belt. The negative results imply that, agricultural extension delivery helps households to improve their productivity which is able to translate in improving other economic indicators of the household thereby reducing the probability of being poor. On the contrary, a positive result was found for the Northern belt. This does not in any way imply that, extension service delivery have a worsening effect on household multidimensional poverty but could be because, the poor in the belt are most the farmers to whom the agricultural extension agents attend to and hence the mixed results.

Finally, households with someone formally employed (with a salaried work) had lesser probability of being multidimensionally poor than those that do not. This is consistent with GSS (2018) who found households that are formally employed in the public sector to experience reduction in their level of consumption poverty. A positive results was however found for the middle belt, suggesting that most of the households without anybody formally employed rather had a higher probability of being poor. The negative effect for the pool sample, the Northern belt as well as the



Coastal belt could imply that, such households earn more income on a whole from the salaried work among other sources which helps to eradicate multidimensional poverty in their homes than those who do not. This is consistent with Sulemana (2016) who also found households with consistent monthly income to have a positive influence on the probability of being non-poor at the East Gonja district within the Northern belt. The situation was not true for the middle belt where a rather positive effect suggest that, the informal sector plays a crucial role in this area where households without a salaried work have lesser probability of being poor. In order words, those with higher probability of being poor were from households with someone formally employed.

4.7 Impact of Livelihood Diversification on Multidimensional Poverty

Table 4.7 is the empirical results of the inverse probability-weighted regression-adjustment (IPWRA) which shows the impact of livelihood diversification on multidimensional poverty. The impact was estimated for the pooled sample and at the various quantiles of crop and income diversification. Hence, each quantile is binary, where a household is assigned 1 if the diversification index is within that quantile and zero otherwise. The average treatment effect on the treated (ATT) was computed, which shows the net impact of diversification at that quantile on multidimensional poverty. The results reveal interesting dynamics of livelihood diversification (Crop diversification and income diversification) across the three belts as well as the pooled sample. It must be noted that, a positive effect in this study will be welfare reducing since it will rather contribute to multidimensional poverty levels.



The study results for the pooled sample reveal that crop diversification has a negative and significant impact on multidimensional poverty at the lower and middle quantiles. However, at the higher quantile, the impact of crop diversification on multidimensional poverty is positive and significant. It is therefore intuitive to state that most households in Ghana should often diversify into different crop portfolios to some medium degree and then specialize in the production of those crop enterprises. Thus, diversifying into many crops is likely to render the households into poverty.

Evaluating the impact across the three belts shows a similar trend. Crop diversification was found to have a negative and significant effect on multidimensional poverty at the middle quantiles for both the northern and Middle belts. However, for the coastal belt, the impact was negative and statistically significant at both the lower and middle quantiles of crop diversification, which is the same as for the pooled sample. It is worth noting from the descriptive statistics that the coastal belt recorded a lower index for the extent of crop diversification. Unlike the results for the pooled sample, the dynamics of the Northern and middle belts imply that too less of crop diversification in these belts do not significantly help in reducing multidimensional poverty levels since it was not significant at the lower quantile. A study by Asfaw et al. (2019) on heterogeneous impact of diversification using cross-country panel data reveals some heterogeneity within same country and different ecological zones. Interestingly, this study found that, at the higher quantile of crop diversification, it could worsen multidimensional poverty since all belts had a positive and significant effect at the higher quantiles. This also supports some parts



of the findings of Asfaw et al. (2019) who found crop diversification to either be insignificant or have negative effect on household's welfare in Niger and Zambia.





Table 4.7: Impact of Livelihood Diversification on Multidimensional Poverty in Ghana

Multidimensional Poverty	Treatment effects	Crop Diversification			Income Diversification		
		25 th Percentile	50 th Percentile	75 th Percentile	25 th Percentile	50 th Percentile	75 th Percentile
Pool	ATT	-1.493(0.545) ^a	-0.941(0.025) ^a	0.550(0.028) ^a	0.115(0.028)	0.165(0.148)	-0.170(0.030) ^a
Northern	ATT	-0.089(0.0837)	-0.764(0.043) ^a	0.331(0.041) ^a	-0.012(0.049)	-0.311(207)	-0.010(0.087)
Middle	ATT	0.055(0.070)	-0.802(0.045) ^a	0.529(0.054) ^a	0.271(0.053) ^a	0.179(0.265)	-0.337(0.053) ^a
Coastal	ATT	-4.615(1.818) ^a	-0.794(0.038) ^a	0.577(0.053) ^a	0.196(0.044) ^a	0.423(0.248) ^b	-0.254(0.046) ^a

^{a, b and c} represent 1% ,5% and 10% significance level respectively

Thus crop diversification in Ghana is necessary for fighting multidimensional poverty but at a point households need to specialize to increase their scale of production.



With regards to the income diversification, the impact was negative and statistically significant only at the higher quantile for the pool sample. This is inconsistent with that of Asfaw et al. (2019) who found the effect to rather have a positive influence on household's welfare at the lower quantiles. The negative effect at a higher quantile implies that income diversification in Ghana significantly contributes to the reduction of multidimensional poverty levels at the higher quantile of diversity. Thus, at a lower level of income diversification, the impact does not significantly influence multidimensional poverty. Surprisingly, the result was not significant at all quantiles within the Northern belt. Even though the direction showed a negative effect of income diversification on multidimensional poverty across the three quantiles, it was not statistically significant. The descriptive statistics showed that, the Northern recorded the least in terms of the extent of income diversification. Once this study focuses on multidimensional poverty, it could mean that, the returns from varied income portfolio within the belt is not enough to split over to the various dimensions and indicators, though it could be significant on other welfare measures, which is not the interest of this study. Again the results show that at all quantiles, no level of income diversification makes household worse off since there is no positive direction of the covariates at all levels of diversification. For the middle belt, the impact of income diversification on multidimensional poverty is negative and statistically significant at the higher quantiles but positive at the lower quantile. This implies that, at a lower level of income diversification in the Middle belt, farm households become worse-off probably because the returns may not be enough to pay for the effort, which makes them worse-off in some dimensions. However, at a higher level of income diversification, households can

pay for their efforts, which improve their welfare and reduces multidimensional poverty at the end. The results for the middle belt and the Coastal belt is similar. Income diversification was also found to have a negative and significant effect on multidimensional poverty at the higher quantiles but positive at the lower and middle quantiles. From the analysis so far, it could be concluded that income diversification in Ghana generally helps in the reduction of multidimensional poverty at the higher quantiles of diversity below which could be of no significant effect or a worsening effect.



