

Impacts of Climate Change on Food Security in Southern Ghana: A Community Perspective

by

Dickson Danso Aboagye

Dissertation submitted in fulfilment of the requirements for the degree of

MASTER OF ARTS

in

Development Studies

at the

Faculty of Business & Economic Sciences

of the

NELSON MANDELA METROPOLITAN UNIVERSITY

Supervisor Name: Mr. Ekiyie Nzante

November 2014

DECLARATION

DEPARTMENT OF ACADEMIC ADMINISTRATION
EXAMINATION SECTION
SUMMERSTARND NORTH CAMPUS
PO Box 77000
Nelson Mandela Metropolitan University
Port Elizabeth
6018



**Nelson Mandela
Metropolitan
University**

for tomorrow

Enquiries: Postgraduate Examination Officer

DECLARATION BY CANDIDATE

NAME: DICKSON DANSO ABORGYE

STUDENT NUMBER: 212479423

QUALIFICATION: MASTERS IN DEVELOPMENT STUDIES

TITLE OF PROJECT: THE IMPACT OF CLIMATE CHANGE
ON FOOD SECURITY IN SOUTHERN GHANA,
'A COMMUNITY PERSPECTIVE'.

DECLARATION:

In accordance with Rule G4.6.3, I hereby declare that the above-mentioned treatise/ dissertation/ thesis is my own work and that it has not previously been submitted for assessment to another University or for another qualification.

SIGNATURE: 

DATE: 10/3/2015

DEDICATION

This work is dedicated to my daughter Agyeiwaa Suzzy, my sisters Freda and Lily, my parents John and Maa Agyeiwaa Aboagye who has been so supportive to me throughout this process.

ACKNOWLEDGEMENT

Gratitude goes to Almighty God for his grace and mercy. I acknowledge my entire family John Owusu Sekyere Aboagye, Maa Agyeiwa Aboagye, Freda Aboagye, Lily Aboagye and Agyeiwaa Suzzy Aboagye for their wonderful support given me through this period. I also give a big thank you to my supervisor Mr. Nzante Ekiyie and his wife Fatima Nzante for being there for me and coaching me relentlessly throughout this process. I use this opportunity to acknowledge the entire department of Development Studies for the wonderful academic assistance. I also acknowledge the entire NMMU for the magnificent and prestigious academic environment given me.

Furthermore, my appreciation goes to my uncle Mr Ernest Atta- Adusei and my friends Ohene Kojo Richmond, Msabala Sthembiso and Lindelani Dackmond Malunga for encouraging me to pursue this course. Lastly, my sincere thanks go to Wiseman Mondli Mhlongo for his efforts in spending time in reading through my work.

Aboagye, Dickson Danso

NMMU, Port Elizabeth, South Africa.

TABLE OF CONTENTS

DECLARATION	i
DEDICATION.....	ii
ACKNOWLEDGEMENT	iii
LIST OF FIGURES	ix
LIST OF TABLES	x
LIST OF ABBREVIATIONS.....	xi
ABSTRACT	xii

CHAPTER 1

INTRODUCTION.....	1
1.1 INTRODUCTION	1
1.2 THE BACKGROUND OF THE STUDY.....	1
1.3 PROBLEM STATEMENT	2
1.4 RESEARCH QUESTIONS.....	3
1.5 RESEARCH OBJECTIVES	3
1.6 LITERATURE REVIEW	4
1.7 RESEARCH AREA	5
1.7.1 Scope of Study.....	5
1.7.2 Target Population.....	6
1.7.3 Sampling and Sampling size	6
1.8 RESEARCH METHODOLOGY.....	6
1.8.1 Research Approach	6
1.8.2 Research Design.....	7

1.8.3	Data Collection.....	7
1.9	VALIDITY AND RELIABILITY	7
1.10	DATA ANALYSIS.....	8
	CHAPTER 2.....	9
	LITERATURE REVIEW	9
2.1	INTRODUCTION	9
2.2	FOOD SECURITY IN HISTORICAL CONTEXT	9
2.3	GLOBAL FRAMEWORK TO FOOD SECURITY	11
2.4	LEGISLATIVE FRAMEWORK TO FOOD SECURITY IN GHANA.....	12
2.4.1	Environmental Protection Agency Act (1994) Act 490.....	12
2.4.2	Environmental Impact Assessment Regulations 1999, LI 1652	12
2.5	POLICY FRAMEWORK TO FOOD SECURITY IN GHANA	13
2.6	APPROACHES TO FOOD SECURITY	13
2.7	CLIMATE CHANGE IMPACT ON FOOD SECURITY IN GHANA	14
2.8	CONCLUSION.....	16

CHAPTER 3

	RESEARCH METHODOLOGY.....	17
3.1	INTRODUCTION	17
3.2	RESEARCH METHODOLOGY AND DEFINITIONS	17
3.3	RESEARCH DESIGN	17
3.4	RESEARCH PARADIGM.....	18
3.5	RESEARCH APPROACH.....	18
3.6.1	Geography	20
3.6.2	Climate in Southern Ghana	20

3.7	TARGET POPULATION	21
3.8	SAMPLING AND SAMPLING SIZE	21
3.9	DATA COLLECTION INSTRUMENTS	21
3.10	VALIDITY.....	23
3.11	RELIABILITY	23
3.12	DELIMITATION OF STUDY.....	24
3.13	ETHICAL CONSIDERATIONS	24
3.14	CONCLUSION.....	24

CHAPTER 4

FINDINGS.....	26
4.1 INTRODUCTION	26
4.2 SOCIO-DEMOGRAPHIC INFORMATION OF RESPONDENTS.....	27
4.2.1 Gender Representation.....	27
4.2.2 Marital Status of respondents.....	27
4.2.3 Age Distribution of Respondents.....	28
4.2.4 Ethnicity of Respondents	29
4.3 IMPACTS OF CLIMATE CHANGE ON FOOD PRODUCTION IN SOUTHERN GHANA.....	29
4.3.1 What do you understand by the term climate change?	30
4.3.2 Do you rely on climate for production of food?	30
4.3.3 What type of food stuffs are locally produced in Southern Ghana?.....	30
4.3.4 A comparism of previous and present level of production.	31
4.3.5 Reasons for the change in food production from the respondents' perspective.....	31
4.3.6 What problems are facing food security in Southern Ghana?	32

4.3.7	What are the local communities doing towards addressing this problem?	32
4.3.8	What challenges are the local communities facing in addressing food security problems?	33
4.4	CONCLUSION	33

CHAPTER 5

DISCUSSION	35
5.1 INTRODUCTION	35
5.2 STRATEGIES GOVERNING FOOD SECURITY IN SOUTHERN GHANA	35
5.2.1 Support for local projects	35
5.2.2 Environmental education	36
5.2.3 Public-Private Partnerships (PPPs)	36
5.2.4 Research	36
5.3 TO WHAT EXTENT HAVE THESE STRATEGIES BEEN IMPLEMENTED?	36
5.4 PREVAILING CLIMATE CHANGE EFFECT ON THE PEOPLE OF SOUTHERN GHANA	37
5.5 FOOD SECURITY PROBLEMS IN SOUTHERN GHANA	38
5.6 CHALLENGES FACED BY LOCAL COMMUNITIES	39
5.6.1 Funding	39
5.6.2 Administrative bottlenecks and Agricultural extension workers	39
5.6.3 Political promises	39
5.7 WHAT NEEDS TO BE DONE IN SOUTHERN GHANA TO ENSURE FOOD PRODUCTION?	40
5.8 CONCLUSION	40

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS.....	41
6.1 INTRODUCTION	41
6.2 SUMMARY OF CONCLUSIONS BASED ON THE FINDINGS.....	41
6.3 RECOMMENDATIONS EMERGING FROM THE CONCLUSIONS	41
6.3.1 Recommendation for further research.....	42
6.3.2 Capacity development and reinforcement programs in Southern Ghana.	42
6.4 CONCLUSION.....	43
 REFERENCES.....	 44
 APPENDIX I: QUESTIONNAIRE.....	 52
APPENDIX II: ETHICS CLEARANCE	57

LIST OF FIGURES

Figure 1.1: The map of Southern Ghana (Source: Ben et al., 2004)	5
Figure 3.1: The area map of the research site (Adopted from Meteo365.com, 2014) ...	20
Figure 4.1: Gender Representation of respondents	27
Figure 4.2: Marital Status of Respondents	28
Figure 4.3: A bar diagram representing age distribution of respondents in Southern Ghana	29

LIST OF TABLES

Table 4.1: Table showing Age distribution of respondents	28
Table 4.2: Shows the types of food stuffs that are locally grown in the Gomoa West community.....	30
Table 4.3: Annual Akan clan food production Table (Source: Ministry of Agriculture public Gazette, June 2014.)	31

LIST OF ABBREVIATIONS

DAWEP	:	Department of Agriculture Workers Extension Program
FAO	:	Food and Agriculture Organization
GDP	:	Gross Domestic Product
IPCC	:	Intergovernmental Panel on Climate Change
PPMED	:	Policy Planning Monitoring and Evaluation
PPPs	:	Public –Private Partnerships
UNFCCC	:	United Nations Framework Convention on Climate Change
UNDP	:	United Nations Development Program
WFP	:	World Food Program

ABSTRACT

This study will examine the impacts of climate change on food security in Southern Ghana. Southern Ghana reveals that the district suffers post-harvest losses of about 8 percent of all cereals which hinders Ghana's food security. Ghana still faces food insecurity due to high temperatures and low rainfall. This research therefore seeks to investigate what local communities of Southern Ghana are doing to address food insecurity problems with the advent of climate change. Several objectives to achieve this goal involve to identify factors hindering food security in Southern Ghana and to evaluate the extent that climate change has affected food security.

A qualitative research approach was used by the researcher to come up with community strategies which this research seeks to address. Various conclusions such as community demand for support from the local government, sustainable irrigation programs, availability of pipe-borne water and environmental education were put in place, as possible solutions to the persisting food security problems in Southern Ghana.

Keywords: Community Adaptation, Climate Change, Food Security, Environmental Degradation, Sustainable Development, Pipe Borne water, irrigation.

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

This study will examine the impacts of climate change on food security in Southern Ghana. Climate change refers to the influence of human activity that alters the composition of the global atmosphere (Codjoe & Owusu, 2011). Food security is presented as the physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (WFP, 2009). It has been proven scientifically that human beings cannot leave without food and it is for this reason that countries around the world are building programs to ensure food security. The role of developing countries in Sub-Saharan African to global food security cannot be underestimated, but such role is weakened by the continent's agricultural sector due to its severe reliance on the climate (FAO, 2007).

Climate change will impact negatively on food production in most developing countries and will lead to consequences such as high poverty rates, high vulnerability and low adaptation capacities (Cai et al, 2010). It is forecasted that climate change will lead to a decline in the net crop revenues by 90% by 2100 in most Sub-Saharan African countries (Antwi-Agyei et al, 2013).

The Intergovernmental Panel on Climate Change (IPCC) spells out Africa as the region prone to climate change due to the fact that most of the African countries' economies' backbone is largely dependent on the agricultural sector (IPCC, 2007). According to Nyantakyi-Frimpong (2013) food insecurity in Southern Ghana is estimated to be about one to seven percent. A recent survey conducted in the Afram plains of Southern Ghana reveals that the district suffers post-harvest losses of about 8 percent of all cereals which hinders Ghana's food security (Codjoe & Owusu, 2011).

