

**FACTORS INFLUENCING FOOD SECURITY IN KENYA;
A CASE OF BUNGOMA SOUTH SUB-COUNTY,
BUNGOMA COUNTY.**

**BY
CHENGE NDALILA MICHAEL**

**A RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILMENT OF THE
REQUIREMENTS OF THE AWARD OF THE DEGREE OF MASTER OF ARTS
IN PROJECT PLANNING AND MANAGEMENT OF THE UNIVERSITY OF
NAIROBI**

2015

DECLARATION

This research project is my original work and has never been presented for award of the degree in any other university.

Signature..... Date.....

Chenge Ndalila Michael

L50/70748/2013

This research project has been submitted for examination with my approval as the university supervisor.

Signature..... Date.....

MR. PETER K. HARRY,

Lecturer,

Department of Extra mural Studies.

University of Nairobi

DEDICATION

I dedicate this research project to my wife Betty, my dear son Denzel Livingstone, my father Livingstone Chenge, mother Kelly Chenge and my siblings who supported me during my studies.

ACKNOWLEDGEMENT

I would like to acknowledge the University of Nairobi for giving me a conducive environment which has made it possible for me to carry out my studies successfully. I sincerely give my gratitude to my able supervisor Mr. Harry Peter for his mature criticism, motivation and intellectual guidance which enabled the writing of this research project possible.

My recognition also goes to my 2013 fellow course mates who were always there for me when I required their support and the great work of my Lecturers and management team including Prof Ochola, Prof Toili, Prof Onkware, Dr. Mbugua, Dr. Obwoka, Dr. Okelo, Dr. Luketero, Dr. Kilika, Dr. Maende, Mr. Wandera, Mr. Marani, Mrs. Janet Maina, Mr. Wachiye and Mr. Shililu.

I acknowledge the support of the administrative assistants of Bungoma Sub centre Mr. Issa Shabir and Mr. Marcus for being always available to offer services to me and more so for their Professional guidance, inspiration and hope through my course.

I can't forget my entire family members including my wife Betty, my dear son Denzel Livingstone Ndalila Chenge, my father Livingstone Chenge, mother Kelly Apeli Chenge and my siblings who accorded me moral support during the study time hence facilitating its completion.

I also recognize the great work of type-setting, proof reading and corrections done by my friend who tirelessly ensured the entire document is reasonable and presentable.

Again my thanks go to my office mates, the staff at One Acre Fund for their continued technical input and encouragement during this course work.

To all of the aforementioned, I say may God bless you abundantly.

TABLE OF CONTENTS

DECLARATION	ii
DEDICATION	iii
ACKNOWLEDGEMENT	iv
LIST OF FIGURES	viii
LIST OF TABLES	ix
ABBREVIATIONS AND ACRONYMS	xi
ABSTRACT	xii
CHAPTER ONE	1
INTRODUCTION	1
1.1 Background of the Study	1
1.2 Statement of the Problem	2
1.3 Purpose of the Study	4
1.4 Objectives of the Study	4
1.5 Research Questions	4
1.6 Significance of the Study	4
1.7 Delimitation of the Study	5
1.8 Limitations of the Study	5
1.9 Assumptions of the Study	5
1.10 Definitions of Key Terms	6
1.11 Organization of the study	6
CHAPTER TWO	8
LITERATURE REVIEW	8
2.1 Introduction	8
2.2 Farming methods and food security	8
2.3 Farmers demographic characteristics and food security	11

2.4 Farm inputs and food security.....	13
2.5 Population Size and food security	18
2.6 Theoretical Framework	22
2.7 Conceptual Framework	23
2.7.1 Discussion of Conceptual framework.....	24
2.8 Knowledge gaps.....	24
CHAPTER THREE	26
RESEARCH METHODOLOGY.....	266
3.1 Introduction	266
3.2 Research Design.....	26
3.3 Target Population	26
3.4 Sampling Size and Sampling Technique.....	27
3.4.1 Sample Size	27
3.4.2 Sampling Technique.....	27
3.5 Research instrumentation	27
3.5.1 Questionnaires	27
3.6 Data Collection Procedure.....	28
3.7 Validity and reliability of research instruments	28
3.8 Data presentation and analysis techniques	29
3.9 Operational Definitions of Variables	30
3.10 Ethical Consideration	30
CHAPTER FOUR.....	31
DATA ANALYSIS, PRESENTATION ,INTERPRETATION AND DISCUSSIONS	31
4.1 Introduction	31
4.2 The Response Rate	31
4.3 Socio-economic Characteristics of the Sampled Farmers	31

4.3.1 Gender	31
Table 4.1: Gender distribution of respondents	31
4.3.2 Age Distribution	32
4.3.3 Education Level.....	32
4.4 Analysis as per the objectives	34
4.4.1 Farming methods and food security	34
4.4.2 Farmers demographic characteristicsand food security.....	37
4.4.3 Farm inputs and food security	46
4.4.4Population Sizeand food security	49
4.5 Analysis from the interview	50
CHAPTER FIVE.....	53
SUMMARY OF FINDINGS AND DISCUSSIONS	53
5.1 Introduction	53
5.2 Summary of findings	53
5.4Conclusion.....	55
5.5 Recommendations	56
5.6 Suggestions for Further Research.....	56
APPENDICES	61
Appendix 2: Questionnaire for farmers	62
PART I: Back ground information.....	62
PART II: QUESTIONS ON THEMES	63
2. Farmers demographic characteristicsand food security.....	64
3. Farm inputs and food security	65
4. Population and family sizes	66
Appendix 3: Interview Guide for OAF staff and agricultural officials.....	67