CHAPTER FIVE

CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The concluding chapter of the study presents the summary of the key findings of the study, conclusion and policy recommendations. Section 5.2 outlines the key findings from the study. Section 5.3 presents the conclusions made from the study, while section 5.4 entails the policy recommendations.

5.2 Key Findings of the Study

The study has brought to light interesting findings which will help guide policy formulation and implementation. Among them includes the following. First, the study results reveal zero livelihood specialization in Ghana on the average.

The results showed that while the Coastal belts records a relatively low crop diversification index (1.376), it records the highest (0.438) for income diversification. However, the Northern belt recorded the least average extent of both crop and income diversification index of 1.198 and 0.357, respectively.

The results further revealed that, both crop diversification and income diversification were more of a rural phenomenon than urban with crop diversification index of 1.391 and income diversification index of 0.479, respectively in the rural areas as compared to 1.303 and 0.343, respectively in the urban areas.

With regards to multidimensional poverty, most of the households in Ghana are deprived in cooking fuel under living standards (93.25%) followed by nutrition (86.36%) under health and then child school attendance (50.86%) under education.



However, the multidimensional poverty in the Northern belt was the highest followed by the middle belt and then the coastal belt. Also, the incidence of multidimensional poverty was generally high for all belts with the Northern belts recording the highest incidence of multidimensional poverty of about 88.8% though it also recorded the least in terms of the intensity of 0.209

Moreover, the study revealed that rural multidimensional poverty was generally higher than Urban for both the pooled sample and across belts. In contrast, the contribution of health (domain 2) to urban multidimensional poverty was higher (33%) than its contribution for rural multidimensional poverty (30%).

Concerning the contribution of the three domains to multidimensional poverty in Ghana, the results showed that education domain contributes slightly higher (35%) for the full sample than health domain of 31% and living standards domain of 34%.

Both socio-economic factors (livestock rearing, total farm size, household size etc) and institutional factors (savings groups, accessibility to loans, agricultural extension service and employment status) significantly influence multidimensional poverty in Ghana with heterogeneous direction of causality across belts.

Finally, crop diversification was found to have a negative and significant impact on multidimensional poverty at the lower and middle quantiles beyond, which could have an adverse effect on households. In comparison, income diversification in Ghana generally helps in the reduction of multidimensional poverty at the higher quantiles of diversity below, which could be of no significant effect.



5.3 Conclusions

The study sought to achieve five key objectives. (1) to identify the extent of livelihood diversification, (2) identify the drivers of livelihood diversification, (3) compute the level of multidimensional poverty, (4) estimate the determinants of multidimensional poverty and (5) to estimate the impact of livelihood diversification on multidimensional poverty in Ghana. Data from the seventh round of the Ghana Living Standards survey by the Ghana Statistical Service was used. The Margalef index was used to identify the extent of livelihood diversification in Ghana, the simultaneous bootstrapped quantile regression was used to identify the drivers of livelihood diversification at the various quantiles, the Alkire Foster Multidimensional poverty index was employed to unravel the Multidimensional poverty situation of Ghana while while a probit model was used to identify the determinants of multidimensional poverty in Ghana. Finally, the inverse probability weighted regression adjustment was used to estimate the impact of livelihood diversification on multidimensional poverty at the various quantiles of diversity. The Margalef index revealed zero specialization in Ghana on the average with the Northern belt recording the least in terms of the extent of both crop and income diversification. The Coastal belt recorded the highest level of income diversification while the middle belt recorded the highest average level of crop diversification. Results from the simultaneous bootstrapped quantile regression reveals that pull factors (e.g. Household per capita income, total farm size, livestock rearing, asset ownership savings and health status), push factors (e.g. Migration, conflicts and climate shock) and location variables were found to have an influence on livelihood diversification at various quantiles. On the level of multidimensional poverty in the country, it was found that



most of the households in Ghana were generally more deprived of cooking fuel, nutrition and child school attendance. Multidimensional poverty was higher than the monetary poverty with the northern belt identified as the poorest belt followed by the middle belt and then the Coastal belt. Rural multidimensional poverty was also higher than urban multidimensional poverty. However, the contribution of health to urban multidimensional poverty was found to be higher than that for rural. The probit model on the determinants of multidimensional poverty in Ghana revealed that both socio-economic factors and institutional factors significantly influence multidimensional poverty in Ghana with heterogeneous direction of causality across belts. Socio-economic factors like rearing of livestock, total farm size, household size among others were found to be key determinants of poverty while institutional factors like savings groups, accessibility to loans, agricultural extension service and employment status were also revealed to influence poverty.

Finally, while the impact of crop diversification was found to reduce multidimensional poverty at the lower and middle quantiles of diversification, income diversification was found to reduce multidimensional poverty at the higher levels of diversification.



5.4 Policy Recommendations

The results of the study have significant policy implications for us as a country amidst the current sustainable development goals. First of all, if we have to end poverty in all its forms, then it must be multidimensional poverty which is proven to be higher than the monetary poverty often used as a measure of progress in the pursuit of the SGD 1. The higher multidimensional poverty suggests that government and development partners have to consider how deprived households are with respect to the given indicators than a uni-dimensional perspective.

Secondly, the relatively high deprivation in terms of nutrition implies that, the government of Ghana needs to focus on the nutrition security of Ghana. There has been a rising focus on food security evident in the current planting for food and jobs programme. The study results suggest significant policy shift towards the nutrition security of the country.

Meanwhile in our effort to fighting multidimensional poverty in Ghana by the development authorities, focus should be given to livestock rearing especially in the northern belt, encouraging savings and formation of saving groups, strengthening the services of agricultural extension agents as well as fostering the formal employment to the labour force for more regular and sustained earnings or creating the conditions that will engineer formal employment such as salaried work.