1.2 THE BACKGROUND OF THE STUDY

There have been many efforts by the Ghana government to ensure food security post-independence through large-scale agriculture mechanization adopted in the Five Year Development Plan (Nyantakyi-Frimpong, 2013). The Agricultural Development Bank was

brought up by the government to offer loans to small scale farmers as an incentive to increase food production (Codjoe & Owusu, 2011). The establishment of a number of food factories and silos in the ten regions of Ghana was aimed at ensuring food security (Codjoe & Owusu, 2011). However, Ghana still faces food insecurity due to high temperatures and low rainfall (Codjoe & Owusu, 2011). This claim was supported by Brown & Crawford (2008) “Historical data across the country from the year 1960 to 2000 shows a progressive and discernible rise in temperature and a concomitant decrease in rainfall in all agro-ecological zones in the country. Based on this data it is estimated that temperature will continue to rise by on average about 0.6 °C, 2.0 °C, and 3.9 °C by the year 2020, 2050 and 2080 respectively. Rainfall is also predicted to decrease on average by 2.8 per cent, 10.9 per cent and 18.6 per cent by 2020, 2050 and 2080 respectively in all agro-ecological zones” (Brown & Crawford, 2008 as cited in Mahama & Rademacher-Schulz, 2012).

Ghana’s economy was severely hit by drought and famine in 1983 which led to the country’s inability to ensure food security (Nyantakyi-Frimpong, 2013). Majority of the areas in Ghana are food insecure (World Bank, 2011). Food security will be worse as Ghana’s population increases tremendously over the decade from over 18 million in 2000 to over 25 million in 2010 (Ghana Statistical Service, 2012). Ghana’s growing population means that there will be pressure on land for food production as the average amount of land available per person will decline (Seo & Rodriguez, 2012).

Climate change needs not to be an obstacle to Ghana’s food security but unfortunately, many sources (World Bank, 2011; Antwi- Agyei et al, 2013; Nyantakyi-Frimpong, 2013; Codjoe & Owusu, 2011) acknowledge that Ghana faces severe food insecurity due to climate change. It is against this background that the study will be undertaken.

1.3 PROBLEM STATEMENT

Constitutionally, Ghana’s Ministry of Food and Agriculture has the responsibility to ensure that the country maintain high volumes of food stuffs in storage in case of food insecurity (Ministry of Food and Agriculture, 2013). Ghana government established the Ghana Food Distribution Corporation in 1972 to ensure sufficient food distribution especially during food shortages (Nyantakyi-Frimpong, 2013). Several factors impede the aims of the corporation; and it includes

storage facilities not sufficient enough to store food stuffs during harvest seasons as they could only store about 10 percent of the harvest, food was not sold at the market prices (Nyantakyi-Frimpong, 2013). Daze (2011) concurs by stating that land degradation, droughts, floods, bush fires and windstorms pose severe problems of achieving food security in Ghana.

The researcher's concern is that if this decline of the Ghana's agricultural sector contribution to GDP is allow to go on as a result of the impact of climate change year after year then Ghana will continue to face food insecurity. It is against this background that the study seeks to examine consequences of climate change on food security in Southern Ghana.

1.4 RESEARCH QUESTIONS

What are the local communities of Southern Ghana doing to address food insecurity problems with the advent of climate change?

A breakdown of these questions will leave behind the following sub foci:

- What are the prevailing climate change effects of the people of Southern Ghana?
- What aspects of food problems are they facing?
- What are they doing towards addressing these problems?
- What resources do they have to this effect?
- What are the local communities doing to assist?
- To what extent are they coping?
- What problems or challenges do they have while addressing this issue?
- What is the way?

1.5 RESEARCH OBJECTIVES

The primary objective of the research is to study the impact of climate change on food security with specific reference to Southern Ghana. This objective is broken down into the following sub-objectives;

- To identify factors hindering food security in Southern Ghana

- To evaluate the extent that climate change has affected food security in Southern Ghana
- To propose an adequate climate change strategies that will speak to food security in Southern Ghana
- To investigate the extent of community participation in addressing climate change in Southern Ghana

1.6 LITERATURE REVIEW

Ghana has made significant efforts to ensure food security but the country's agricultural sector the backbone of livelihood of most people are still vulnerable to climate change. This has made the country to face severe food shortages (United Nations Development Programme (UNDP), 2007). Climate change impacts negatively on Ghana's food production between 1983 and 1984 farming season as a result of drought and famine (Nyantakyi-Frimpong, 2013). Food production during this period declined and the country experienced severe food insecurity as many people have to form queues in order to obtain basic food stuffs (Nyantakyi-Frimpong, 2013).

Pinto et al,(2012) argues that the existence of high temperatures in Ghana's agricultural sector have impacted negatively on the country's food security especially in major crops such as maize, rice and groundnuts which shows a decline in yields.

Mahama & Rademacher-Schulz, (2012) highlighted that agriculture is the livelihood of most people in Ghana especially in the Northern part of Ghana and due to uncertainty of the rain most farmers migrate to the Southern Ghana for non agricultural jobs which puts pressure on the country's food security.

Quaye, (2008) recent study of food security in Northern Ghana find out that there is food insecurity in the region due to climate change negative impact on food production as most farmers who practice subsistence farming harvest crops stays for seven months and finish.

Mahama & Rademacher-Schulz (2012) concurs that Ghana is still vulnerable to food insecurity due to poor traditionally post-harvest management of food stuffs which lead to increase post harvest losses of about 20-30 percent hence soaring food prices making it difficult for most people to get enough food.

1.7 RESEARCH AREA

1.7.1 Scope of Study

The study will be done in Southern Ghana. Figure 1.6 below shows the study area



Figure 1.1: The map of Southern Ghana (Source: Ben et al., 2004)

Ghana is located in West Africa and borders in the West by Cote d' Ivoire, North to Burkina Faso and East by Togo (Awumbila et al,2008). The population of Ghana is estimated to be about 24,658,823 in 2010 (Ghana Statistical Service, 2012). Ghana has 10 administrative regional capitals divided into two parts; Northern Ghana comprises of Northern, Upper East and Upper West Regions and Southern Ghana comprises of Ashanti, Central, Western, Eastern, Brong-Ahafo, Volta and Greater Accra Regions (Ananga, 2011).The study area is Southern Ghana which lies southern coast between latitudes $4\frac{1}{2}^{\circ}$ North at Cape Three Points and $6\frac{1}{2}^{\circ}$ North in extreme east (Ghana High Commission Canada, 2013). Southern Ghana was chosen as the study area because it more densely settled and populated than Northern Ghana. According to 2010 population and housing census, the Southern Ghana has a population of about 20,430,707 while Northern Ghana has a population of about 4,228,116(Ghana Statistical Service, 2012).

1.7.2 Target Population

The target population for this study will be all farmers, fishermen, community leaders and youths, heads of household and stakeholders of agricultural food production in Southern Ghana.

1.7.3 Sampling and Sampling size

Sampling is the process of selecting a group of people from the population for a study (Burns & Grove, 2009). The study will use purposive and random sampling techniques to seek the opinions of different respondents in order to obtain diverse views (Leedy, 1993). Random sampling was essential for this study because it was not practicable or economically for the researcher to include larger population of the communities in Southern Ghana (Burns & Grove, 2007). The researcher will also adopt purposive sampling in order to obtain the opinions of respondents who have knowledge on the study variables climate change and food security, and as such the researcher will select about 20 key informants such as farmers, fisherman and stakeholders of agricultural food production in Southern Ghana (Lynn, 2004).

1.8 RESEARCH METHODOLOGY

1.8.1 Research Approach

The researcher will adopt qualitative research approach in this study. Neuman (1994) presents qualitative research as a research in the form of words, sentences and paragraphs. Mouton (2001) also concurs that qualitative research approach studies people according to their own perspectives; gives room to the subjective sentiments and feelings of individuals; and is sensitive to contexts. This approach will be adopted in this study because the study variables climate change and food security; qualitative research approach stands a better chance of providing rich and substantiated experiences and data; and will also enable the researcher to draw out knowledge on community perceptions and experiences on climate change (Mouton,2001).

1.8.2 Research Design

According to Bless & Higginson-Smith (1995) a research design details the planning of the research from beginning to the last stage and this guides the researcher in the collection, analyzing and interpretation of observed facts.

Trochim (2006) concurs with this view that research design is used to structure the research-is the glue that holds all of the elements in a research project together.

The researcher will use exploratory design in this study. Friedrich Ebert Stiftung & Ghana Agricultural Workers Union (2012) opines that exploratory design to this study is appropriate as it sought to investigate the views of farmers and stakeholders of agricultural food production on the impact of climate change on food security.

1.8.3 Data Collection

According to Leedy & Ormrod (2006) the type of data to be collected determines the research method. This study will use both primary and secondary data for data collection.

O' Leary (2004) gave an explanation to interview as a method of collecting data where the interviewer ask the interviewee open-ended questions. Primary data will be collected through unstructured interviews. The researcher will adopt unstructured interviews as the researcher is not so familiar with the topic and requires comprehensive information. Secondary data will be collected from journals, articles and internet sources.

Other data collection technique to be use by the researcher is household questionnaires. Household questionnaires will be administered to heads of households to get their views on climate change, and food security. This data collection method is to enable the researcher to have a comprehensive understanding on what heads of household do to ensure food security as their livelihood.

1.9 VALIDITY AND RELIABILITY

Validity is the degree that the instrument measures what it claims to measure (DeVaus, 2002). There are three ways to ensure validity of a research instrument; criterion, content and construct

validity. The researcher will adopt content validity in this study to ensure validity of the research instrument. Content validity refers to the ability of the instrument's items to represent the content of the given construct (DeVaus, 2002). The researcher will design the questions in such a way that the language and sentence structure of every question in the research instrument do not confused the respondents. In this case the researcher will make available samples of the research instruments design in advance to respondent to examine its content before the final instrument are use in the data collection.

Reliability is the ability of a measuring tool to provide the same result on repeated occasions (DeVaus, 2002). The researcher will adopt test re-test method to ensure reliability of the research instrument. The researcher will randomly select about 10 farmers, fishermen, stake holders of agricultural food production, community members and heads of households to repeatedly complete the same question twice at an interval of six weeks to test the reliability of the research instrument (DeVaus, 2002). This is necessary such that if the same research instrument is carried out at the same research settings at different time and produce the same findings then the researcher need not give feed back to the respondents.

1.10 DATA ANALYSIS

Qualitative data analysis calls for step –by- step analysis of all data. Data collected through primary and secondary sources will be listed, coded, categorized and create themes. A discussion will follow and conclusions will be made. The researcher's data collection method involves two methods namely interviews and households questionnaires and as such the triangulation method will be adopted.

Gerber (2014) supports this assertion and defines triangulation as the application and combination of several research methodologies in the study of the same phenomenon or construct. This method gives credibility of qualitative analyses and it is the preferred way in most social sciences. He further argues that one of the strength of the triangulation method is that because it combines two or more methods of data collection researchers can hope to overcome the weakness or intrinsic bias associated with a single method of data collection. Golafshani (2003) also argues that most researchers who use qualitative and quantitative approaches adopt triangulation method as a way to ensure validity and reliability of their study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

Ghana, like many other African countries is experiencing the problem of the climate change which impacts badly on its food security. Many legislations and policies have been introduced by the Ghanaian government to deal with the challenge of food crisis. Many studies have been conducted by many researchers on the challenge of food security which is greatly related to the problem of climate change. In this chapter, a review will be done on food security in historical context, global framework to food security, legislative and policy framework to food security in Ghana. The chapter will also discuss approaches to food security and lastly the climate change impact on food security in Ghana.

2.2 FOOD SECURITY IN HISTORICAL CONTEXT

According to Simon (2012) food security has its roots beginning from the 1930- 1945 post world war and League of Nations. It originates from where and when food security becomes a global issue as against a country, province, village and household issue. During this period Yugoslavia suggested to the League of Nations the importance of food to mankind's health and that the member countries in the world should consider food security a global issue. This led to the establishment of the Food and Agriculture Organization during the 1940s to pay attention to increased food production. Fulton (2012) disagrees with Simon (2012) sentiment and argued that food security originated from during the food crisis in 1972-74 that led to world price increase in oil. This scholar also argues that food security shifted from global issue to access of sufficient food by individuals and households. Clay (2002) concurs with Fulton's assertion by arguing that the concept of food security has its roots only in the mid-1970s during the global food crisis. The establishment of a committee on World Food Security and World Food Council by Food and Agriculture Organization in 1974 was the beginning of the concept of food security (Maxwell, 1998) cited in (Hall, 1998).