LIST OF FIGURES

Figure 1: Conceptual framework.....	11
--	----

LIST OF TABLES

Table 2.1: Operational definition of variables.....	15
Table 4.1: Gender distribution of respondents.....	30
Table 4.2: Age Distribution	31
Table 4.3: education Level of the respondents.....	32
Table 4.4: Utilization of BMPs and conservation practices related to nutrient management, Pesticide use, grazing methods and soil protection.....	34
Table 4.5: Farmers caring about protecting the environment including soil, air and water quality.....	35
Table 4.6: Farmers regular participation in FSA, NRCS, SWCS, and Extension programming	36
Table 4.7: Education of household head.....	36
Table 4.8: Education for rural people as a key factor in fighting food insecurity.....	37
Table 4.9 Limitations in coordination, harmonization of methodologies, analysis and dissemination as well as in scope and geographical coverage, focusing on major markets and commodities.....	38
Table 4.10: Existence of opportunities to improve market and trade information, including the use of mobile phones, short message.....	39
Table 4.11: Providing of farmers with training on how to use these technologies by the organization.....	40
Table 4.12 Provision of Local field officers extensive training to farmers in the fields...41	
Table 4.13: Simple techniques such as fertilizer micro-dosing as training	42
Table 4.14: Education for power to read and communication.....	43

Table4.15 Education and avenues to better farming methods and marketing strategies.....	44
Table 4.16: Average household Production by farmers in Bungoma South sub-county for two consecutive seasons of giving inputs by one acre fund.....	45
Table 4.17: Average Food availability per household.....	46
Table 4.18: The size of family members.....	47

ABBREVIATIONS AND ACRONYMS

PRSP	-Poverty Reduction Strategy Paper
ERS	-Economic Recovery Strategy
SPSS	-Statistical Package for Social Sciences
SRA	-Strategy for Revitalizing Agriculture
MDGs	-Millennium Development Goals
CAADP Programme	-Comprehensive Africa Agriculture Development
NEPAD	-New Partnership for Africa's Development
UN	-United Nations
HIV	-Human Immuno-deficiency Virus
AIDS	-Acquired Immune Deficiency Syndrome
KFSSG	-Kenya Food Security Steering Group
SMS	-short Message Service
ASDS	- Agriculture Sector Development Strategy

ABSTRACT

Kenya's approach to food security combines longer-term action to enhance productive potential and incomes, with programs and policies that respond to immediate needs of the poor and food insecure. The purpose of this study was to investigate the factors influencing food security in a case of One Acre Fund in Bungoma South District, Bungoma County. The objectives of this study were; to determine how farmers' demographic characteristics influence food security, to investigate how farming methods influence food security, to establish how poverty influences food security and to examine how population Size influences food security in Bungoma South District. The study adopted the descriptive survey research design on how the interventions had boosted food security. The target population was 1700 farmers and 20 One Acre Fund staffs who include One Acre Fund extension workers in the livestock sector, metrological sector, soils department; local government department and a co-member from Kenya Agricultural Research Institute hence a total of 1720 . The sample for this study was 170. The sampling technique used was stratified and simple random sampling where farmers were grouped into sub-locations and randomly selected. The research instrument that was used in this study for data collection was the questionnaire and interview schedule. A pilot study was done in two sub-locations in Bumula sub-county to clarify the research instruments and avoid contamination of results. Validity of research instruments was achieved at piloting stage and also through expert judgments by the study supervisors. In order to ensure reliability of the instrument, the split-half technique was used by applying the Spearman's Brown Prophecy Formula to calculate the reliability coefficient where a coefficient correlation of 0.6 was found and deemed adequate for the study. Frequency tables and percentages were used to analyse the quantitative data. Such information was useful to stakeholders and the government in designing customized and more effective strategies or interventions to the food security besides forming a basis for further research .Findings showed that the low productivity of subsistence agriculture is largely a result of poor access to productive resources and improved inputs. The productivity can be improved by increasing access to household assets such as land, water and human capital, and by encouraging farmers to intensify production through the use of improved inputs. This includes the use of fertilizer, organic inputs and conservation investments. It was also found that Farmers' demographic characteristic affects food security. Agricultural extension could be one tool in attaining the millennium development goal related to the reduction of extreme poverty and hunger in developing countries like Kenya and could improve food security. The researcher recommended that the Government of Kenya to have policy interventions that target access to resources such as land, technology, credit and training; promotion of irrigation and rainwater harnessing technologies; improving access to credit by the poor, including women; improving access to food production and food processing technologies, particularly technologies for women. It is also recommended that the Government of Kenya to formulate and implement policies that enhance the ownership and exchange entitlement of the poor in the trade of agriculture and food sectors; and improve household food security by commercializing agriculture to increase income and employment generation among food-insecure households. It is recommended that the Government should come up with strategies for opportunities to

improve market and trade information, including the use of mobile phones, short message so as farmers can use it to improve productivity in farming.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Food security is defined in different ways by international organizations and researchers without much change in basic concept. According to FAO (2010) food security is defined as ensuring that all people at all times have both physical and economic access to the food they need. World Bank defined it as access by all people at all times to sufficient food for an active and healthy life. Von Braun et al defined food security as access by all people at all times to the food required for a healthy life. In 1996, the World Food Summit defined food security as ‘Food security exists when all people at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life’.