Finally, the study results have brought to light the reality of the debate as to whether to pursue livelihood specialization or diversification. Since crop diversification was found to reduce multidimensional poverty at the lower and middle quantiles, it implies that households in Ghana need to diversify but not infinitely. Households need to specialize



after some level of diversification. However, income diversification should be encouraged since its impact outweighs specialization. The impact of income diversification was revealed to reduce multidimensional poverty at the higher quantiles, which suggest that a very low level of diversification is not significant. Hence, income diversification should be encouraged in the three ecological zones of Ghana. It should be incorporated in the policy framework of the Northern, middle and Coastal development authorities.



REFERENCES

- Aboagye-Attah, K. (2019). *Socioeconomic correlates of poverty in Ghana using Ghana Living Standards Survey round 6 and 7*.
- Abugre, C. (1993) Beyond the crowded shelves: An assessment of the Ghana Structural adjustment experiences, San Francisco, Institute of Food and Research Policy
- Ackah, C. (2013). Financial Inclusion and Development: A Cross Country Analysis. *In Annual Conference of the Human Development and Capability Association, New Delhi, 25(3), 325–339*. <https://doi.org/10.1002/jid>
- Adeoti, A. I. (2014). Trend and determinants of multidimensional poverty in rural Nigeria. *Journal of Development and Agricultural Economics, 6(5), 220–231*. <https://doi.org/10.5897/jdae2013.0535>
- Agyeman, B. Y. (2013). *The role of local knowledge in adaptation to climate change*. Doctoral thesis at the university of Waterloo, Canada. <https://doi.org/10.1002/wcc.204>
- Agyeman, S., Arcibald, B., Brimpong, S. A., & Onumah, E. E. (2014). Determinants of Income Diversification in the Western Region of Ghana. *Quarterly Journal of International Agriculture, 53(1), 55–72*.
- Ahmed, M., Bhandari, H., Gordoncillo, P., Quicoy, C., & Carnaje, G. (2018). Factors affecting extent of rural livelihood diversification in selected areas of Bangladesh. *SAARC Journal of Agriculture, 16(1), 7–21*. <https://doi.org/10.3329/sja.v16i1.37419>



Alcock, P. (2006). *Understanding poverty*. (3rd ed.). London: Palgrave MacMillan.

Alkire, S. (2005). *Valuing freedoms: Sen's capability approach and poverty reduction*,
Oxford University Press on Demand, Oxford

Alkire, S., Roche, J. M., Ballon, P., Foster, J., Santos, M. E., & Seth, S. (2015).
Multidimensional poverty measurement and analysis. Oxford University
Press, USA.

Alkire, Sabina, & Foster, J. (2011). OPHI WORKING PAPER NO . 43
Understandings and Misunderstandings of Multidimensional Poverty
Measurement. *The Journal of Economic Inequality*, 52(27), 1–82.
<http://www.ophi.org.uk/measuring-multidimensional-poverty-in-latin-america-previous-experience-and-the-way-forward/>
<https://ideas.repec.org/p/qeh/ophiwp/ophiwp040.html>
<http://link.springer.com/article/10.1007/s10888-011-9210-3>
<http://link.springer.com>

Alobo Loison, S. (2015). Rural Livelihood Diversification in Sub-Saharan Africa: A
Literature Review. *Journal of Development Studies*, 51(9), 1125–1138.
<https://doi.org/10.1080/00220388.2015.1046445>

Amos, T. T. (2007). An analysis of productivity and technical efficiency of smallholder
cocoa farmers in Nigeria. *Journal of Social Sciences*, 15(2), 127–133.

Aneani, F., Anchirinah, V. M., Owusu-Ansah, F., & Asamoah, M. (2011). An analysis
of the extent and determinants of crop diversification by cocoa (*Theobroma*



cacao) farmers in Ghana. *African Journal of Agricultural Research*, 6(18), 4277–4287. <https://doi.org/10.5897/AJAR10.1083>

Aniah, P., Kaunza-Nu-Dem, M. K., Quacou, I. E., Abugre, J. A., & Abindaw, B. A. (2016). The Effects of Climate Change on Livelihoods of Smallholder Farmers in the Upper East Region of Ghana. *International Journal of Sciences: Basic and Applied Research*, 28(2), 1–20. [http://ageconsearch.umn.edu/bitstream/160478/2/Climate Change Impact on Smallholder Farmers in.pdf](http://ageconsearch.umn.edu/bitstream/160478/2/Climate%20Change%20Impact%20on%20Smallholder%20Farmers%20in.pdf)

Antwi-Agyei, P., Stringer, L. C., & Dougill, A. J. (2014). Livelihood adaptations to climate variability: Insights from farming households in Ghana. *Regional Environmental Change*, 14(4), 1615–1626. <https://doi.org/10.1007/s10113-014-0597-9>

Antwi-boasiako, G. (2012). *How to Live and Cope with Climate Change: Coping Strategies of Small-Scale Farmers in Upper East Region, Ghana*. University of Uppsala.

Arabsheibani, R. G., Carneiro, G. F., & Henley, A. (2003). Human Capital and Earnings Inequality in Brazil, 1988–1998: Quintile Regression Evidence. *World Bank Policy Research Working Paper 3147*, [Http://Econ.Worldbank.Org](http://Econ.Worldbank.Org).

Asante, B. O., Villano, R. A., Patrick, I. W., & Battese, G. E. (2018). Determinants of farm diversification in integrated crop-livestock farming systems in Ghana. *Renewable Agriculture and Food Systems*, 33(2), 131–149. <https://doi.org/10.1017/S1742170516000545>



Asfaw, S., Scognamillo, A., Di Caprera, G., Sitko, N., & Ignaciuk, A. (2019). Heterogeneous impact of livelihood diversification on household welfare: Cross-country evidence from Sub-Saharan Africa. *World Development*, 117, 278-295.

Asravor, R. K. (2018). Livelihood Diversification Strategies to Climate Change among Smallholder Farmers in Northern Ghana. *Journal of International Development*, 30(8), 1318–1338. <https://doi.org/10.1002/jid.3330>

Ataguba, J., Fonta, W., & Ichoku, E. H. (2012). The Determinants of Multidimensional Poverty in Nsukka, Nigeria. *SSRN Electronic Journal*, 1–22. <https://doi.org/10.2139/ssrn.1937721>

Babatunde, R. O., & Qaim, M. (2010). Impact of off-farm income on food security and nutrition in Nigeria. *Food Policy*, 35(4), 303–311. <https://doi.org/10.1016/j.foodpol.2010.01.006>

Bader, C., Bieri, S., Wiesmann, U., & Heinemann, A. (2016). A Different Perspective on Poverty in Lao PDR: Multidimensional Poverty in Lao PDR for the Years 2002/2003 and 2007/2008. *Social Indicators Research*, 126(2), 483–502. <https://doi.org/10.1007/s11205-015-0900-2>

Barrett, C. B., & Reardon, T. (2000). Working Paper African Agriculturalists : Some Practical Issues. In *New York* (Issue March).