Sijm (1997) also added to this sentiment and argued that during the 1960s and 1970s food security originated from global food supply shortfall couple with high food prices. The global food crisis severely hit Africa and became the dominant issue during the 1974 World Food Conference and much attention was focus on ensuring food security in the continent (Davies et al 1991). The history of food security also became a dominant issue during the mid-1980s food crisis that hit the Africa continent. It came to light that food security at the national level was not enough to ensure food security at individual and household levels (Frankenberger & McCaston, 1998).

In view of various literatures on the origins of food security, the 1974 World Food Conference became popular due to the global down turn on food supply. The conference among other aims and objectives proclaim that “every man, woman and child has the inalienable right to be free from hunger and malnutrition in order to develop their physical and mental faculties” (World Food Conference, 1974). However, some sources FAO (2007) and Wlokas (2008) have added their views on the 1974 World Food Conference. FAO (2007) estimated that about 925 million people in the world are food insecure hence undernourished of which Africa account for 98%. Wlokas (2008) argues that there are estimated about 400 million people in Africa that are undernourished according to World Health Organization. Maxwell (1996) argued that three overlapping paradigm shifts was eluded from the 1974 World Food Conference. Among them include firstly, a shift from the global and the national levels to the household and individual levels; secondly, from a food first perspective to a livelihood perspective and thirdly, from objective indicators to subjective perceptions. Frankenberger & McCaston (1998) agrees with this sentiment and argued that there have been four shifts from food security to livelihood security from 1970 to 1990.

These are firstly, a focus on national food security with an emphasis on food supply in the 1970s, secondly, a focus on household food security with an emphasis on food access in the 1980s, thirdly, a focus on nutritional security with an emphasis on food, health, mother and child care in early 1990s and lastly, a focus on household livelihood security. According to Sen (1981) food insecurity focus more on demand side that affect people’s access to food at household level, as against supply side, affecting availability of food at national level. Swaminathan (1998) cited in Hall (1998) states that “food security must be view from the points of physical, social, economic

and environmental access”. Maxwell (1998) cited in Hall (1998) concurs that “there has been a significant change in the food security agenda since the mid- 1970s, with a discussion concerned with the complexities of livelihood strategies in difficult and uncertain environments and with understanding how people themselves respond to perceived risks and uncertainties”.

According to Maxwell (1996) there has been a shift in the food security paradigm from a macro to a micro perspective understanding of food security. He further argues that food insecurity was seen as a problem of access to food with attention shifted from global and national levels to the household and individual levels. A number of conferences which speak to food security have been held in recent years. Notably include First International Conference on Global Food Security held in the Netherlands, 2013, aim at addressing food production and access and trade – offs between competing environmental, economic and social objectives and outcomes, Third Global Conference on Agriculture, Food and Nutrition Security and Climate Change, Johannesburg, South Africa, 2013, aim at deliberating on challenges and threats to food and nutrition security under climate change, World Food Summit 1996 in Rome aimed at pledge by member countries to reduce poverty and hunger by 2015 and many more.

2.3 GLOBAL FRAMEWORK TO FOOD SECURITY

The international communities and national governments have agreed on a number of policy measures to address the severe impact of climate change in achieving food security by signing the United Nations Framework Convention on Climate Change (UNFCCC). One of the roles in this convention is “for national governments to ensure that climate change issues are taken into consideration in national development planning” (Ghana Republic National Climate Change Adaptation Strategy, 2013). Ghana is a signatory to the United Nations Framework Convention on Climate Change (UNFCCC) and as such the country’s government aims to reduce poverty and hunger by the year 2020 (Ghana Republic National Environmental Policy, 1995).

According to the Millennium Development Goals (MDGs), all signatories to the United Nations Framework Convention on Climate Change (UNFCCC) have the responsibility to reduce poverty caused by hunger in their respective countries by half in 2015. Ghana has not been able to achieve these MDGs as stunting among children decline by only 5% from 33 % to 28% between

1993 and 2008 as a result of inability of the country to supply sufficient food (UNDP & NDPC, 2012).

2.4 LEGISLATIVE FRAMEWORK TO FOOD SECURITY IN GHANA

In Ghana a number of legislations have been put in place in relation to agriculture and food security.

2.4.1 Environmental Protection Agency Act (1994) Act 490

According to this legislation the government through the Minister of Science and Technology is responsible for ensuring that the environment is protected against the destruction by people (Ghana (Republic) Environmental Protection Agency Act 1994). In spite of this legislation deforestation still continues to degrade the land as 125,400 hectares and a total of 33.7% forest cover was lost (Dosu, 2011). If so much land was lost it becomes clear that Ghana experiences food shortage considering that migration of farmers from Northern part of Ghana to Southern part for non- agricultural jobs (Mahama & Rademacher-Schulz, 2012).

2.4.2 Environmental Impact Assessment Regulations 1999, LI 1652

Another regulation which tries to protect the environment stipulates that humans need to register and obtain environmental permits before proceeding with environmental activities (Ghana Republic Environmental Impact Assessment Regulations, 1999). The challenge to enforce this regulation is that there are no inspectors, on the ground, who see to it that people do not continue destroying the land. This is also worsened by the fact that the government does not have control over climate change. Pinto et al (2012) states that high temperatures in Ghana negatively impact on the agricultural sector and that hampers production of land. Besides the above legislations a number of policies have also been put in place in Ghana to protect the environment to ensure food security.

2.5 POLICY FRAMEWORK TO FOOD SECURITY IN GHANA

There is no doubt that food crisis experience in 1983 in Ghana caused a decline in the economy hence the National Environmental Action Plan was introduced to solve this decline. This resulted to a decline in the Gross Domestic Product (GDP) at an average of 1.3% (Ghana Republic National Environmental Action Plan, 1988). The attempt by the government to bring Ghanaians together to work in ensuring that the environment in which they live enable the country to achieve sufficient food security proves to be difficult to implement as it is only the national government that is responsible to ensure that the environment is free from negative impact (Ghana Republic National Environmental Policy, 1995). It is now clear that Ghana will continue suffering the destruction of the environment by people as long as people feel it is government responsibility to protect the environment.

The Medium Term Development Plan- Vision 2020 will not be achieved in spite of the modern agricultural practices if people do not take the protection of the environment as human responsibility considering the rate at which the population grows from 18 million in 2000 to over 25 million in 2010 (Ghana Statistical Service, 2012). Climate change is affecting Ghana's food production as acknowledge by (World Bank, 2011; Antwi- Agyei et al, 2013; Nyantakyi-Frimpong, 2013; Codjoe & Owusu, 2011). It is for this reason that much more needs to be done to understand the impact of climate change on the country's food security. The government trying to modernize agriculture enacted the National Climate Change Policy 2010, which its aim was to ensure a climate resilient and climate compactable economy to sustain development and equitable low carbon growth for Ghana. The fact that 18% of Ghanaians in 2008 were faced with food insecurity proves the impact of climate change cannot be underestimated (Ghana Republic National Climate Change Policy 2010).

2.6 APPROACHES TO FOOD SECURITY

Burchi & Muro (2012) highlighted five approaches to food security and these are

- (1) Food availability,
- (2) Income-based,
- (3) Basic needs,

- (4) Entitlement and
- (5) Sustainable livelihoods.

2.7 CLIMATE CHANGE IMPACT ON FOOD SECURITY IN GHANA

A number of literatures have been done on the impact of climate change on food security. According to UNDP (2007) Ghana has made significant efforts to ensure food security but the country's agricultural sector the backbone of livelihood of most people are still vulnerable to climate change. This has made the country to face severe food shortages. Nyantakyi-Frimpong (2013) concurs that climate change impacts negatively on Ghana's food production during the 2000s farming season as a result of drought and famine. Food production during this period declined and the country experienced severe food insecurity as many people have to form queues in order to obtain basic food stuffs. A study conducted in Ghana by Armah et al (2011) cited in Mahama & Rademacher-Schulz (2012) argues that climate change such as less rainfall and high temperatures will push the country to have low crop yields which will bring food insecurity. Codjoe & Owusu (2011) in their recent research findings on climate change and food systems from the Afram plains in Southern Ghana argue that food security could not be guarantee in the Afram plains as most communities have experience little or no heavy rainfall during the farming seasons. In addition, they further argue that most farming communities have experience a substantial reduction in most food crops such as cocoyam, plantain, mushroom, pawpaw and orange which is negatively impact on food security.

Glazebrook (2011) recent study on the impact of climate change such as drought and flooding on the lives of women subsistence farmers in Northeast Ghana argued that most women have knowledge of strategies to reduce the impact of climate change on their crop production. He further argues that women do not have full control on the final yields of food production. Mahama & Rademacher-Schulz (2012) highlighted that agriculture is the livelihood of most people in Ghana especially in the Northern part of Ghana. The numbers of farmers from Northern part are now in Southern Ghana due to uncertainty of the weather. This puts pressure on the country's food security. Quaye (2008) recent study on food security in Ghana found that there is food insecurity in the country due to climate change. The unreliability of rainfall patterns in Ghana has forced farmers who practice subsistence farming to leave their land after few

months. Mahama & Rademacher-Schulz (2012) concurs with Quaye that Ghana is still vulnerable to food insecurity due to poor traditionally post-harvest management of food stuffs. This led to increase in post harvest losses of about 20-30 percent. “Agricultural sector in Ghana makes the highest contribution to the country’s GDP of about 50%” (PPMED, 1995) cited in (FAO, 2014). The biggest crop production in Ghana is from the root and tuber crops such as cassava, yam and cocoyam with Southern Ghana producing the country’s greatest yields (FAO, 2014).

Ghana’s Ministry of Food and Agriculture also concurs with this view that the country’s agricultural sector contribution to the Gross Domestic Product (GDP) which relies extensively on climate has decline tremendously from 1997 to 2008 (Ministry of Food and Agriculture, 2010). World Bank (2009) cited in Quartey (2010) highlighted that “Ghana’s major export commodities such as cocoa and minerals have decline in production due to climate change and its contribution to the country’s GDP have also decline”. Climate change, food security and land degradation are inextricably linked and form a vicious cycle (Nuwagaba & Namateefu, 2013).

Mahama & Rademacher-Schulz (2012) supports this view by Nuwagaba & Namateefu, (2013) by arguing that land degradation caused by overgrazing, bush burning and deforestation has made farming less attractive and this has contributed to food insecurity in Ghana, whilst Diao & Sarpong (2007) argues that land degradation has made Ghana more vulnerable to food insecurity. He further mentions that most farming practices are mixed farming and that allows rotational bush fallow- clearing and burning of bush which destroy the soil fertility. On the other hand Dosu (2011) concurs with the above argument by stating that deforestation has caused severe land degradation which led to Ghana losing an average of 125,400 hectares annually and a total of 33.7% forest cover between 1990 and 2010. Quartey (2010) also states that climate change impacts on Ghana’s food security due to the country over reliance on natural resources such as agriculture and forestry (timber). “The country’s major export commodities such as cocoa and minerals are likely to decline in production due to climate change and its contribution to the country’s GDP will also decline” (World Bank, 2009) cited in (Quartey, 2010).

2.8 CONCLUSION

The above review shows that food insecurity is a developmental issue confronting many nations especially developing nations. According to academics and development actors food security is a complex concept. Discussions were centred on the historical context of food security, global framework to food security, legislative framework to food security in Ghana, policy framework to food security in Ghana and climate change impact on food security in Ghana. Four key issues to food security such as accessibility, availability, utilisation and stability were fundamental to ensure food security to individual and households at rural levels. These key issues speak to governments and other policy holders to have in place adaptation and mitigation strategies to reduce the negative effects of climate change on food security to sustain the livelihood of its citizens.

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter provides a detailed account of the research methodology and processes followed in this research. The chapter begins with some definitions of research methodology and research methods, research design, research paradigm, research approach, research site, target population and sampling and sampling size. The chapter will also discuss data collection instruments, issues relating to validity and reliability of the instrument, data analysis as well as ethical considerations important to this research.