Like as food security, food insecurity definition is forwarded by different researchers and international organizations. According to World Bank (2007), food insecurity can be defined as ‘the lack of capability to produce food and to provide access to all people at all times to enough food for an active and healthy life’. Hamilton defined food insecurity as limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways. In 1996, the World Food Summit explained that food insecurity exists when people lack secure access to sufficient amounts of safe and nutritious food for normal growth and development and an active and healthy life. This definition of food security is the most widely used definition of food security.

The study of Urban Livelihoods and Food and Nutrition Security in Greater Accra, Ghana indicated that household food availability is a function of food prices, household demographics and household tastes and preferences. M.S. Swaminathan Research Foundation and the World Food Programme in study of food insecurity Atlas of urban India, revealed that factors such as unemployment, illiteracy, infant mortality rate, lack of toilet facilities and safe drinking water, discrimination at social level and little political attention for urban areas determine food insecurity in urban India.

Mucavele suggested that the main factors that affect food security in urban Maputo, Mozambique, are poverty, low family income, low availability of general alimentation at the family level, floods, family crisis, high unemployment levels and low levels of schooling and training and the absence of a social security system to alleviate the urban shocks. Von Braun et al denoted that employment and wages, along with prices and incomes, play the central role in determining the food security status of urban households.

The situation in Ethiopia is not much different from the conditions in other developing regions. For example, World Food Programme stated that the common factors that cause household food-insecurity in urban areas of the country are: household size, age of household, sex of household head, marital status of household, education level of household, dependency ratio, access to credit, ownership of saving account, total income per adult equivalent, expenditure level (food and non-food), asset possession, access to social services, owner of home garden, access to subsidized food, sources of food, availability of food commodities, and supply of food commodities.

One Acre Fund is a nonprofit organization started in January 2006 with the goal of completely rethinking how to solve the chronic hunger problem in Africa. The organizations is of the view that food aid is at best a temporary solution, and instead have put together a permanent, proven investment package for farmers and their families, which doubles farm income by providing seeds and fertilizer, weekly farm education, and market facilitation. This investment package is the core of our program (National Food and Nutrition Security Policy, 2011).

Bungoma South Sub County is situated in Bungoma County. The Sub County hosts the headquarters of Bungoma county, Bungoma town which is the second largest town in Western province. However the division also covers some of the remote areas on the outskirts characterized by farming as the predominant economic activity.

1.2 Statement of the Problem

The world is facing a potential crisis in terms of food security. The challenge is to provide the world's growing population with a sustainable, secure supply of safe, nutritious, and affordable high-quality food using less land, with lower inputs, and in the context of global climate change,

other environmental changes and declining resources. Despite some advances, most of the region is not on track to reach the goal of eradicating poverty and hunger, and rapid population size makes tackling hunger even more challenging. Population size will greatly increase the amount of food needed to adequately feed Bungoma County's people. Despite impressive reductions in child mortality and improvements in life expectancy, women's reproductive health lags behind and birth rates remain high. (Ministry of Agriculture, Bungoma County)

A rapid decrease in fertility (the average number of children a woman will bear in her lifetime), however, is far from certain. Fertility declines when women and their partners desire a smaller family and choose to delay or space their births, and when they know about and can access a variety of contraceptive methods. Economic development and women's education foster the use of family planning and smaller families; however, a number of challenges contribute to sustained high levels of fertility across the region. In many parts of the county, high child mortality and traditional cultural views contribute to couples still preferring large families. Gender inequities result in many girls having children early in adolescence and having little power over the number of children they bear. And limited access to family planning results in hundreds of unintended pregnancies. Furthermore, current levels of funding for family planning and reproductive health from donors and Kenyan governments fail to meet current needs, much less the future needs of the growing number of people entering their reproductive years. Failure to increase resources for family planning will further delay reproductive health gains and fertility declines and could result in a far larger population and thus greater-than-anticipated food needs. (Ministry of Health Bungoma County.)

Food security exists when all people at all times have both physical and economic access to sufficient food to meet their dietary needs for a productive and healthy life. Achieving food security requires that: Sufficient quantities of appropriate foods are consistently available, Individuals have adequate incomes or other resources to purchase or barter for food, Food is properly processed and stored, and Individuals have sound knowledge of nutrition and child care that they put to good use, and have access to adequate health and sanitation services. Improving agricultural productivity in Bungoma County will be crucial to meet the increasing food and nutritional demands. However, agriculture also plays a key role in soil fertility, natural resource management and environmental protection so agricultural production systems need to be

intensified sustainably and with greater integration across key sectors – from the farmer to the consumer.

1.3 Purpose of the Study

The purpose of this study was to investigate the factors influencing food security in Bungoma south Sub-county.

1.4 Objectives of the Study

The following were the objectives of the study:

- 1) To determine how farming methods influence food security in Bungoma south sub-county.
- 2) To investigate how farmers' demographic characteristics influence food security in Bungoma south sub-county.
- 3) To examine the influence of farm inputs on food security in Bungoma south sub-county.
- 4) To investigate the influence of population Size on food security in Bungoma south sub-county.

1.5 Research Questions

The following were the research questions:

- 1) How does farmers' farming method influence food security in Bungoma south sub-county?
- 2) How does farmer's demographic characteristic influence food security in Bungoma south sub-county?
- 3) How does availability of inputs influence food security in Bungoma south sub-county?
- 4) How does population Size influence food security in Bungoma south sub-county?