Barrett, C. B., Reardon, T., & Webb, and P. (2001). Nonfarm Income Diversification and Household Livelihood Strategies in Rural Africa: Christopher B. Barrett.



Concepts, Dynamics, and Policy Implications, 26, 315–331.

Bellon, M. R., Kotu, B. H., Azzarri, C., & Caracciolo, F. (2020). To diversify or not to diversify, that is the question. Pursuing agricultural development for smallholder farmers in marginal areas of Ghana. *World Development*, 125. <https://doi.org/https://doi.org/10.1016/j.worlddev.2019.104682>

Bening, R. B.(1975) Colonial Development Policy in northern Ghana 1898-1950, Bulletin of Ghana Geographical Association, vol.17

Bezu, S., & Holden, S. (2014). Are rural youth in Ethiopia abandoning agriculture? *World Development*, 64(1), 259–272.

Boasiako, G. A.-, & Antwi-boasiako, G. (2012). *How to Live and Cope with Climate Change*.

Bogale, A., Hagedorn, K., & Korf, B. (2005). Determinants of poverty in rural Ethiopia. *Quarterly Journal of International Agriculture*, 44(2), 101–120. <https://doi.org/10.5167/uzh-64170>

Bourguignon, F., & Chakravarty, S. (2003). The measurement of multidimensional poverty. *Journal of Economic Inequality*, 1, 25-49.

Buam, C. F. (2013). Quintile regression: EC823 Applied econometrics. *Boston College United Nations Development Plan Ghana*.

Carney, D. (1998). *Sustainable rural livelihoods: What contribution can we make?* London: DFID.



- Chambers, R. (2006). Concepts and measures What is poverty? *International Poverty Centre Poverty In Focus, Brazil*
- Clark, K. A. (1965). A role for librarians in the relevant war against poverty. *Wilson Library Bulletin*, 40(1), 1–45.
- Cooke, E., Hague, S., & McKay, A. (2016). The Ghana poverty and inequality report: Using the 6th Ghana living standards survey. *University of Sussex*.
- Czyżewski, A., & Smędzik-Ambroży, K. (2015). Specialization and diversification of agricultural production in the light of sustainable development. *Journal of International Studies*, 8(2), 63–73. <https://doi.org/10.14254/2071-8330.2015/8-2/6>
- Dagunga, G., Sedem Ehiakpor, D., Kwabena Parry, I., & Danso-Abbeam, G. (2018). Determinants of Income Diversification Among Maize Farm Households in the Garu-Tempene District, Ghana. *Review of Agricultural and Applied Economics*, 21(1), 55–63. <https://doi.org/10.15414/raae.2018.21.01.55-63>
- Dimova, R., & Sen, K. (2010). *Is Household Income Diversification a Means of Survival or a Means of Accumulation? Panel Data Evidence from Tanzania*.
- Dittoh S. (2008) Poverty Alleviation in northern Ghana: Fantasy or Realism? Paper presented at the 2008 Harmattan School, Bolgatanga, Ghana, 1st-2nd February, 2008
- Donkoh, S.A. Ayambila, S. and Abdulai, S. (2013). Technical Efficiency of Rice Production at the Tono Irrigation Scheme in Northern Ghana. *American*



Journal of Experimental Agriculture, 3(1), 25–42.

Donkoh, S. A. (2010). The Determinants of Poverty in Ghana. *Development Spectrum*, 3(1).

Dries, L., Pascucci, S., & Gardebroek, C. (2012). Diversification in Italian farm systems: are farmers using interlinked strategies? *Mediterranean Journal of Economics*, 11(4): 7–15.

Dzanku, M. F. (2015). Household Welfare Effects of Agricultural Productivity: A Multidimensional Perspective from Ghana. *The Journal of Development Studies*, 51(9), 1139–1154. <https://doi.org/DOI:10.1080/00220388.2015.1010153>

Ebenezer, M., & Abbyssinia, M. (2018). Livelihood diversification and its Effect on household poverty in Eastern Cape Province, south Africa, *The Journal of Developing Areas*, 52(1), 235–249.

Elesh, D. (1973). Poverty theories and income maintenance: validity and policy relevance. *Social science quarterly*, 1(1): 359-373.

Ellis, F. (1998). Household Strategies and Rural Livelihood Diversification. *Journal of Development Studies*, 35(1), 1–38.

Ellis, F. (2000). *Rural livelihoods and diversity in developing countries*. Oxford University Press.

Ellis, F., & Biggs, S. (2001). Evolving themes in rural development 1950s-2000s. *Development Policy Review*, 19(4), 437–448. <https://doi.org/10.1111/1467->



7679.00143

- Emran, M. S., & Shilpi, F. (2015). Gender, geography, and generations: Intergenerational educational mobility in post-reform India. *World Development*, 72, 362-380.
- Evenson, R. E., & Gollin, D. (2003). Assessing the Impact of the Green Revolution, 1960 to 2000. *Science*, 300(5620), 758–762.
- FAO. (2012). *Crop diversification for sustainable diets and nutrition: The role of FAO's Plant Production and Protection Division. Technical report, Plant Production and Protection Division*. Food and Agriculture Organization of the United Nations, Rome.
- FAO. (2015). Livelihood diversification and vulnerability to poverty in rural Malawi. *ESA Working Paper*, No. 15-02.
- Fields, G. S., Cichello, P. ., Freije, S., Menendez, M., & Newhouse, D. (2003). Household Income Dynamics: A Four Country Story. *Journal of Development Studies*, 40(2), 30–54.
- Foste, J., Greer, J., & Thorbecke, E. (1984). A Class of Decomposable Poverty Measures. *Econometrica*, 52(3), 761–766.
- Ghana Statistical Service. (2013). *Non-monetary Poverty in Ghana, 2010 Population and Housing Census report*.
- GSS. (2018). *Ghana Living Standards Survey Round 7 (GLSS 7): Poverty Trends in Ghana 2005–2017*.