3.2 RESEARCH METHODOLOGY AND DEFINITIONS

According to Burns and Grove (2001) research methodology is “the total strategy, from the identification of the problem, to the final plans for data gathering and analysis”. Neville (2007) Research Method is defined as the various specific tools or ways data can be collected and analyzed. There are two main research methods and these are qualitative and quantitative methods. In this study qualitative research method will be used. Neville gives a meaning to qualitative research methods as “more subjective in nature and involves examining and reflecting on less tangible aspects of research subjects such as values, attitudes and perceptions”. Qualitative method was chosen in this study because it produces information in textual form such as interview transcripts which will be used in this study, diaries and student essays (Robinson & Lai, 2006). The researcher in this study will interview respondents telephonically and ask some respondents to respond to a questionnaire which basically has open ended questions.

3.3 RESEARCH DESIGN

Trochim (2006) defines research design as “the structure of research- it is the ‘glue’ that holds all of the elements in a research project together”. In this study the researcher will use exploratory design. Gerber (2014) is of the view that exploratory design is important to use in the study like this if the researcher is unfamiliar, have little or no knowledge with the research problem. This design is use in this study as it attempts to investigate the opinions of key informants such as

farmers and stakeholders of agricultural food production on the impact of climate change on food security in order to generate new ideas.

3.4 RESEARCH PARADIGM

Patton (1990) refers to paradigm as “a world view, a general perspective, and a way of breaking down the complexity of the real world”. In other words Paradigm function as defining how the world works, how knowledge is extracted from the world, how one is to think and write and talk about knowledge (Dills & Romiszowski, 1997).

Creswell (2003) argues that depending on the objectives and questions of study researchers may use different paradigms such as positivism, anti- positivism, critical theory and constructivism just to mention a few. This study aimed to discover the impact of climate change on food security from a community point of view, the researcher will adopt anti- positivism in order to get the right information from key informants and other respondents. Dash (2005) is of the view that anti – positivism is justified for this study as information obtained from respondents from a community perspective will be based on personal experiences rather than acquired from or imposed from outside. Furthermore, this study will adopt qualitative research approach as a way of obtaining data and analyzing data.

3.5 RESEARCH APPROACH

According to Neuman (1994) qualitative research is a type of research approach in the form of words, sentences and paragraphs. Creswell (2003) concurs with this view by arguing that qualitative research seeks to acquire specific information about the values, opinions, behaviours and social contexts of particular populations. This approach is essential for this study because the study variables climate change and food security; qualitative research approach stands a better chance of providing rich and substantiated experiences and data; and will also enable the researcher to draw out knowledge on community perceptions and experiences on climate change (Mouton,2001). Hancock (1998) criticized qualitative approach method as time consuming in terms of data collection and data analysis. Furthermore, Hancock argues that knowledge obtained from this method may not generalize to other people but only those included in the study.

3.6 Research Site

According to Burns & Grove (2009) research site is the area where the researcher will collect the research data. The study will be conducted in Southern Ghana as already mention in chapter one. This study will be done in Central region as it forms part of Southern Ghana as a sample to represent the population of Southern Ghana. There are 20 districts in the Central region and this research will be done in Apam in the Gomoa West district (Ghana Statistical Service, 2012). Figure 3.1 below depicts the geographical location of Apam.

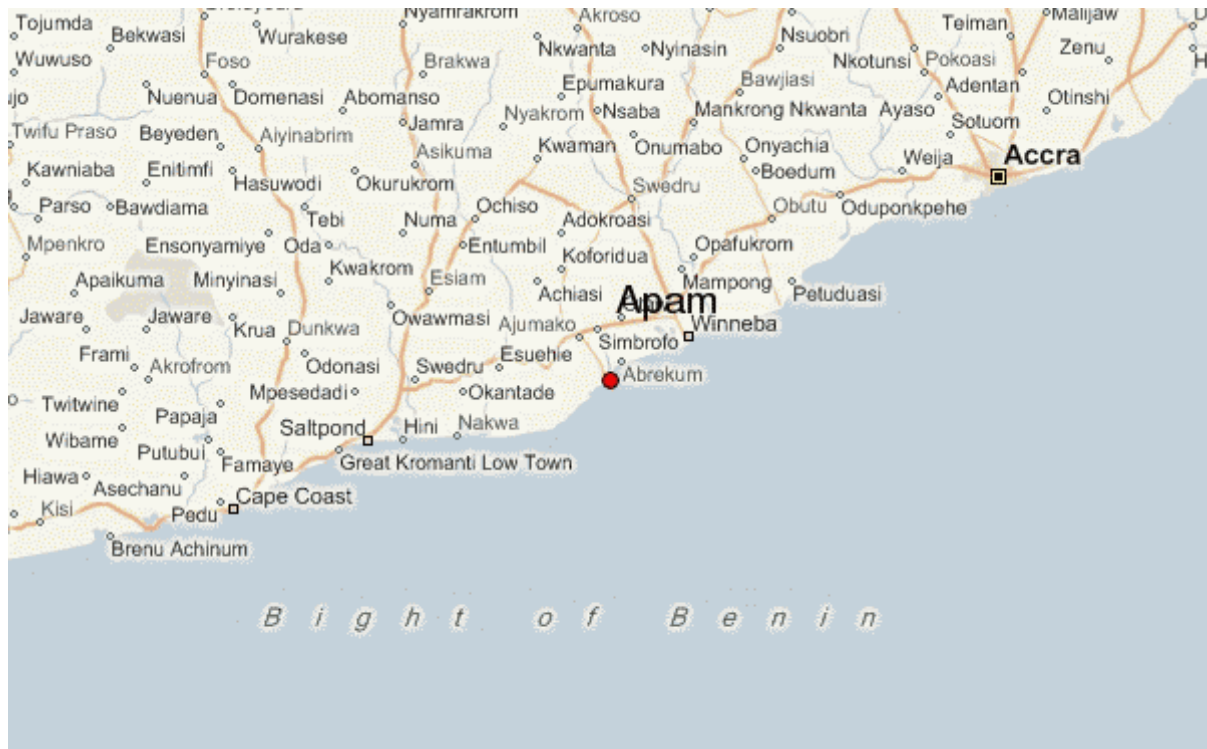


Figure 3.1: The area map of the research site (Adopted from Meteo365.com, 2014)

3.6.1 Geography

The rate at which Ghana's population increases especially in the Southern part of Ghana poses a new challenge for food security. According to 2000 population and housing census, the population of Southern Ghana was estimated to be 15, 594,601 and this increase up to 20,430,707 in 2010 as mentioned in chapter 1, the need for food increases with the level at which this population develops (Ghana Statistical Service, 2012). The matter of food cannot be tackled separately from the challenge of climate change. The researcher in this study chose Southern Ghana due to its densely populated nature compared to Northern Ghana.

3.6.2 Climate in Southern Ghana

There are two rainy seasons in Southern Ghana with the major rainy season beginning from March to July and the minor rainy season beginning from September to November (WFP, 2012).

3.7 TARGET POPULATION

Yount (2006) defines target population as “consists of all the subjects you want to study”. The target populations for this study are farmers, fishermen, community leaders, youths, heads of households and stakeholders of agricultural food production located in Southern Ghana. These people are part of Southern Ghana whose population was estimated at about 20,430,707 in 2010 (Ghana Statistical Service, 2012). The researcher has in mind that not all over 20 million of the population of Southern Ghana are involved in food production and as such the target population mention will be used in this study.

3.8 SAMPLING AND SAMPLING SIZE

Sampling is the process of selecting a group of subjects from the population for a study (Burns & Grove, 2009). The study will use convenience, purposive and random sampling techniques to seek the opinions of different respondents in order to obtain diverse views (Leedy, 1993). The stakeholders of food production will involve the local district of the Ministry of Food and Agriculture and some other local food agencies. Convenience sampling will be use to select some respondents. Convenience sampling is justified in this study because of easy convenient accessibility and proximity of some respondents to the researcher. Random sampling will be used as it was not practicable or economically for the researcher to include larger population of the communities in Southern Ghana (Burns & Grove, 2007). The researcher will also adopt purposive sampling in order to obtain the opinions of respondents who have knowledge on the study variables climate change and food security, and as such the researcher will select about 20 key informants such as farmers, fishermen and stakeholders of agricultural food production in Southern Ghana.

3.9 DATA COLLECTION INSTRUMENTS

According to Leedy & Ormrod (2006) the type of data to be collected determines the research method. This study will use both primary and secondary data for data collection. The researcher will adopt two data collection instruments; interviews and questionnaires for primary data whilst secondary data will be sourced from journals, articles and internet sources. O’ Leary (2004) gave an explanation to interview as a method of collecting data where the interviewer ask the

interviewee open-ended questions. Interviews may be in a form of standard or structured interviews, semi- standard or semi- structured interviews and non-standard or unstructured interviews (Berg, 2001). The type of interview for this study is unstructured interviews. According to O' Leary (2004) an unstructured interview is defined as the type of interview where the interviewer asks the participant open-ended questions that is not predetermined. The researcher will adopt unstructured interviews as the researcher is not so familiar with the topic and requires comprehensive information (Mahama & Rademacher-Schulz, 2012). Wimmer & Dominick (1997) cited in Oatey, (1999) gave the advantages and disadvantages of unstructured interviews (1) freedom for the respondent to answer how they wish to is important in giving them a feeling of control in the interview situation (2) freedom of expression by the respondent means that the interviewer is able to develop a good rapport and as such the respondent will be open and honest with their responses. The disadvantages of this method are that (1) it is time consuming it terms of amount of time needed to collect and analyze the responses; (2) it can also create confusion either because of the lack of understanding of the question by the informants or by lack of understanding of the respondent's answer by the interviewer. The researcher will conduct an unstructured interview with key informants such as farmers, fisherman and stakeholders of agricultural food production in Southern Ghana to obtain data on their experiences on the impact of climate change on food security.

Another method of data collection to be use in this study is questionnaire. According to Babbie (1990) cited in Acharya (2010) questionnaire is defined as "a document containing questions and other types of items designed to solicit information appropriate to analysis". There are different types of questionnaires and these include structured, unstructured and quasi- structured questionnaires (Acharya, 2010). This study will use unstructured questionnaires to solicit data from respondents and is justified on the grounds that the researcher wants to have a comprehensive understanding on what community leaders and heads of household do to ensure food security as their livelihood (Mahama & Rademacher-Schulz, 2012). Babbie (1990) cited in Acharya (2010) gives meaning to unstructured questionnaires "as open- ended questions that are not in the format of interrogative sentences and the enumerator has to elaborate the sense of question". According to Yount (2006) the advantages of unstructured questionnaires includes; it allows respondents to give answers in their own way using their own terms and language and it is less restrictive so it might uncover subjects characteristics that would be missed by the close-

ended type. Yount, further stress the disadvantages of using this method of questionnaires as includes; it increases the likelihood that respondents will respond wrongly in a way that is out of context not planned by the researcher and it may provide so many data points that the researcher cannot reduce them meaningfully.

3.10 VALIDITY

Leedy & Ormrod (2005) cited in Ellis & Levy (2009) argues that “every study must address threats to validity and reliability”. According to DeVaus (2002) validity is the degree that the instrument measures what it claims to measure. Creswell (2005) cited in Ellis & Levy (2009) also defines validity as “researcher’s ability to draw meaningful and justifiable inferences from scores about a sample or population”. Validity may take different forms (Polgar & Thomas 1995, Bowling 1997, Bryman & Cramer, 1997) cited in (Rattray & Jones, 2007) and this include; internal validity, face validity, criterion related validity, construct validity, content validity, statistical conclusion validity and external validity (Ellis & Levy, 2009). To ensure validity of the research instrument this study will adopt content validity. DeVaus (2002) gave meaning to content validity as refers to the ability of the instrument’s items to represent the content of the given construct. The researcher will design the questions in such a way that the language and sentence structure of every question in the research instrument do not confused the respondents. Respondents will be given advance samples of research instruments design to review its content first for their clarity and comments before a final one is made available to them to collect data.