1.6 Significance of the Study

Hopefully, the findings of this study will be useful to various agencies concerned with the well being of the human population. The government will be able to devise strategies that will ensure there is enough and adequate food for its population through increased productivity. Other organizations like FAO, will benefit in terms of being able to understand the factors that influence food security and how to combat food shortage. The farmers and general population will be better informed of the prevailing conditions and issues surrounding food productivity and

to step the war against hunger. Research would also be enriched by the literature from the findings of this study.

1.7 Delimitation of the Study

These were boundaries of the study and were controlled. The study investigated factors influencing food security in Kenya; a case of One Acre Fund in Bungoma South Sub County, Bungoma County in Western Province. The Sub County is located on western part of the county and borders Bumula Sub County on lower side. The Sub county has a population of 229,701 (IEBC 2012) and an area of 944 km². Bungoma town is the headquarters of the County and therefore comparatively developed and cosmopolitan than other areas in the Sub County though they are dotted with upcoming centers and estates. Part of the Sub County is under the municipal Council of Bungoma while the other is served by Bungoma County council.

The study only focussed on factors influencing food security and the interventions provided to farmers by One Acre Fund towards improving the production capacities of majority of farmers who participated in its programme over the years since its inception.

1.8 Limitations of the Study

According to Best and Kahn (1998), limitations are conditions beyond the control of the researcher that may place restrictions on the conclusions of the study and their application to other situations. The respondents may not have been honest in giving the information or may simply have given incorrect information to please the interviewer. However the interviewer was very proactive in analyzing farmers responses before coding them and also doubted survey sheets were not used for analysis. Some farmers may have changed from farming to something else like sub dividing the farms into plots and selling them for residential purposes. This was solved by finding out more farmers to cover the sample size.

1.9 Assumptions of the Study

During the study, the following assumptions were considered; that all respondents gave honest responses. It also assumed that the sample taken represented the population adequately, that the data collection instrument were valid and measured the desired outcomes for the study. Finally,

though hunger was now prevailing due to the dry spell being experienced, the respondents were expecting hand outs in the process of data collection by the researcher.

1.10 Definitions of Key Terms

Food security - is said to exist when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life.

Farmers' demographic characteristics- is the ability of to grasp information to an inexperienced person to help him/her develop physically, mentally, socially, emotionally, spiritually, politically and economically.

Farming methods -different methods of tilling or cultivating land and rearing domesticated animals could either be scientific or traditional.

Poverty -the state of being extremely poor or the state of being inferior in quality or insufficient in amount

Population Size - increase in the number of people who inhabit a territory or state or a sudden sharp increase in the relative numbers of a population

One Acre Fund -is a non-governmental organization that aid farmers to increase their productivity through farming, by getting farm inputs and the farmers pay them on credit.

1.11 Organization of the study

The study was organized in five chapters: Introduction, Literature review and Methodology. It covered page with the title and the details of the researcher. The preliminary pages contained declaration, dedication, and acknowledgement, abstract, table of content, list of figures, list of tables, abbreviations and acronyms and the pagination will be in roman numbers. Chapter one (Introduction) contained; background of the study, statement of the problem, purpose of the study, objectives of the study, research questions, significance of the study, delimitation of the study, limitations of the study, assumptions of the study, definition of significant terms and the organization of the study.

Chapter two (Literature review) contained; Introduction, literacy levels, farming methods, poverty and food security, population and food security, theoretical framework, conceptual framework, extraneous variables and summary. Chapter three (Research methodology) contained; Introduction, research design, target population, sampling procedures and sample size, data collection instruments and their validity and reliability, methods of data collection, data analysis techniques, operational definition of variables, ethical considerations and summary. Chapter Four described details on data analysis and presentation of findings and interpretation. Finally Chapter Five highlights a summary of the Findings, Discussions, Conclusions and Recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This review of the literature assisted the researcher to understand better the topic; Factors influencing food security in Bungoma County. It therefore focused on the following pertinent areas; provision of seeds and fertilizers, weekly farm education and market facilitation. The literature review is to provide for a conceptual framework showing relationships among the variables to guide the study.

2.2 Farming methods and food security

Recent studies carried in the Tanzania indicates that smallholder maize productivity in the country is suffering due to the fact that, most smallholders do not practice high-yield farming methods, and produce mainly for subsistence(Amani,2004; 2005; Skarstein, 2005; Isinika et al, (2003; MAFC, 2006; Nyange and Wobst 2005; and R&AWG, 2005: Kulindwa et al 2009). According to R&AWG (2005) and Msuya (2008), increasing productivity is crucial for improving the livelihoods of smallholder farmers, who makes the majority of the rural poor in Tanzania. Msuya (2008: 291) shows that, low productivity is one of the primary causes of low and unstable value added along the value chains leading to a stagnant rural economy with persistence of poverty.

Means to improve sustainability and productivity of terrestrial livestock systems need to be sought through breeding, nutrition and health. New phenotypes linked to sustainable animal productivity could be developed and integrated into breeding schemes. Precision feeding could increase production efficiency by adapting accurately the needs and the delivery of feed to individual animals. The development of new or alternative feeds, in particular as protein sources, has the potential to minimize reliance on imports and increase European self-sufficiency.

Livestock diseases reduce the efficiency of animal production and they have a major impact in terms of economic costs and animal welfare. Vaccination can be an efficient way to control

diseases and to reduce the use of antimicrobials. Deeper knowledge is required to develop safer, cheaper, novel, multivalent and more efficient vaccines. Farming systems need to be (re)designed in a holistic manner to best reconcile the various demands concerning productivity, sustainability and societal values, for now and the future.