- Haddad, L., & Ahmed, A. (2003).). Chronic and transitory poverty: evidence from Egypt, 1997 -1999. *World Development*, 31(1), 71–85.
- Harvey, C. A., Rakotobe, Z. L., Rao, N. S., Dave, R., Razafimahatratra, H., Rabarijohn, R. H., Rajaofara, H., & MacKinnon, J. L. (2014). Extreme vulnerability of smallholder farmers to agricultural risks and climate change in Madagascar. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 369(1639). <https://doi.org/10.1098/rstb.2013.0089>
- Ibrahim, M., Sare, Y. A., & Adam, R. (2019). Poverty in Upper West Region of Ghana : Determinants and Policy Prescriptions. *UDS International Journal of Development*, 9(11), 2026–5336.
- Iddi, F. Y., Donkoh, S. A., Danso-Abbeam, G., Karg, H., & Akoto-Danso, E. K. (2018). Marketing Efficiency Analysis of Yam Value Chain in the Northern Region of Ghana. *UDS International Journal of Development*, 5(1), 117–128. <http://udsijd.org/index.php/udsijd/article/view/238/116>
- Imbens, G. W., & Wooldridge, J. M. (2009). Recent developments in the econometrics of program evaluation. *Journal of Economic Literature*, 47(1), 5–86. <https://doi.org/10.1257/jel.47.1.5>
- Juszczak S. (2004): In Czyżewski, A. and Smędzik-Ambroży, K. (2015) Specialization and diversification of agricultural production in the light of sustainable development”, *Journal of International Studies*, Vol. 8, No 2, pp. 63-73. DOI: 10.14254/2071-8330.2015/8-2/6
- Kaguongo, W. A., Nyangweso, J., Mutunga, J., Nderitu, C., Lunga’ho, N., Nganga, D.,



Kipkoech, J., Kabira, M., Gathumbi, P., Njane, J., Irungu, A., Onyango, D. B., & Schutlte-Geldermann, E. (2013). *A policymakers' guide to crop diversification: the case of the potato in Kenya. Technical report, Plant Production and Protection Division*. Food and Agriculture Organization of the United Nations, Rome.

Kanbur, S. R. (1991). *Poverty and development: The human development report and the world development report, 1990* (Vol. 103). World Bank Publications.

Karver, J., Kenny, C. and Sumner, A. (2012). MDGs 2.0: What goals, targets, and timeframe?" *IDS Working Papers*, 2012(398), 1–57

Knutsson, P. (2016). Understanding Lightning : experiments on meter long discharges and their x-rays. *Human Ecology Review*, 13(1), 90–99. <https://doi.org/10.6100/IR783261>

Koenker, R., & Bassett, G. (1978). Regression Quantiles Author (s): Roger Koenker , Gilbert Bassett and Jr . Published by : The Econometric Society Stable URL : <https://www.jstor.org/stable/1913643> The Econometric Society is collaborating with JSTOR to digitize , preserve and extend acce. *Econometrica*, 46(1), 33–50.

Kuu-ire, S.M.A. (2009) Poverty reduction in northern Ghana: A review of colonial and post-independence development strategies, *Ghana journal of Development studies*, 6(1): 1-29

Laderchi, C. R., Saith, R. and Stewart, F. (2003). Does it matter that we do not agree



on the definition of poverty? A comparison of four approaches. *Oxford Development Studies*, 31(3), 243–274.

Lao Statistics Bureau. (2013). *Lao expenditure and consumption 2007/8*. Vientiane.

Laube, W., Schraven, B., & Awo, M. (2012). Smallholder adaptation to climate change: Dynamics and limits in Northern Ghana. *Climatic Change*, 111(3), 753–774.
<https://doi.org/10.1007/s10584-011-0199-1>

Lay, J. & Schüler, D. (2008). Income diversification and poverty in a growing agricultural economy: the case of Ghana. *Proceedings of the German Development Economics Conference. Zürich*.

Lewis, A. (1958). Economic Development with unlimited Supplies of Labor. *Manchester School*, 22(2), 139–191.

Lister, R. (2004). *Poverty*. Cambridge: Polity Press.

Loison, S.A. (2015) Rural Livelihood Diversification in Sub-Saharan Africa: A Literature Review, the Journal of Development Studies, 51:9, 1125-1138,
[DOI:10.1080/00220388.2015.1046445](https://doi.org/10.1080/00220388.2015.1046445)

Lucas, R. (1988). The Mechanics of Economic Development,. *Journal of Monetary Economics*., 22, 3–41.

Makate, C., Wang, R., Makate, M., & Mango, N. (2016). Crop diversification and livelihoods of smallholder farmers in Zimbabwe: adaptive management for environmental change. *SpringerPlus*, 5(1), 1135.

Mensah, C. (2014). The Impact of Livelihood Diversification on Food Security amongst



farm households in northern Ghana: a case study of Bole District. (Doctoral dissertation, University of the Western Cape).

Michler, J. D., & Josephson, A. L. (2017). To Specialize or Diversify: Agricultural Diversity and Poverty Dynamics in Ethiopia. *World Development*, 89, 214–226. <https://doi.org/10.1016/j.worlddev.2016.08.011>

Mudhara, M., Dittoh, S., Sessay, M., Critchley, W., & Di Prima, S. (Eds. . (2016). *Community Innovations in Sustainable Land Management: Lessons from the Field in Africa*. Routledge.

Mukherjee, S., & Benson, T. (2003). The Determinants of Poverty in Malawi, 1998. *World Development*, 32(1), 339-358.

Nkegbe, P. K., Araar, A., Abu, M. B., Ustarz, Y., Alhassan, H., Setsoafia, D. E., & Abdul-Wahab, S. (2018). *Agriculture Commercialization in Ghana : Complements or Competitors? November*.

Northern Ghana Human Development Report. (2018). *Bridging the poverty gap and fostering socio-economic transformation and empowerment to contribute to human development for all*. Yamens Press Ltd, Ghana.

Ostrom, E. (2000). *Social capital: a fad or a fundamental concept? Dasgupta P., Serageldin I. (Edited by), Social Capital. A Multifaceted Perspective*. World Bank, Washington, D.C.