3.11 RELIABILITY

DeVaus (2002) defines reliability as the ability of a measuring tool to provide the same result on repeated occasions. According to Leedy & Ormrod (2005) cited in Ellis & Levy (2009) reliability may also be defined as “the consistency with which a measuring instrument yield’s a certain results when the entity being measured hasn’t changed”. There are different types of reliability. Carmines & Zeller (1991) cited in Ellis & Levy (2009), these include equivalency reliability, stability reliability, inter- rater reliability and internal consistency. However, for the purpose of this study the researcher decided to adopt stability reliability to ensure reliability of the research instrument. Ellis & Levy (2009) defines stability reliability “which is also known as

test, retest reliability as concerned with how consistent results of measuring with a given instrument or process are over time”. They further argue that stability reliability is based on the assumptions that research instrument should yield the same results when repeated on different times. To measure the reliability of the research instruments the researcher will randomly select about 10 farmers, fishermen, stake holders of agricultural food production, community members and heads of households to repeatedly complete the same question twice at an interval of six weeks (DeVaus, 2002). This is important so to test whether the same research instruments if carried out at the same research area at different time will yield the same results (Ellis & Levy, 2009).

3.12 DELIMITATION OF STUDY

According to Ghana Statistical Service (2012) Ghana is divided into two parts namely Northern Ghana and Southern Ghana. There are 10 regions in Ghana: Northern Ghana which has 3 regions and Southern Ghana with 7 regions. Geographically, this study will be conducted in Southern Ghana since it is impossible or not feasible for the researcher to undertake the research in the whole Ghana. According to Ghana Statistical service (2008) about 3.4 million people were involved in farming in Ghana as at 2008 and this number was expected to increase in the subsequent years due to the increase in size of the country’s population.

3.13 ETHICAL CONSIDERATIONS

Crommelin & Pline (2007) define ethics as “a set of moral principles or values that distinguishes between what is good and bad”. The researcher is aware that it is vital to uphold the ethical considerations in conducting a researcher. Ethical consideration is taken from Nelson Mandela Metropolitan University department of development studies that favoured the student to carry out research.

3.14 CONCLUSION

In conclusion, the chapter spells out the various research methods and methodological approaches intended to be use by the researcher to achieve the research objectives. Key

important ethical considerations were also elaborated in this chapter as required in this research. The next chapter will deal with findings from the data collected from respondents.

CHAPTER 4

FINDINGS

4.1 INTRODUCTION

This chapter of the research provides details of the findings in the field. Information was gathered from the Gomoa West district in Southern Ghana in which opinions of respondents were sampled. The choice of the respondents cuts across a societal spectrum to deplete any generation of bias. Informants represented governmental and non-governmental organization, civil societies, private consultants engineering consulting firms working on the environment and other government departments. The questions that constituted the questionnaire were open ended and probing to bring out the real position of the respondents with anonymity well taken care of (Greeff, 2005). Twenty respondents provided information that made up this research, with educational portfolio ranging from junior certificates with years of practice in the field of environment sustainability to doctoral degree. The strength of the research stemmed from the fact respondents possessed at least two years' experience in current capacity.

The proceeding part of this chapter is an analysis of the semi-structured interviews held with environmental actors in the Gomoa West district. The overall objective of the findings was to examine the impact of climate change in Southern Ghana.

The raw data is presented in this chapter without alteration (Greeff, 2005). The first part presents socio-demographic information; the second part looked at the impact of climate change from different corners.

4.2 SOCIO-DEMOGRAPHIC INFORMATION OF RESPONDENTS

4.2.1 Gender Representation

A demographic presentation of respondent highlighted that the majority of respondents were male. Female respondents only constituted 30 percent as seen in the pie chart in figure 4.1 below. Indicating therefore that out of the twenty respondents fourteen of them was male while only six of them were female.

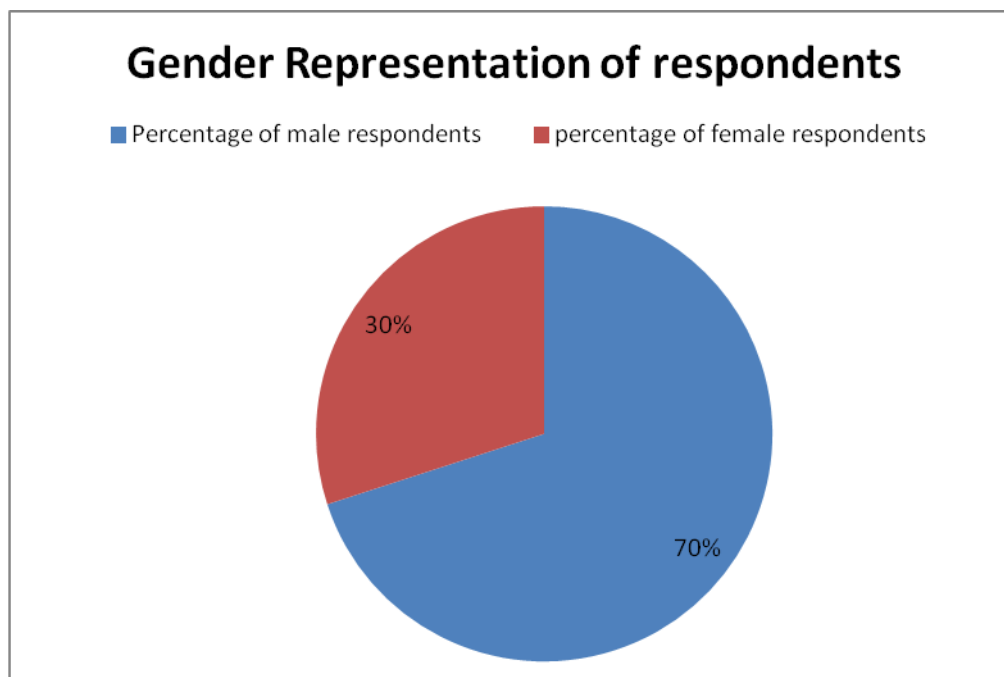


Figure 4.1: Gender Representation of respondents

4.2.2 Marital Status of respondents

Research in the field harnessed that about ninety percent of respondents were married. According to reports from the questionnaire eighteen respondents indicated their status as married while only two respondents highlighted that they were still searching. The Pie Chart in figure 4.2 below explains this diagrammatically.

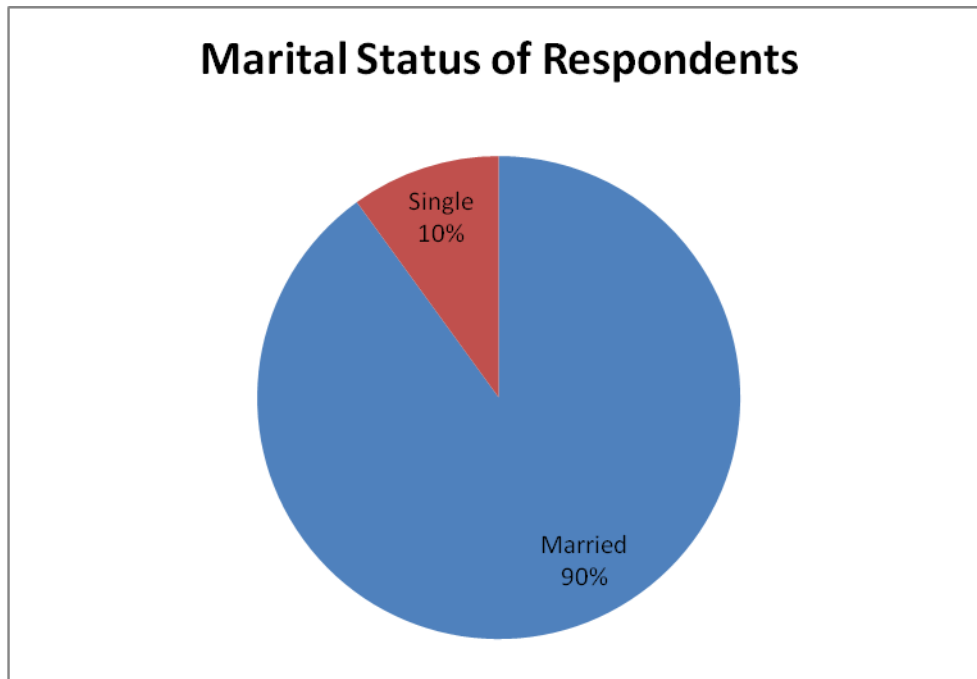


Figure 4.2: Marital Status of Respondents

4.2.3 Age Distribution of Respondents

According to report from respondents, the age distribution also plays a pertinent role in the provision of information to the researcher. The ages were grouped in fives ranging from twenty years to sixty and above. This is well presented in table 4.1 below.

20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65-69
1	2	5	4	3	2	1	1	1	

Table 4.1: Table showing Age distribution of respondents

Table 4.1 above shows the various ages' groups of respondents that participated in the survey. This can also be clearly represented in the bar diagram in figure 4.3 below.

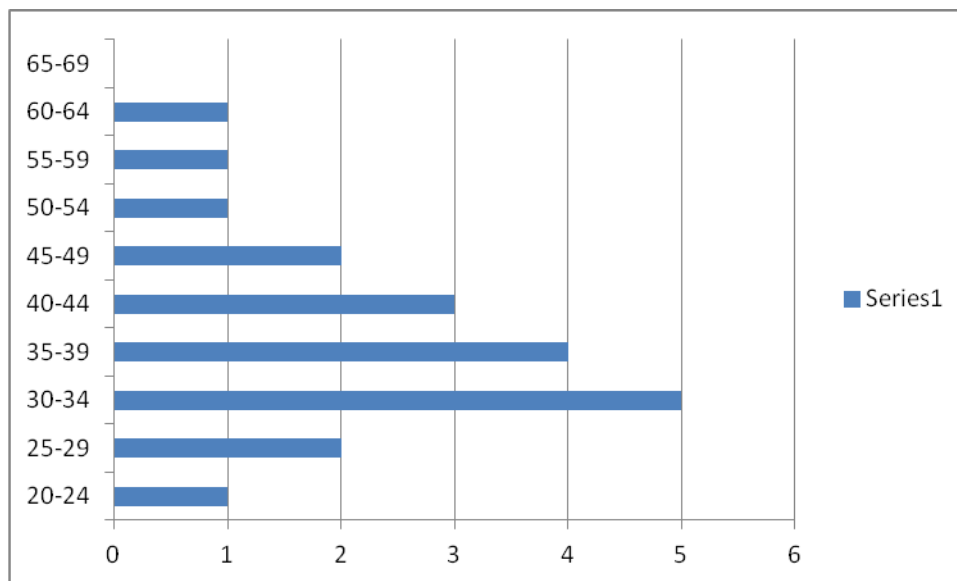


Figure 4.3: A bar diagram representing age distribution of respondents in Southern Ghana

4.2.4 Ethnicity of Respondents

The respondents that provided information in this research came from Southern Ghana. They belong to the Akan ethnic group which constitute the largest ethnic group in the Gomoa region of Southern Ghana. Respondent postulated that this group of people fall within the average economic class therefore have realised much effect of climate change in Southern Ghana region.

The demographic information of respondents as presented above gives a flashlight to the impact of climate change Southern Ghana is experiencing.

4.3 IMPACTS OF CLIMATE CHANGE ON FOOD PRODUCTION IN SOUTHERN GHANA.

In this section of the research open ended probing questions were used in the field so as to search the minds of the researchers. These questions were directed to particular themes to handle particular point of interest. The subject matter of the research is highlighted greatly with particular thematic.

4.3.1 What do you understand by the term climate change?

Respondents were of the opinion that climate change was the observation of changes in the weather condition for an elongated period of time. Within these respondents two of them reiterated that the duration of the period of weather observation is not uniform. It depended on many other factors. In the same loop three other respondents were also of the opinion that the change in weather condition starts with a change in the weather pattern and behaviour. One respondent presents climate change as a variation in the condition of weather in a defined environment over a long period of time.