A common perception is that rain fed areas did not benefit much from the Green Revolution, but breeding improvements have enabled modern varieties to spread to many rain fed areas. Over the past 10- 15 years most of the area expansion through the use of modern varieties has occurred in rain fed areas, beginning first with wetter areas and proceeding gradually to more marginal areas. In the 1980s, modern varieties of the major cereals spread to an additional 20 million hectares in India, a figure comparable to adoption rates at the height of the Green Revolution (1966- 75). Three quarters of the more recent adoption took place on rain fed land, and adoption rates for improved varieties of maize and wheat in rain fed environments are approaching those in irrigated areas.

Although adoption rates of modern varieties in rain fed areas are catching up with irrigated areas, the yield gains in rain fed areas remain lower. The high heterogeneity and erratic rainfall of rain fed environments make plant breeding a difficult task. Until recently, potential cereal yield increases appeared limited in the less favorable rain fed areas with poor soils and harsh environmental conditions. However, recent evidence shows dramatic increases in yield potential in even drought- prone and high temperature rain fed environments. For example, the yield potential for wheat in less favorable environments increased by more than 2.5 percent per year between 1979 and 1995, far higher than the rates of increase for irrigated areas.

A change in breeding strategy to directly target rain fed areas, rather than relying on “spill-in” from breeding for irrigated areas was a key to this faster growth. Both conventional and non - conventional breeding techniques are used to increase rain fed cereal yields. Three major breeding strategies include research to increase harvest index, to increase plant biomass, and to increase stress tolerance (particularly drought resistance). The first two methods increase yields by altering the plant architecture, while the third focuses on increasing the ability of plants to survive stressful environments.

The first of these may have only limited potential for generating further yield growth due to physical limitations, but there is considerable potential from the latter two. For example the “New Rice for Africa”, a hybrid between Asian and African species, was bred to fit the rain fed upland rice environment in West Africa. It produces over 50 percent more grain than current varieties when cultivated in traditional rain fed systems without fertilizer. In addition to higher yields, these varieties mature 30 to 50 days earlier than current varieties and are far more disease and drought tolerant than previous varieties.

In South Africa, an estimated four million people engage in smallholder agriculture for various reasons, and the majority of these people are in the former homeland areas. The most common reason given for engaging in agriculture is procuring ‘an extra source of food’, which has seen an expansion over time at the expense of the reason given for engaging in agriculture as a ‘main source of food’ or purely for subsistence. In addition, the number of people engaged in agriculture as a main or extra source of income is small but consistent over time. However, there are no credible, long-term national data that establish the contribution of the subsistence/smallholder agricultural sector to food security. Household survey data indicate that black households with access to agricultural land projected that agriculture contributes 15% of the total household income, but for the poorest quintile the contribution stands at 35% (Aliber, 2005). While the contribution of agriculture to household income is small, evidence from case studies indicates that agriculture in the former homelands is undergoing a decline. The commonly cited reason for this decline is the removal of support that farmers in former homelands used to receive from pre-1994 governments. An example is Thaba Nchu in the Free State where, with the removal of government subsidies, farmers stopped cultivating communal lands because they could not afford the necessary inputs, and some of the institutions which used to ‘drive’ agriculture during the homeland era collapsed (Kundhlande et al., 2004).

Other reasons include the extension of freedom of movement, which has seen an increase in migration from the rural areas to the urban centres. The effects of increased access to social protection transfers on smallholder agriculture are still a matter of debate. Even though subsistence agriculture is declining in rural areas, efforts have been made to improve its

contribution, especially to household food security. From the Labour Force Surveys conducted between 2000 and 2004 (Aliber, 2005) it can be seen that the proportion of households that practiced agriculture as a main source of food declined from 33% to 6%, whereas those who used it as an extra source of food increased from 54% to 88%. This may imply that rural 'people are practicing agriculture less intensively as they find other, more remunerative, economic activities' (Aliber, 2005:91). According to the most recent NIDS project, 4.6% of the adult population participated in agricultural production, with Kwa-Zulu Natal accounting for about 60% of the total number of subsistence producers (May & Carter, 2009). The majority of the subsistence producers were found to be in the rural areas and about 300 000 from urban areas (formal and informal). Furthermore, females account for 58% of the subsistence farmers.

2.3 Farmers demographic characteristics and food security

Education is an additional factor which is thought to influence the food security status of households. Educational attainment by the household head could lead to awareness of the possible advantages of modernizing agriculture by means of technological inputs, enable them to read instructions on fertilizer packs and diversification of household incomes which, in turn, would enhance households' food supply (Najafi, 2003). Educational attainment of a household head is considered by this study to be a qualitative variable. Households led by educated heads take a value of 1 while those who are led by uneducated heads take a value of 0.

Agricultural statistics are crucial for food security assessment, monitoring and analysis, but analysts are faced with a number of serious constraints. Production data are generated through estimates based on unstructured observations and the local knowledge of extension workers rather than through formal statistical processes and survey techniques through sampling. Low extension worker to farmer ratios, limited capacity to analyze data and low frequency of agricultural censuses and surveys, raise general concerns over data reliability. Additionally, agricultural statistics are aggregated such that sub-national analysis by agro-ecological or livelihood zones is difficult, limiting their utility for detailed cross-sectoral food security analysis (Najafi, 2003).