Owusu, V., Abdulai, A., & Abdul-Rahman, S. (2011). Non-farm work and food security among farm households in Northern Ghana. *Food Policy*, 36(2), 108–118.



<https://doi.org/10.1016/j.foodpol.2010.09.002>

Petscher, Y., & Logan, J. A. R. (2014). Quantile Regression in the Study of Developmental Sciences. *Child Development*, 85(3), 861–881.
<https://doi.org/10.1111/cdev.12190>

Polman, N. B. P., & Slangen, L. H. G. (2008). Institutional design of agri-environmental contracts in the European Union: The role of trust and social capital. *NJAS - Wageningen Journal of Life Sciences*, 55(4), 413–430.
[https://doi.org/10.1016/S1573-5214\(08\)80029-2](https://doi.org/10.1016/S1573-5214(08)80029-2)

Rainwater, L. (1966). Crucible of identity: The Negro lower-class family. *Daedalus*, 95(1), 172–216.

Ravallion, M. (2010). *Poverty lines across the world*. The World Bank.

Robins, J., Sued, M., Lei-Gomez, Q., & Rotnitzky, A. (2007). Demystifying double robustness: A comparison of alternative strategies for estimating a population mean from incomplete data. *Statistical Science*, 22(4), 523–539.
<https://doi.org/10.1214/07-STS227>

Rosenzweig, M. R. (1988). Risk , Implicit Contracts and the Family in Rural Areas of Low-Income Countries Author (s): Mark R . Rosenzweig Published by : Wiley on behalf of the Royal Economic Society Stable URL : <http://www.jstor.org/stable/2233724> Accessed : 03-08-2016 05 : 13 U. *The Economic Journal*, 98(393), 1148–1170.



- Saaka, Y. (2001) North-South relations and the colonial enterprise in Ghana. In Saaka, Yakubu (ed) regionalism and public policy in northern Ghana, New York, Peter Lang Publishing Inc. p139-152
- Sackey, H. A. (2005). Poverty in Ghana from an assets-based perspective: An application of probit technique. *African Development Review*, 17(1), 41–69.
<https://doi.org/10.1111/j.1017-6772.2005.00106.x>
- Salam, S., Bauer, S., & Palash, M. S. (2019). Impact of income diversification on rural livelihood in some selected areas of Bangladesh. *Journal of the Bangladesh Agricultural University*, 17(1), 73–79.
<https://doi.org/10.3329/jbau.v17i1.40666>
- Santos, D. T. M. (2017). Poverty as a lack of capabilities. *Peri*, 09, 125–148.
- Schwarze, S., & Zeller, M. (2005). Income diversification of rural households in Central Sulawesi, Indonesia. *Quarterly Journal of International Agriculture*, 44(1), 61–73.
- Sekhampu, T. J. (2013). Determinants of Poverty in a South African Township. *Journal of Social Sciences*, 34(2), 145–153.
<https://doi.org/10.1080/09718923.2013.11893126>
- Sen, A. K. (1992). *Inequality Reexamined* (3rd ed.). Russell Sage Foundation, New York.
- Senadza, B. (2014). Income diversification strategies among rural households in developing countries evidence from Ghana. *African Journal of Economic and*



Management Studies, 5(1), 75–92. <https://doi.org/10.1108/AJEMS-05-2012-0029>

Shah, J. A., & Pandit, A. K. (2013). Diversity and Abundance of Cladoceran Zooplankton in Wular Lake, Kashmir Himalaya. *Natura Montenegrina, Podgorica*, 12(1), 43–54.

Stępień S. (2007): In Czyżewski, A. and Smędzik-Ambroży, K. (2015) Specialization and diversification of agricultural production in the light of sustainable development”, *Journal of International Studies*, Vol. 8, No 2, pp. 63-73. DOI: 10.14254/2071-8330.2015/8-2/6

Sulemana, M. (2016). Measuring Multidimensional Poverty in Ghana ’ s East Gonja District. *Journal of Poverty Alleviation and International Development*, 7(2), 24.

Tafesse, B., Bekele, T., & Kelbessa, E. (2015). *DIVERSITY AND ECOLOGICAL ANALYSIS OF VASCULAR EPIPHYTES IN Epiphytes are those species which normally germinate on the surface of another living plant and pass the entire life cycle without becoming connected to the ground (Kress , 1989). They derive th.* 14(2), 147–170.

Thorbecke, E. (2007). *The evolution of the development doctrine, 1950–2005*. Palgrave Macmillan, London. www.wider.unu.edu

Timmer, C. P. (1997). Farmers and Markets: The Political Economy of New Paradigms. *American Journal of Agricultural Economics*, 79(2), 621–627. <https://doi.org/10.2307/1244161>



- Townsend, P. (1979). *Poverty in the United Kingdom: a survey of household resources and standards of living*. University of California Press.
- Tsui, K. Y. (2002). Multidimensional poverty indices. *Social Choice and Welfare*, 19(1), 69–93. <https://doi.org/10.1007/s355-002-8326-3>
- UNCTAD. (2015). *The Least Developed Countries Report 2015: Transforming Rural Economies*. United Nations publication.
- UNDP. (2020). *Charting pathways out of multidimensional poverty : Achieving the SDGs*. http://hdr.undp.org/sites/default/files/2020_mpi_report_en.pdf
- UNDP Ghana. (2018). *Human Development Reports, The 2016 Global Multidimensional Poverty Index (MPI)*.
- United Nations. (1995). *Rehabilitation engineering: review publication for the World Summit for Social Development, Copenhagen (Denmark)*. 6–12.
- Vandemoortele, J. (2011). The MDG Story: Intention Denied. *Development and Change*, 42(1), 1–21. <https://doi.org/10.1111/j.1467-7660.2010.01678.x>
- Wenz, S. E. (2019). What Quantile Regression Does and Doesn't Do: A Commentary on Petscher and Logan (2014). *Child Development*, 90(4), 1442–1452. <https://doi.org/10.1111/cdev.13141>
- Wooldridge, J. M. (2007). Inverse probability weighted estimation for general missing data problems. *Journal of Econometrics*, 141(2), 1281–1301.
- World Bank. (2007). *World Development Report 2008*. The World bank, Washington,



DC.

Yaffee, R. A. (2002). Robust regression analysis: some popular statistical package options. *ITS Statistics, Social Science and Mapping Group, New York State University*, 1–12.