4.3.2 Do you rely on climate for production of food?

In this category all respondent agreed with a ‘Yes’. Some respondents supported by saying that there are some food stuff that they make in the factories but in a nutshell about ninety percent of the food they eat here in Gomoa district is locally grown.

4.3.3 What type of food stuffs are locally produced in Southern Ghana?

This was a very pertinent preoccupation because it was aimed at realising what has transpired at the level of food production as climate changes in Southern Ghana. Respondents were sampled and the table below presents the various types of crops and animals that the community grow, all in the name of food stuff.

Profession	Number of professionals sampled	Product
Farmers	6	Maize, Cassava, Vegetable
Fishers	3	Fish
Animal Farmers	6	Goats, Cattle, Sheep
Administrators	5	Administration

Table 4.2: Shows the types of food stuffs that are locally grown in the Gomoa West community.

4.3.4 A comparison of previous and present level of production.

Local farmers in the Akan region complained that in the old days they used to have everything at their disposal for free. There used to be enough runoffs when the rain falls. Recently things have changed. They have to do bore holes and other irrigation schemes to keep water so as to keep their crops alive. This has drastically dropped down the level of production of tubers and cereals in southern Ghana. Table 4.4 below presents a situation in southern Ghana. This table shows the drastic reduction in the production of food stuff by the Akan people over the year. (All figures are in 000 tons)

Item	2006	2007	2008	2009	2010	2011	2012	2013
Maize	700	705	694	641	650	620	618	617
Yams	350	351	351	330	320	321	300	315
Cassava	463	460	461	400	411	382	398	395
Potatoes	420	410	410	410	400	396	392	392

Table 4.3: Annual Akan clan food production Table (Source: Ministry of Agriculture public Gazette, June 2014.)

A comparative annual study of the above table will reveal a severe drop in the production of food stuff by the Akan clan. Respondents also revealed that there is a drastic drop in the quality and quantity of livestock due to rationing of food which was not the case at first in this part of Ghana. In the same category the production of vegetable is not seeing any good, ‘...the desertic north is moving down the aisle to the south...’ one respondent yelled. In a nutshell five respondents did not produce any critical analysis since they work mostly in the office and develop policies for the local communities.

4.3.5 Reasons for the change in food production from the respondents’ perspective

In this section respondents forwarded multiply reasons while food production as per the table above has been greatly reduced. Four respondents pounded on the fact that it is due to change in

climate. Another four respondents were of the opinion that the local government is not assisting the Akan community in the provision of basic agricultural needs like pesticides and insecticides. Three respondents insinuated that it is the duty of the department of agriculture to subsidise and provide fertilizers to local farmers, which is not done. The fishers harnessed that prevention and security refresher courses which used to be rampant in the old days are no more. This explains why young agile fishermen are sceptical to join the business for lack of protection.

4.3.6 What problems are facing food security in Southern Ghana?

Food security in Southern Ghana is a new domain in the department of agriculture that needs much care. Respondents postulated that this domain needs a combine community and governmental effort to reinstate this domain. Four respondents insinuated that this domain is facing a lot of abandonment by local government. Another five respondent blamed it on the culture of the Akan people. According to this respondent the Akan people are generally hardworking people that have developed the ‘I can do it myself’ attitude that is down playing now on them.

Six respondents insinuated that the real problem facing food security in this part of Ghana is lack of finances to buy chemicals and seedlings in the beginning of an agricultural season. In a similar vein five respondents harnessed that it is the change of climate, with the desertic northern climate moving to the south that is causing food problems every year.

4.3.7 What are the local communities doing towards addressing this problem?

In responding to this preoccupation three respondents were of the opinion that local communities in Akan clan of the Gomoe district of Southern Ghana have developed local irrigation techniques to make water available even in the interior land. They call this technique “Group for Water” in which mostly women in the Akan Area used ropes buckets and sticks to tap water from nearby river to water vegetables in the surrounding cultivated land.

Another three respondents were also of the opinion that periodic capacity building programs are being carried out by extension staff to sensitise the populace of a food unsecured location in the near future. To this respect, much is being done to step up capabilities in this area. Four

respondents in the same vein highlighted the gradual transition into mechanised farming in the Gomoa district in order to step up production.

Three respondents highlighted that in the department of fisheries, the local communities have applied to the local and national government for subsidies. This will cover areas such as capacity building and development and to cover security measures. It will also provide and cover storage facilities so that future availability will be guaranteed.

In the domain of livestock, the local communities have requested for assistance from the local government to cover various areas of security. These areas include constant veterinary check up and drug provision to livestock. Veterinary education and animal production were promised to be encouraged in all local communities.

4.3.8 What challenges are the local communities facing in addressing food security problems?

In responding to this preoccupation respondents provided various challenges that the local communities are facing that is preventing them from achieving excellence in the field of food security. Five respondents strictly harnessed that these communities do not have enough funds to run their own personal projects. Another eight respondents postulated that the communities over depend on the national government of which environmental issues and climate change are not priorities to them.

Two respondents were of the opinion that the local communities are running short of food due to insufficient human resource to control local veterinaries to ensure survival of livestock. In the same vein these communities do lack human resource to build environmental policies as climate change becomes rampant in Southern Ghana. Two respondents highlighted that the Akan community possesses insufficient extension officers to match the farmer's ratio. This explains why the department of agriculture could not assist and monitor local farmers in attaining their goals. In the execution of this preoccupation two respondents pledged their neutrality.

4.4 CONCLUSION

Looking at the interview analysis, it will not be wrong to say that:

- Drawing from the level of ‘awareness’ of climate change and food security in the Gomoa district of Southern Ghana by the respondents, most of them exercised a high level of awareness of the issue being addressed (climate change and food security). Furthermore, the respondents have a positive perception of food security initiatives and the community’s effort in addressing it. Furthermore the national government needs to provide support to the municipalities through the promulgation of enabling and unconflicting legislations.

It is worth highlighting that these findings form the basis of the discussion which will be presented clearly in the next chapter.

CHAPTER 5

DISCUSSION.

5.1 INTRODUCTION

This chapter sets out a balance sheet of the results presented in the previous chapter. As noted in the problem statement, Southern Ghana is the most economically viable regions in Ghana, but it suffers significantly from environmental degradation and food security problems. The results of the study are analyzed in order to address the study's research questions.

5.2 STRATEGIES GOVERNING FOOD SECURITY IN SOUTHERN GHANA

Respondents revealed strategies governing food security in the Gomoa District of Southern Ghana. This portrayed how the local communities have been functioning over the years to ensure both environmental sustainability and food security. Respondents cited four clear strategies that have been in place for some time in this region. A respondent stated that no matter the circumstances, the local communities always turns to these strategies to ensure food availability.

5.2.1 Support for local projects

The results revealed that the Akan clan of Gomoa district have been at the forefront of ensuring food availability within the district. Local food production projects are subvented by local communities through the various programs:

- Capacity building and reinforcement of the Gomoa people,
- Education and Resource mobilisation programs
- Department of Agriculture Workers Extension Program (DAWEP)

These projects were noted to be of great value to local communities, not only in enhancing food security, but in creating jobs. The projects' sustainability is thanks to the community participation.

5.2.2 Environmental education

As the environment degrades, Southern Ghana has also used environmental education to confront food insecurity. The respondents noted that days are set aside at local primary and secondary schools to address environmental issues. Learners are taught environmentally friendly habits and how to take care of their environment. They are also made to understand that the environment is the primary livelihood source in Africa and that the sustainable use of the environment will therefore enhance food security. These environmental programs are sponsored by the municipality as part of a pilot community education program.

5.2.3 Public-Private Partnerships (PPPs)

The respondents noted that PPPs to promote food security have been in place in the Gomoa district since 1994. The municipality has realized the need to partner with the private sector to ensure continued production of basic necessities. Almost all sections of the municipality are now engaged in PPPs.

5.2.4 Research

Southern Ghana regards research as an essential component of its efforts to address food security and environmental degradation. The respondents noted that the municipality has developed a partnership with the with local community leaders and other young researchers to conduct research on food security.

5.3 TO WHAT EXTENT HAVE THESE STRATEGIES BEEN IMPLEMENTED?

Respondents revealed that the municipality is drafting policies on issues such as climate change, which has greatly impacts food security and the environment. Some respondents were of the opinion that the implementation is the main problem in the Gomoa district of Southern Ghana. This is as a result of certain factors:

- Differences in political opinion,
- Inappropriate monitoring mechanisms,
- Inadequate staffing,

- Level of education,
- Financial constraints,
- Lack of commitment.

The respondents highlighted that these factors have been detrimental to economic growth and food security not only in Southern Ghana but in the national territory.

5.4 PREVAILING CLIMATE CHANGE EFFECT ON THE PEOPLE OF SOUTHERN GHANA.

Research in the field has proven that the people of Southern Ghana in recent years have experienced a lot of food security problems due to the change in climate. The Gomoa district which is the core district of Southern Ghana where the setting of this research is based has experienced a lot of changes over the years. Aidoo et al (2013) postulated that climate change and food insecurity works hand in gloves. No matter the resilience or coping policies put in place the indigenes must feel a pinch of the change in climate.

Respondents also in the field revealed that as a result of change in climate in the Gomoa district the entire Southern Ghana has gone through a lot of food shortage that can lead to severe economic problems if intervention is not made immediately. This position is also supported by Ghana Republic, National Environmental Policy (1995). These are legislations guiding the environment in Ghana which propound on the theories that the communities have the right to the environment; in case of any stressor it is the duty of the local communities to initiate adaptation proposals that will speak to their livelihoods.

Another severe effect that the change of climate has left on the people of Southern Ghana is dryness. Respondents revealed that dryness is common in the northern section of Ghana due to its desertic qualities. This dryness is being exported in recent times in the southern section. This has made food availability a remote possibility, forcing both small and large scale farmers to assume irrigation as a panacea. This quality is in line with Clay (2002) who is of the opinion that as an adaptation model to climate change, local communities must look for ways to deal with dryness because it “...comes along with the climate change package”. Another research by Simon (2012) highlighted that the disruption of the ozone layer gives the rays of the sun direct access

and contact with the earth crust. This has been the cause of dryness in most part of Saharan and equatorial Africa.

Respondents in the field revealed that climate change has greatly affected the people in southern Ghana in so many ways: It has led to low rainfall, low yields, poor sanitary situations due to insufficient water supply, favourisation of predatory plant species and many others. Simon (2012), WFP (2009) and Lima (2008) were of the opinion that the availability of multiple effects of climate variation and change has plunged the world into a 'New Deal'. According to the New Deal Sub Saharan nations have rethink ways to curtail the negative effects of climate change in a sustainable manner that will not jeopardise the running of their economies.

The inculcation of climate change in southern Ghana has left the nation with new food security problems. Some of these problems are discussed below.

5.5 FOOD SECURITY PROBLEMS IN SOUTHERN GHANA

Respondents identified the following problems of food security in the Gomoa district of Southern Ghana.

- Insufficient human resource building
- Insufficient safety for fishers
- Limited number of veterinaries
- Insufficient veterinary staff
- The emergence of predatory plant species
- Climate variation and change
- Dryness and drought
- Disappearance of springs and streams
- Unsupportive irrigation schemes
- Insufficient extension officers to farmers ratio

5.6 CHALLENGES FACED BY LOCAL COMMUNITIES

5.6.1 Funding

Finance is a major problem of food security in Southern. One respondent revealed that a number of projects to ensure food availability have slowed down or closed due to the community financial constraints. However, another respondent blamed this on poor management and insufficient provision of funds. According to Weingartner (2004), Dosu (2011) and Lima (2008), projects in Southern Ghana have failed to reach completion in the past ten years. This can be held responsible by certain factors such as; insufficient financial support and lack of national government funding

5.6.2 Administrative bottlenecks and Agricultural extension workers

A few respondents felt that administrative bureaucracy slows down decision-making; indeed, some projects never get off the ground. One respondent declared that "...as decision goes up. The people up there are looking for their family to bring in..." This has been a severe problem that Southern Ghana has faced over the years that is gradually affecting production of food crop.