Education is widely recognized as one of the key dimensions of development. Two Millennium Development Goals: 2 and 3, directly focus on education. In the same way, the Education for All initiative, and especially the first World Conference held in Jomtien in 1990 and the successive conference held in Dakar in 2000 concentrate on education, and more specifically, on primary education. Also the World Food Summit in 1996 acknowledged the critical role of education in achieving food security.

This study attributes a further value to education: education for rural people is a key factor in fighting food insecurity in developing countries. Recognizing the inter-linkages between rural people deprivations such as lack of education on the one hand, and food insecurity and malnutrition on the other hand, is fundamental in order to have a more comprehensive view of the MDGs. This way, it is possible to have a framework in which both ends and instruments for development are well identified (Najafi, 2003).

Market information systems are operated by various institutions, however there are limitations in coordination, harmonization of methodologies, analysis and dissemination as well as in scope and geographical coverage, focusing on major markets and commodities. Price data also suffer from poor response rates and delays in processing and projecting. A number of opportunities exist to improve market and trade information, including the use of mobile phones, short message service (SMS) and others (Najafi, 2003).

According to Najafi (2003), the organization then provides farmers with training on how to use these technologies. Local field officers provide extensive training to farmers in the fields where they live and work. The training includes simple techniques such as fertilizer micro-dosing, which teaches farmers to apply a bottle cap of fertilizer for each seed to ensure the appropriate amount is used. This study will provide a link between weekly farm education and food security.

Africa should focus on education, research and development, access to capital and infrastructure development. Measures to facilitate free primary education throughout Africa are urgently required. Education not only endows one with the power to read and hence be informed, but it also allows one to communicate. As an intervention to food security, education must go beyond the level of reading and writing to that of transfer of knowledge. To be useful, information transfer should be two - way. The poor have an idea of what would work for them and what they

need. Since they are supposed to be the primary beneficiaries of food security related policies, it would be prudent to at least listen to them. In addition, education will open avenues to off - farm employment, thus acting as a safety net. It is time that Africans played an active role in research and development on matters that affect them. This includes food preservation at the village level, alternative medicine to make health more affordable to its people, creating more efficient agricultural extension, options for improving soil fertility, best approach to manage the different agricultural systems, and marketing strategies that would work best for a given group of farmers. Care should be taken to modify available technology to suit community setting and not the other way round. For benefits to be realized in all areas, infrastructure development must be high priority (Najafi, 2003).

2.4 Farm inputs and food security.

The root cause of food insecurity in developing countries is the inability of people to gain access to food due to poverty. While the rest of the world has made significant progress towards increased and sustainable productivity, Africa, in particular Sub- Saharan Africa, continues to lag behind. Projections show that there will be an increase in this tendency unless preventive measures are taken. Many factors have contributed to this tendency including the high prevalence of HIV/AIDS; civil war, strife and poor governance; frequent drought and famine; and agricultural dependency on the climate and environment. Food security on the continent has worsened since 1970 and the proportion of the malnourished population has remained within the 33 to 35 percent range in Sub - Saharan Africa. The prevalence of malnutrition within the continent varies by region. It is lowest in Northern Africa (4 percent) and highest in Central Africa (40 percent) (Kassa et al., 2002)

The brief statement on farm inputs highlights the key pertinent issues including incidence of lack of finances mainly in the rural areas; location of the poor in particular geographical zones including ASAL, western Kenya and central highlands; farm inputs in-availability with large households, female headed households, how educational status and households reliance on agriculture and informal sector. It is important to point out in relation to female-headed households being poor that a sizeable proportion are in subsistence agriculture in which most rural poor are found and is the only way of life known to them. In addition, the fact that most of the women may not generally be involved in production decision-making has a consequence of

low returns to farming which in turn aggravates poverty (Shaohua Chen and Martin Ravallion (2000).

It is decried that Millennium Development Goals (MDGs) as pointers to food security reduction efforts face grim prospect that they will not as a whole be realized in the foreseeable future. This is a damning worry especially in the African context including Kenya. The key problem areas in effecting pro-poor change leading to meeting these goals are well recognized by the Kenya government in her policies on issues of broad-based economic growth, access to markets, services and assets, political and social empowerment, etc as the project explicitly states.

The contribution of family farms and in particular smallholder farms to food and nutrition security (FNS) has been gaining global attention, both in Europe and in the context of less developed countries. While small farms, as well as other small and micro-sized food businesses, have an important role to play in supporting the local economy and food security in rural areas, this is often placed in contrast with the perceived benefits of large farm structures. This comparison, arguing for the benefits of economies of scale tends to downplay the efficiency of smallholdings, averts considerations for complementarities between agro-food systems, neglects the environmental and social aspects of sustainability such as the ability of small farms to maintain more diverse mixed production systems and the role of labour-inclusive family farms in maintaining an adequate rural/urban balance and enabling territorial development—a challenge for countries facing a strong rural population Size(World Bank, 2001b).