Zakaria, A., Azumah, S. B., & Donkoh, S. A. (2019). Welfare Effects of Livelihood Diversification of Farm Households in Northern Ghana: A Quantitative Approach. *Uds International Journal of Development*, 6(3), 214-226.

Zieliński, D. (1985): In Czyżewski, A. and Smędzik-Ambroży, K. (2015) Specialization and diversification of agricultural production in the light of sustainable development”, *Journal of International Studies*, Vol. 8, No 2, pp. 63-73. DOI: 10.14254/2071-8330.2015/8-2/6



Appendix

Normality checks for the Livelihood diversification Dependent Variables

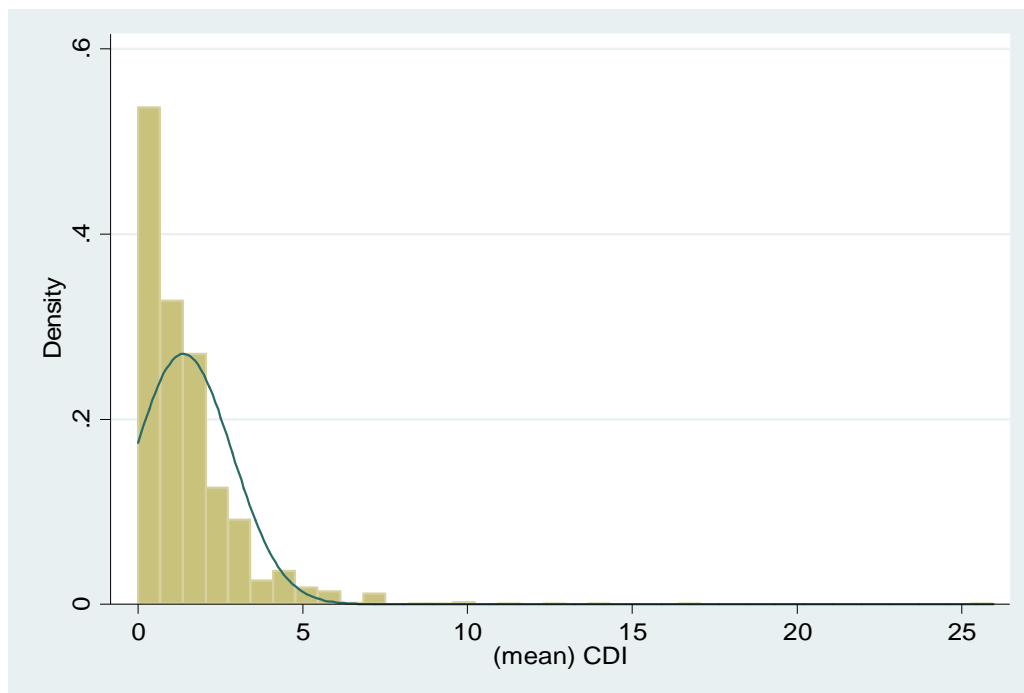


Fig 1: Density distribution of Crop Diversification Index (CDI)

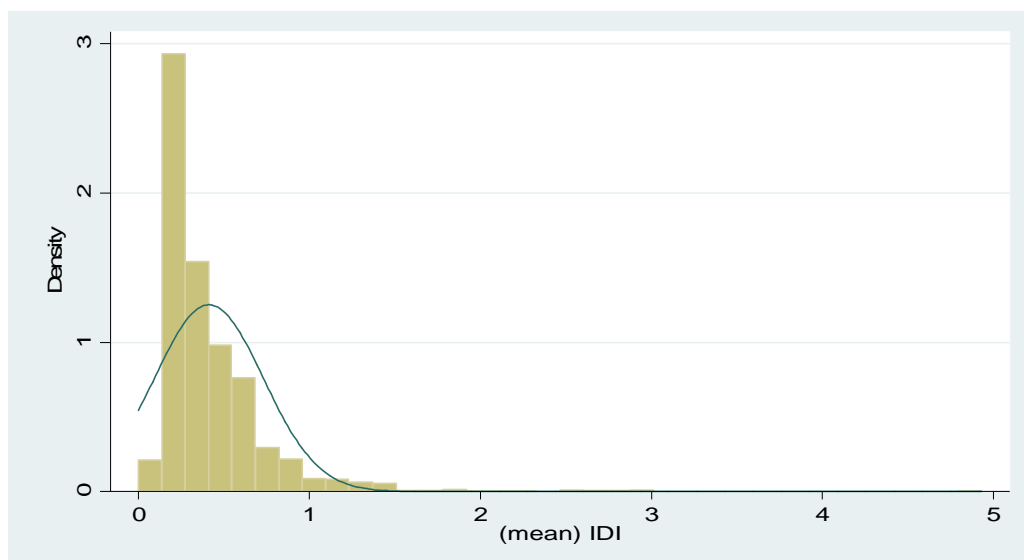


Fig 2: Density distribution of Income Diversification Index (IDI)