The department of agriculture have trained extension workers in the field who are required to train and give clearance to local farmers on how to take off the farming business. These trained extension workers are limited in supply as the quantity of farmers only multiply in a geometric progression. Aidoo et al (2013), Lima (2008) and Simon (2012) are of the opinion that environmental hazards in sub-saharan African have accentuated unemployment to the extent that newly retrenched workers find solace in going to the farm to become potential farmers with no learning skills.

5.6.3 Political promises

One respondent highlighted that politicians make promises they cannot or will not keep during political campaigns. "He will make promise so much so that when he is voted, the voters turn to the municipality to provide what the politicians promised them". This respondent highlighted that what is promised "...is not within the municipal budget". This has resulted in frequent

protest action in the Gomoa district. To this effect Ghana Republic Environmental Protection Agency (1994), urged community leaders vying for political positions to limit propaganda as a development policy.

5.7 WHAT NEEDS TO BE DONE IN SOUTHERN GHANA TO ENSURE FOOD PRODUCTION?

This section was one of the most sensitive parts of the questionnaire. It was raised to establish what needs to be done to ensure the sustainability of current efforts. There were mixed responses. A few of the respondents were of the opinion that Southern Ghana should place more emphasis on environmental issues.

According to some of the respondents, education campaigns are an import tool to raise awareness of environmental issues, especially since the Ghana Republic National Environmental Policy (1995) stresses on the need to protect the environment. As one respondent noted, environmentally friendly habits will go a long way in promoting food security.

Finally, another respondent suggested that the Gomoa district should revisit its construction pattern. Most of the built up areas are close to the sea. This area is subject to oxidation and therefore much-needed local community resources are being used for maintenance and repairs. These resources could be directed to food production.

5.8 CONCLUSION

This chapter examined the impacts of climate change on ensure food security in Southern Ghana. It also discussed the extent to which the communities have been able to implement these strategies, and the various challenges the communities have faced. The chapter outlined problems agricultural projects in Southern Ghana and the sustainability of food security have gone through over the years. It concluded by examining what needs to be done to enhance food production. These issues are the core issues raised in the research objectives.

CHAPTER 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter presents the study's conclusions and its recommendations for further research that speak to food security in Southern Ghana.

6.2 SUMMARY OF CONCLUSIONS BASED ON THE FINDINGS

The design and planning of a successful food security program in Southern Ghana should be part of a holistic development program within the Gomoa district municipality. This will tackle the issue of food production as climate change accentuates. This study concluded that, in order to enhance food security and address climate change issues:

- Gomoa district should accelerate efforts to enhance awareness of climate change issues. Education programs should be geared towards building resilience to climate change which is one of the greatest environmental threats to food security in Southern Ghana.
- Policy makers should draft efficient and effective food security policies and ensure their implementation and monitoring in the municipality. These policies should be cost effective that will also speak to the development of the local communities.
- Local government should craft and implement policies to address environmental degradation caused by floods, climate change, and the invasion of alien plant species that impact food security. This will promote food production initiatives that address food insecurity in Southern Ghana. These initiatives should be well implemented and monitored.

6.3 RECOMMENDATIONS EMERGING FROM THE CONCLUSIONS

This study revealed the respondents' experiences, perceptions and needs with regard to food security in southern Ghana. It also revealed how local communities can better respond to food insecurity and the environmental challenges confronting them. The recommendations are based

on the findings of the study as well as the literature review in Chapter two. While these recommendations are presented separately, they overlap.

6.3.1 Recommendation for further research

The study revealed that food security and climate change are not considered as core issues to local communities of the Gomoa district in Southern Ghana. Therefore, it is recommended that further research be carried out on socio-cultural responses to environmental problems in the Gomoa district. This will reveal how communities address environmental issues, thus enabling grassroots communities' voices to be heard, which is an important cornerstone of contemporary development trends. Such research would reveal the level of community attachment to the environment, and the way in which rural areas depend on the environment for their livelihoods.

The study also revealed problems around food production, environmental degradation, and insufficient financial resources to address environmental problems. It is therefore **recommended** that future research could explore:

- Food production problems in Southern Ghana to determine the causes of food shortages so as to prevent such shortages.
- The integration of environmental education and care programs in the school curriculum.

6.3.2 Capacity development and reinforcement programs in Southern Ghana.

The study revealed that capacity development and reinforcement is an important aspect in addressing climate change and food insecurity. Educational programs should target learners as well as the community at large. Therefore it is **recommended** that:

- The Gomoa district municipality, NGOs and other organizations make provision for regular visits by counsellors to schools to offer psychosocial and emotional support to these educators and capacity builders.
- NGOs and other civil society organizations in southern Ghana should motivate education through bursaries.

6.4 CONCLUSION

This chapter presented the conclusions reached in terms of the research questions, and made recommendations on how the Gomoa district could better manage food security and environmental degradation as climate change accentuates. The researcher also outlined the study's contribution to knowledge and practice through the discussion of the results in chapter five. The researcher is satisfied that the goals of this study have been achieved. Moreover, the researcher experienced significant personal development during this journey, which will benefit future work with environmental practitioners in Southern Ghana.

REFERENCES

- Acharya, B. 2010. Questionnaire Design. A working paper. Tribhuvan University
- Aidoo, R., Mensah, J. O. & Tuffour, T. 2013. Determinants of Households Food Security in the Sekyere-Afram Plains District of Ghana. First Annual International Interdisciplinary Conference Proceedings, Azores, Portugal.
- Ananga, E. 2011. Dropping Out of School in Southern Ghana: The Push-out and Pull-out Factors. Create Pathways to Access, *Research Monograph* No.55
- Antwi-Agyei, P., Dougill, A. J. & Stringer, L.C. 2013. Barriers to Climate Change Adaptation in Sub-Saharan Africa: Evidence from Northeast Ghana & Systematic Literature Review. *Centre for Climate Change Economics and Policy working paper* 154 & *Sustainability Research Institute paper* 52, pp1-30.
- Awumbila, M., Manuh, T., Quartey, P., Tagoe, C.A., & Bosiakoh, T. A. 2008. Migration Country Paper Ghana. Centre for Migration Studies, University of Ghana
- Ben & Julie Markham Family. 2004. Map of Southern Ghana. Also available on www.bsmarkham.com/mission/Africa/Nov%2004/map.html Accessed on 20 April 2014
- Berg, B. L. 2001. *Qualitative Research Methods for the Social Sciences*. 4th ed. California State University, Long Beach
- Bless, C. & Higginson-Smith, C. 1995. Fundamentals of Social Science Research Methods: *An African Perspective*. Juta & Co. Lusaka, Zambia
- Burchi, F. & Muro, P. D. 2012. A Human Development and Capability to Food Security: Conceptual Framework and Informational Basis. *United Nations Development Programme working paper* 2012-009, Roma, Italy
- Burns, N. & Grove, S.K. 2007. *Study Guide for Understanding Nursing Research*, 4th ed. Philadelphia, Elsevier
- Burns, N & Grove, S.K. 2009. *The Practice of Nursing Research*. Missouri: Saunders Elsevier.

- Burns, N. & Grove, S.K. 2001. *The Practice of Nursing Research: Conduct, Critique and Utilization*. 4th ed. Philadelphia, Saunders
- Cai, X., Koo, J., Ringler, C., Wang, D. & Zhu, T. 2010. Climate Change Impact on Food Security in Sub-Saharan Africa: insights from comprehensive climate change Scenarios. *International Food Policy Research Institute discussion paper* 01042, pp 1-17
- Clay, E. 2002. Food Security: Concepts and Measurement. FAO Expert Consultation on Trade and Food Security: Conceptualising the Linkages working paper no. 1, Rome
- Codjoe, S.N.A. & Owusu, G. 2011. Climate Change Variability and Food Systems: Evidence from the Afram Plains, Ghana. *Reg Environ Change DOI: 10.1007/s10113-011-0211-3*
- Creswell, J.W. 2003. *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 2nd ed. University of Nebraska, Lincoln
- Crommelin, R.W. & Pline, J.L. 2007. Ethics for Experts. *ITE Journal*
- Dash, N.K. 2005. Module: Selection of Research Paradigm and Methodology. Online Research Methods Resource for Teachers and Trainers. Indira Gandhi National Open University. Also available online on http://www.celt.mmu.ac.uk/researchmethods/Modules/Selection_of_methodology/ Accessed on 28 June 2014
- Davies, S., Smith, B. M. & Lambert, R. 1991. Early Warning in the Sahel and the Horn of Africa: A Review of Literature. IDS Research Reports no. 20. Institute of Development Studies. Brighton, UK
- Daze, A. 2011. Understanding Vulnerability to Climate Change: Insights from Application of CARE's climate vulnerability and capacity analysis (CVCA) methodology. United Kingdom
- De Vaus, D. 2002. *Surveys in Social Research*, London: UCL Press
- Diao, X. & Sarpong, D.B. 2007. Cost Implications of Agricultural Land Degradation in Ghana: An Economy Wide, Multimarket Model Assessment. *International Food Policy Research Institute discussion paper* 00698, pp 1-35

- Dills, C.R & Romiszowski, A. J. 1997. The Instructional Development Paradigm: An Introduction. Englewood, NJ. Educational Technology Publications, Inc
- Dosu, A. 2011. Fulani-Farmer Conflict and Climate Change in Ghana. ICE case studies. no. 258
- Ellis, T. J & Levy, Y. 2009. Towards a Guide for Novice Researchers on Research Methodology: Review and Proposed Methods. Issues in Informing Science and Information Technology, vol.6. Nova Southeastern University, Florida
- FAO.2007.Climate Change and Food Security: A Framework for Action. Food and Agriculture Organization Interdepartmental Working Group on Climate Change. Rome
- FAO.2014. Corporate Document Repository. Agriculture and Consumer Protection Department. Rome
- Frankenberger, T. R. & McCaston, M. K. 1998. From Food Security to Livelihood Security: The Evolution of Concepts. CARE, USA
- Friedrich Ebert Stiftung & Ghana Agricultural Workers Union. 2012. Climate change and its impact on the livelihood of farmers and agricultural workers in Ghana. Ghana
- Fulton, M. 2012. Food Security: What Does It Mean for Canadian Food and Agricultural Policy? University of Saskatchewan, Saskatoon, Canada
- Gerber, R.E. 2014. Applied Research Skills: Study Guide. Nelson Mandela Metropolitan University, South Africa
- Ghana High Commission Canada. 2013. Profile of Ghana. Ottawa, Canada
- Ghana Republic. *Environmental Impact Assessment Regulations 1999*. LI 1652 Environmental Permit. Accra
- Ghana Republic. *Environmental Protection Agency Act. 1994. 490*. Accra
- Ghana Republic. *National Environmental Action Plan*. 1988. Vol.1. Accra
- Ghana Republic. *National Climate Change Adaptation Strategy*. 2013. Accra