It is therefore important to gain a better understanding of the contribution of small farms and food businesses to FNS and their resilience to shocks in an increasingly globalised and uncertain world. In particular, it must be understood whether small and family farms may contribute to a 'right balance' between technical, economic, environmental and social sustainability, taking into account the linkages with the up-and downstream sectors and in particular small and medium sized enterprises differentiating between the urban and rural dimensions of FNS, and identifying the requirements with regard to infrastructure (incl. labour, transport, energy, communication, food-safety, etc.), supply chain (local/regional markets), technical pathways (focus on production and transformation at farm level) and governance (local/global). (World Bank, 2001a)

Achieving the global targets in food security, taking into account the MDG, the Monterrey declaration and the Jo'burg summit, is the subject of Panel I. The focus will be on moving beyond declarations, focusing on the realities, the constraints, regions, priorities and actions of development agencies. There is quite an academic debate whether poverty has reduced or increased over the last two decades (Deaton, June 2002). Two recent World Bank projects came to different conclusions on the evolution of poverty, on the basis of the same data set, but different analytical methods (World Bank, 2001a) (World Bank, 2001b). And both projects are truthful - poverty has slightly progressed from 1987 to 1998, and has considerably regressed from 1980 to 1998. It all depends on how poverty is measured in China and India. More than one-fourth of the poor in the world live in India.

According to Shaohua Chen and Martin Ravallion (2000), more than 200 million people in China have been lifted out of poverty during the last two decades. Part of the problem is one of measurement on the basis of household surveys, or on the basis of the national accounts of a country. Also, the World Bank is the only global institution publishing original estimates of the number of poor in the world.

A household's wealth status forms the other important source of livelihood for farming households. Livestock contribute to households' economy in different ways, e.g. as a source of pulling power, source of cash income, source of supplementary food, and means of transport. Besides, livestock are considered a means of security and means of coping during crop failure and other calamities (Kang'ara et al 2001). Livestock provides not only food for the producers, but also a range of other products which could be sold or consumed by the livestock owner to provide nutrition, income, traction and fuel. The major products of livestock include draught power, meat, milk, eggs, manure which is used as fertilizer or fuel, feathers, fibre, hides, and horns. In addition to these products livestock serve as an asset and may provide a reserve that can be converted to cash in times of need.

A study by Kassa et al (2002) found that households who own livestock have good food security status as well as sustainable farming. Particularly in Ethiopia, where crop failure is frequent due to poor rainfall, the level of a household's resources a critical factor in combating such disasters. In view of this, an inventory of livestock for the sample households

was conducted. Households' livestock ownership was measured by the number of tropical livestock unit (TLU) owned. Conversion factors were used in order to change each livestock of a household to its equivalent tropical livestock unit.

It is now recognized that for some farming systems in marginal, resource poor areas, the best strategy may still be to move to other, better endowed areas or cities. This is now, for the first time I believe, explicitly recognized in FAO's pioneering study on the link between farming systems and rural poverty (see John Dixon, 2002, <http://www.fao.org/ag/magazine/GFSS.pdf>).

Food security is not an intrinsic attribute of people, but a product of livelihood systems and the socio-political forces that shape them. There are intimate links between food security and agricultural development. But its name notwithstanding, IFAD is not dedicated to the development of agriculture. IFAD is dedicated to improving the incomes, food security and livelihood security of rural poor people. But most rural people find their livelihood in agriculture, directly or indirectly. The agricultural sector contributes 30 to 80% to GDP (macro-economic development), employs 50% or more of the active population, and represents 50% or more of exports (World Bank, 2001a; World Bank, 2001b).

Agriculture is also the principal source of savings, taxes (mainly at export) and public finance. Most sub-Saharan countries, with a few exceptions (Nigeria, Botswana, South Africa), at the present stage of their development, are really agricultural states. But agriculture is typically poorly performing, under-capitalized and not really competitive at the international level. Agricultural growth is only 2% per year for 25 African countries, and 4% in 17 other (World Bank, 2001a; World Bank, 2001b).

Recent research indicates that subsistence food production is increasing in importance in some countries, mainly as a fallback against a backdrop of inflation and proliferating cash needs (Bryceson, 2002). Rural family farmers in sub-Saharan Africa continue to value pursuing farming activities for home consumption. This is even more important in South Africa against the backdrop of food price differentials between urban and rural households. South African studies have shown that the number of households engaging in subsistence agriculture as a main source of food and income is declining, while there is a rise in the number of households engaging in subsistence production as an extra source of food (Aliber, 2005; 2009). However,

there is evidence of agricultural resources (especially communal land in former homeland areas) being under-utilized (Aliber, 2005; 2009).

In the context of rising food prices, Smale et al. (2009) propose improving agricultural production through the use of targeted subsidies in favorable environments (e.g. with good soils and moisture) and market infrastructure. The above can be achieved through the delivery of improved varieties of seed, fertilizers and other inputs coupled with targeted subsidies in order to realize higher yields. This will result in the expansion of domestic staple food production in order to improve food security and reduce dependence on food imports. According to Bryceson (2002), low domestic food production has a negative impact on the country's general standard of living, so there is reason to move towards improved agricultural production. However, the productivity of staple food production is low, due mainly to the decline in the use of improved input packages by farming households. This is partly due to the reduction in support for farmers to continue taking up the improved input packages as a result of structural adjustment program. The use of improved input packages could be increased by reinstating some 'smart or targeted' input subsidies (Bryceson, 2002; Smale et al., 2009). These inputs should be made available at affordable prices and tailored to the local climate and soil conditions. It should be noted that smallholder farmers in most parts of sub-Saharan Africa rely heavily on informal channels to access inputs (Smale et al., 2009). Some of these channels for seed access include on-farm seed saving, farmer-to-farmer exchange and unregulated sales. In the case of Southern Africa, smallholder farmers access only 10% of their seeds from the formal markets. Therefore, informal or village markets are important channels that may need to be improved or developed in order to improve smallholder farmer access to inputs.