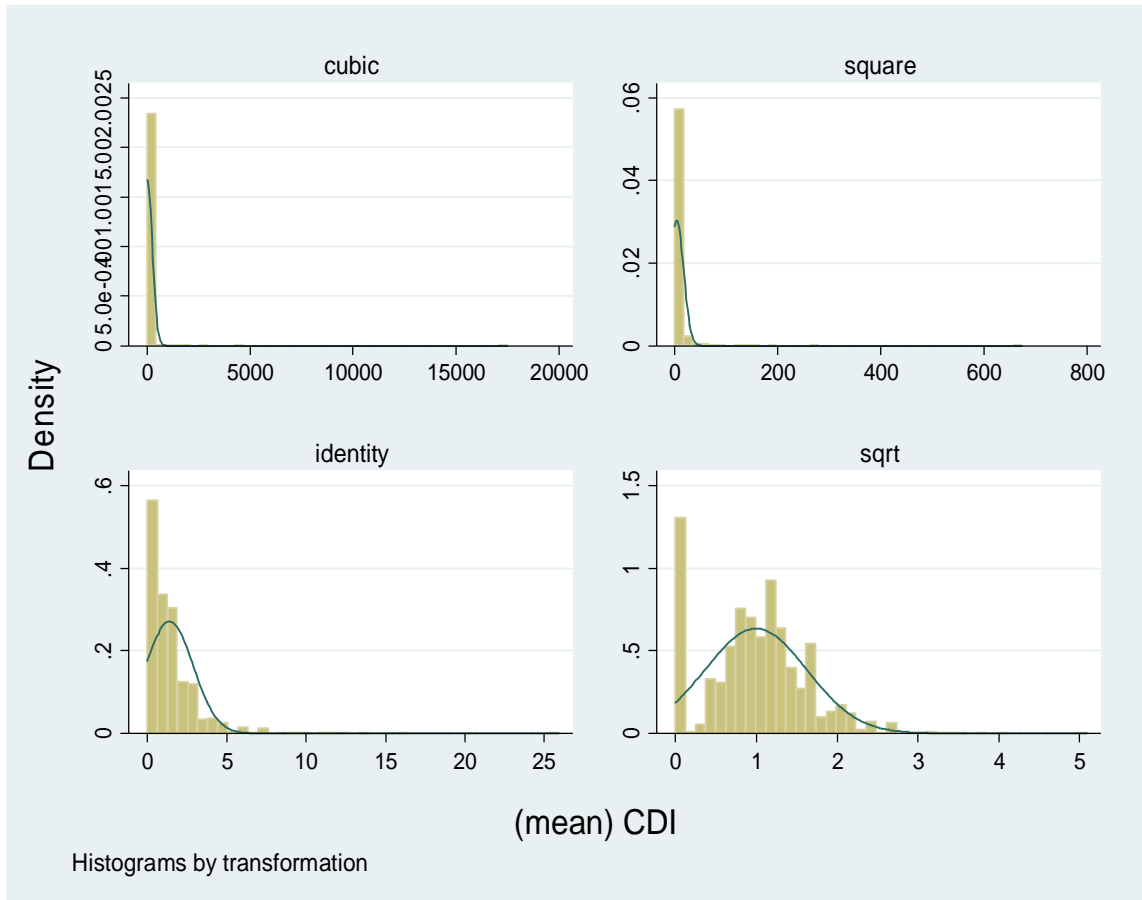


Fig 3 Ladder of Powers for CDI



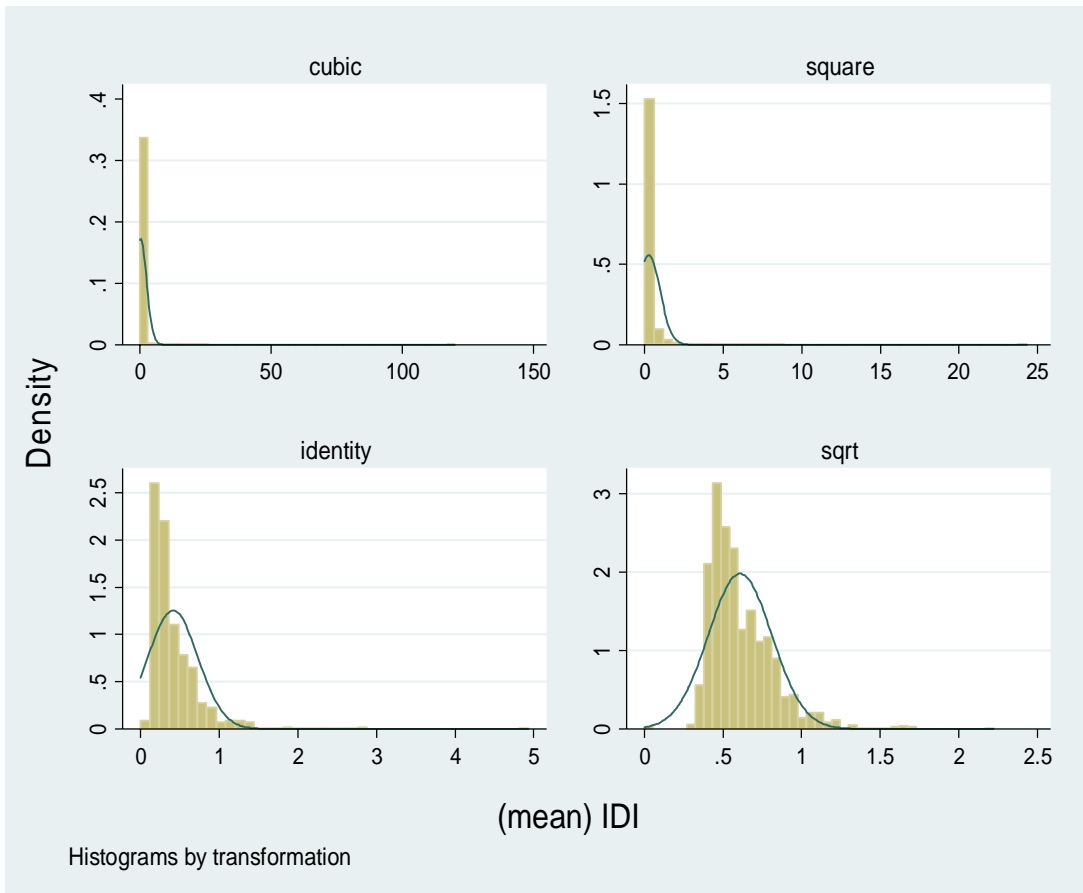


Fig 4 Ladder of Powers for CDI



LIVELIHOOD DIVERSIFICATION

ORIGINALITY REPORT

18%

SIMILARITY INDEX

9%

INTERNET SOURCES

11%

PUBLICATIONS

13%

STUDENT PAPERS

PRIMARY SOURCES

- 1** Submitted to Higher Education Commission Pakistan
Student Paper **1%**
- 2** Bader, Christoph, Sabin Bieri, Urs Wiesmann, and Andreas Heinemann. "Differences Between Monetary and Multidimensional Poverty in the Lao PDR: Implications for Targeting of Poverty Reduction Policies and Interventions : Differences Between Monetary and Multidimensional Poverty in the Lao PDR", Poverty & Public Policy, 2016.
Publication **1%**
- 3** Richard Kofi Asravor. "Livelihood Diversification Strategies to Climate Change among Smallholder Farmers in Northern Ghana", Journal of International Development, 2017
Publication **<1%**
- 4** Submitted to University of Fort Hare
Student Paper **<1%**
- 5** tind-customer-agecon.s3.amazonaws.com
Internet Source