- Ghana Republic. *National Climate Change Policy*. 2010. Accra
- Ghana Republic. *National Environmental Policy*. 1995. Accra
- Ghana Statistical Service. 2008. Ghana Living Standards Survey Report on the Fifth Round. Ghana
- Ghana Statistical Service. 2012. 2010 Population and Housing Census. Accra
- Glazebrook, T. 2011. Women and Climate Change: A Case-Study from Northeast Ghana. *Hypatia* vol. 26, no. 4, pp 762-782
- Golafshani, N. 2003. Understanding Reliability and Validity in Qualitative Research. *The qualitative report*, vol 8, no. 4, pp 597-607
- Greeff, M. 2005. *Information Collection: Interviewing*. In De Vos A. S., Strydom, H., Fouche C.B. & Delport C.S.L. *Research at the Grassroots for the Social Sciences and Human Service Professions*. 3rd ed. Pretoria: JL Van Schaik Publishers
- Hall, D.O. 1998. Food Security: What Have Sciences To Offer? A Study for ICSU
- Hancock, B. 1998. Trent Focus for Research and Development in Primary Health Care: An Introduction to Qualitative Research. Trent Focus. University of Nottingham, UK
- Intergovernmental Panel on Climate Change (IPCC), 2007. Summary for Policymakers. In Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, Martin L., et al. (eds.) Cambridge: Cambridge University Press
- Leedy, P.D. 1993. *Practical Research*, 5th ed. New York: Macmillan
- Leedy, P.D. & Ormrod, J.E. 2006. *Research: Planning and Design*, 8th ed. Dan Kauffman, Florida Atlantic University
- Lima, M. G. B. 2008. Sustainable Food Security for Local Communities in the Globalized Era: A Comparative Examination of Brazilian and Canadian Case Studies

- Lynn, P. 2004. Measuring and Communicating Survey Quality. *Journal of the Royal Statistical Society Series A* 167(4): 51-74
- Mahama, E.S. & Rademacher-Schulz, C. 2012. Where the Rain Falls project. Case Study: Ghana. Results from Nadowli District, Upper West Region. Report no. 3. Bonn:United Nations University Institute for Environmental and Human Security
- Maxwell, S. 1996. Food Security: A Post-Modern Perspective. *Food Policy* no. 21 (2), pp.155-170
- Meteo365.com. 2014. Apam Location Ghana. Also available online <http://www.weather-forecast.com/locations/Apam> . Accessed on 5 August, 2014
- Ministry of Food and Agriculture. 2014. Government Public Gazette. Accra.
- Ministry of Food and Agriculture.2010. Agriculture in Ghana: Facts and Figures 2009. Ministry of Food and Agriculture. Statistics, Research and Information Directorate (SRID), Accra.
- Ministry of Food and Agriculture.2013. Ghana. Also available online <http://mofa.gov.gh> Accessed on 25 March 2014
- Mouton, J.2001. *How to succeed in your Master's and Doctoral Studies*. A South African Guide and Resource Book. Van Shaik Publishers, Pretoria 2001.
- Neuman, L.W. 1994. *Social Research Methods: Qualitative and Quantitative Approaches*. Allyn and Bacon publishers, London
- Neville, C. 2007. Introduction to Research and Research Methods. Effective Learning Service. University of Bradford
- Nuwagaba, A. & Namateefu, L.K. 2013. Climate Change, Land Use and Food Security in Uganda: A Survey of Western Uganda. *Journal of Earth Sciences and Geotechnical Engineering*, vol. 3, no. 2, 2013, 61-72
- Nyantakyi- Frimpong, H. 2013. Food Insecurity in Northern Ghana: Policy Issues in Historical Context. *Africa Portal Background* no.62

Oatey, A. 1999. The Strengths and Limitations of Interviews as A Research Technique for Studying Television Viewers.

Also available online on <http://www.aber.ac.uk/media/Students/aeo9702.html> Accessed on 28 June, 2014.

O'Leary, Z. 2004. The Essential Guide to Doing Research. Sage publishers. Los Angeles, USA

Patton, M.Q. 1990. *Qualitative Evaluation and Research Methods*. 2nd ed. Newbury Park, CA: Sage

Pinto, A.D., Demirag, U., Haruna, A., Koo, J. & Asamoah, M. 2012. Climate Change, Agriculture and Food Crop Production in Ghana. Ghana Strategy Support Program. *IFPRI Discussion Paper 3*. International Food Policy Research Institute

Quartey, J.D. 2010. The Demand for Climate Change Mitigation in Ghana's Forested Regions. 18th Commonwealth Forestry Conference

Quaye, W. 2008. Food Security Situation in Northern Ghana: Coping Strategies and Related Constraints. *African Journal of Agricultural Research*, vol.3, no. 5, pp. 334–342

Rattray, J. & Jones, M.C. 2007. Essential Elements of Questionnaire Design and development: Issues in Clinical Nursing. *Journal of Clinical Nursing*, vol.16, 234-243

Robinson, V. & Lai, K.M. 2006. Practitioner Research for Educators: A Guide for Improving Classrooms and Schools. California, Corwin Press

Sen, A. 1981. Poverty and Famines. Clarendon Press, Oxford

Seo, K. & Rodriguez, N. 2012. Land Grab, Food Security and Climate Change: A Vicious Circle in the Global South. Arizona State University, USA

Sijm, J. 1997. Food Security in Developing Countries: An Introduction. Centre for Developing Planning. Rotterdam

- Simon. G. A. 2012. Food Security: Definition, Four Dimensions and History. University of Roma Tre
- Trochim, W.M.K. 2006. Ethics in Research. Also available online <http://www.socialresearchmethods.net/kb/ethicsphp> Accessed on 21/March/2014
- United Nations Development Programme (UNDP). 2007. Ghana Human Development Report: Towards a more Inclusive Society. Ghana Office. Also available online http://hdr.undp.org/en/reports/national-reports/africa/ghana/NHDR_2007_Ghana.pdf Accessed on 21 May, 2014
- United Nations Development Programme (UNDP) & National Development Planning Commission (NDPC). 2012. 2010 Ghana Millennium Development Goals Report. Also available http://www.za.undp.org/content/dam/ghana/docs/Doc/Inclgro/UNDP_GH_IG_2010MDGreport_18102013.pdf Accessed on 25 May, 2014
- Weingartner, L. 2004. The Concept of Food and Nutrition Security. Food and Nutrition Security Assessment Instruments and Intervention Strategies. Background Paper no. 1
- Wlokas, H. L. 2008. The Impacts of Climate Change on Food Security and Health in Southern Africa. *Journal of Energy in Southern Africa* vol 19 no 4, pp 12-20
- World Bank Group. 2011. Vulnerability, Risk reduction, and Adaptation to Climate Change Ghana. Washington DC
- World Food Conference. 1974. Universal Declaration on the Eradication of Hunger and Malnutrition. World Food Conference General Assembly. Also available on <http://www.ohchr.org/EN/ProfessionalInterest/Pages/EradicationOfHungerAndMalnutrition.aspx> Accessed on 28 May, 2014
- World Food Programme (WFP).2009. Comprehensive Food Security and Vulnerability Analysis, Ghana 2009. World Food Programme, VAM Food Security Analysis. Rome, Italy

World Food Programme (WFP).2012. Comprehensive Food Security and Vulnerability Analysis, Ghana 2012. Focus on Northern Ghana. World Food Programme, VAM Food Security Analysis. Rome, Italy

Yount, R. 2006. *Survey Research: The Questionnaire, The Interview, Developing a Survey Instrument*. 4th ed

APPENDIX I: QUESTIONNAIRE

DATA COLLECTION INSTRUMENT

SURVEY QUESTIONNAIRE ON THE IMPACT OF CLIMATE CHANGE ON FOOD SECURITY IN SOUTHERN GHANA: A COMMUNITY PERSPECTIVE

SECTION A : SOCIO- DEMOGRAPHIC INFORMATION

Please answer all questions accurately and honestly

1. What is your gender?

.....
.....

2. What is your marital status?

.....
.....

3 What is your age?

.....
.....

4. What ethnic group do you belong?

.....
.....

5. The province/region you come from

.....
.....

6. State the municipality/ district

.....
.....

7 What is the highest education level completed by you?

.....
.....

8 What is your work?

.....
.....

9 How long have you been working with your current job

.....
.....

SECTION B

TO UNDERSTAND WHAT AND HOW PRODUCERS PRODUCE THEIR FOOD PRODUCTION

10 What do you produce?

.....
.....

11 How many tones of food production do you produce during the production season?

.....
.....

12 Are you satisfied with the current tones of food production you produce?

.....
.....

13 What do you rely on for your crops to grow?

.....
.....

14 How do this affect your total production

.....
.....

15 Do you have a storage facility to store your final production?

.....
.....

16 If yes, what storage facility do you have

.....
.....

17 How many tons of food production do you store during the production season

.....
.....

18 How long do you store your food production

.....
.....

SECTION C

THE POTENTIAL IMPACT OF CLIMATE CHANGE

19 What do you understand by climate change ?

.....
.....

20 Do you rely on the climate for your food production?

.....
.....

21 If yes, how do climate change affect your final production

.....
.....

22 Do you think your final production is enough to feed the local community people?

.....
.....

23 If no, what aspects of food problems are they facing

.....
.....

24 What are they doing towards addressing these problems?

.....
.....

25 To what extent are they coping?

.....
.....

26 What problems or challenges do they have while addressing this issue?

.....
.....

27 What resources do they have to this effect?

.....
.....

28 What is the way forward?

.....
.....

Thank you for completing this questionnaire.

APPENDIX II: ETHICS CLEARANCE



Nelson Mandela
Metropolitan
University

for tomorrow

FORM E

ETHICS CLEARANCE FOR TREATISES/DISSERTATIONS/THESES

Please type or complete in black ink

FACULTY: BUSINESS AND ECONOMIC SCIENCES

SCHOOL/DEPARTMENT: DEVELOPMENT STUDIES

I, (surname and initials of supervisor) EKINIE NZANIE

the supervisor for (surname and initials of candidate) ABOACIE DD

(student number) 212479423

a candidate for the degree of MASTER OF DEVELOPMENT STUDIES

with a treatise/dissertation/thesis entitled (full title of treatise/dissertation/thesis):

IMPACTS OF CLIMATE CHANGE ON FOOD SECURITY IN SOUTHERN GHANA: A COMMUNITY BASED

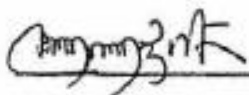
considered the following ethics criteria (please tick the appropriate block):

	YES	NO
1. Is there any risk of harm, embarrassment of offence, however slight or temporary, to the participant, third parties or to the communities at large?		X
2. Is the study based on a research population defined as 'vulnerable' in terms of age, physical characteristics and/or disease status?		X
2.1 Are subjects/participants/respondents of your study:		
(a) Children under the age of 18?		X
(b) NMMU staff?		X
(c) NMMU students?		X
(d) The elderly/persons over the age of 60?		X
(e) A sample from an institution (e.g. hospital/school)?		X
(f) Handicapped (e.g. mentally or physically)?		X
(g) Socially/economically disadvantaged?		X

3. Does the data that will be collected require consent of an institutional authority for this study? (An institutional authority refers to an organisation that is established by government to protect vulnerable people)		X
3.1 Are you intending to access participant data from an existing, stored repository (e.g. school, institutional or university records)?		X
4. Will the participant's privacy, anonymity and confidentiality be disclosed/revealed?		X
4.1 Are you administering a questionnaire/survey that:		
(a) Collects sensitive/identifiable data from participants?		X
(b) Does not guarantee the anonymity of the participant?		X
(c) Does not guarantee the confidentiality of the participant and the data?		X
(d) Will be distributed electronically (e.g. online via email/web link)?		X

Please note that if ANY of the questions above have been answered in the affirmative (YES) the student will need to complete the full ethics clearance form (REC-H application) and submit it with the relevant documentation to the Faculty Ethics Co-ordinator.

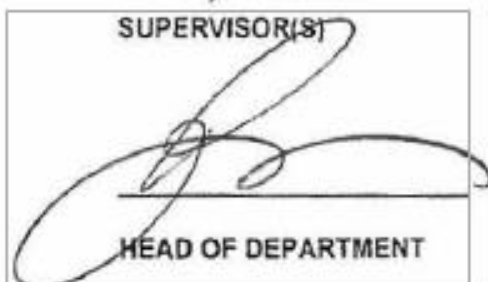
and hereby certify that the student has given his/her research ethical consideration and full ethics approval is not required.



SUPERVISOR(S)

11-08-14

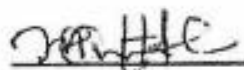
DATE



HEAD OF DEPARTMENT

28/10/2014

DATE



STUDENT(S)

8/8/2014

DATE

Please ensure that the research methodology section from the proposal is attached to this form.