In most urban areas of SSA, the most common group is farming for household food security. This group comprises mostly women who have access to some land on which they can produce food. However, the amount of food produced does not constitute the majority of what the household consumes. These households source most of their foodstuffs from the market. The women who farm for this purpose insist that they will continue to do so rather than seeking wage employment. There are three reasons given for this. Firstly, for them food is a form of income that is less easily expropriated by other members of the household than is cash (Maxwell, 1994). Secondly, the women may access cash from informal businesses that rely on agricultural

produce, especially the preparation of food for sale. Finally, farming is a task that falls well within women's multiple roles and responsibilities in the household. The food produced by this group is used mainly to supplement that purchased during those times of the year when seasonal crops are harvested. Another use is the storage of this food in case of emergencies which prevent the household from accessing other sources, such as a decrease in household income. The need for reserve usage of food stems from erratic and unreliable household income, and more importantly, is necessary for times when the main income-earner is unable to provide money for food purchases. Therefore producing some food for the household increases its food security, as well as releasing cash for other household uses. It reduces reliance on cash to feed the household.

As pointed out above, the productivity of subsistence production will be greatly increased by the use of improved inputs and technologies (seeds, fertilizers, etc.). However, improved access to water and appropriate farmer support (through extension) would also have positive and significant impacts on improved yields for subsistence farmers. Low external input technology (LEIT) is seen as accessible to resource-poor households and thus can be the basis for human and capital formation (Tripp, 2006). But the patterns of use are similar to those purchased inputs, as better-resourced farmers with better access to the markets are more likely to take advantage of technologies. This means that for resource-poor households to take advantage of the technologies, complementary investments, especially in extension, need to be made. Another important innovation to improve access to LEIT would be the development of broad-based farmer organizations in order to stimulate a demand-driven approach to technology generation and information provision. Such farmer organizations would be important in view of the huge shortcomings of agricultural extension services in most parts of sub-Saharan Africa.

2.5 Population Size and food security

According to the FAO, 815 million people worldwide were undernourished in 1997-1999, of whom 777 million were living in developing countries. One third of the population of sub-Saharan Africa is undernourished. Seventy per cent of the world's poor live in rural areas and depend mainly upon agriculture for their livelihood. Despite increasing urbanization, over half will remain there in 2035 (Smil, 2000)

According to Smil (2000), increasing numbers of people often drive up demand for food, which typically results in additional use of arable land and water. This is especially true in the absence of adequate food production technology and integrated programs that simultaneously address community needs for food and reproductive health. The Food and Agriculture Organization (FAO) projects that by 2050, population and economic growth will result in a doubling of demand for food globally.

Addressing the health needs of families in the developing world, including through increased access to family planning, can help slow rapid population growth, improve the health of families and enhance their food security. Overall demand for food is affected by population growth, while economic development and rising incomes tend to shift diets toward meat and animal products that are more expensive and resource-intensive to produce (Smil, 2000).

Meanwhile, food prices are driven by the prices of key agricultural commodities such as meat and grain, stocks of agricultural stores, energy prices, crop failures, demand for biofuels and agricultural trade policies. Although prices for major agricultural commodities—including vegetable oils, grain, dairy products and rice—declined somewhat following peaks in 2008, they have risen quickly, compounding the challenges of chronic food insecurity. The food supply is also affected by high prices for energy, such as petroleum, which raise prices throughout the supply chain and, in turn, increase consumers' costs. Most of the countries with the highest numbers of people facing food insecurity also have high fertility rates and rapid population growth. This increases the challenge of adequately meeting nutritional needs. Sub-Saharan (UNEP, 2009).

Africa has the highest population growth rate in the world. By 2050, even if fertility rates decline, the population of the region is projected to more than double. This area also holds the largest proportion of food-insecure people, with one in four people undernourished. Sub-Saharan Africa also has the lowest agricultural productivity in the world and the highest percentage of people living in poverty. Massive population growth, rising incomes and growing consumption of meat are driving the demand for food. Food production has increased substantially over the past century sustained by increasing yields due to irrigation, fertilizer use and expansion into new lands. But there has been little consideration of food energy efficiency or the ability to

minimize the loss of energy from food during the harvesting, processing, consuming and recycling stages (UNEP, 2009).

Over the past ten years, however, the production of cereals has stabilized and the establishment of fisheries declined, due to lack of investment. This is despite the need for an estimated 50 percent increase in current food production levels by 2013 to keep up with demand (Millennium Project, 2008a). The effects of population growth, climate change, land degradation, crop and cropland losses to non-food production, water scarcity, desertification, resource-depleting subsistence strategies and urban expansion means food production could be as much as 25 percent less than demand by 2050 (UNEP, 2009). Subsequently, world food prices, which recently reached crisis level, are expected to increase by a further 30 to 50 percent.

The 6.3 billion people in the world today have, on average, more food per person than has ever been available on the globe, and yet the progress made towards achieving the MDG objective on hunger is painfully sluggish. Of the 800 million hungry and malnourished people in the developing world in the year 2000, 232 million were in India, 200 million in Sub-Saharan Africa, 112 million in China, 152 million elsewhere in Asia and the Pacific, 56 million in Latin America, and 40 million in the Near East and North Africa (FAO, 2004a). Of this total, about 214 million—26 per cent of the hungry—had caloric intakes so low that they were unable to work or care for themselves.

Experts are divided on whether future increases in agriculture outputs will be sufficient to meet the growing demand resulting from population growth. However, most analysts—including Alexandratos (1995), Bongaarts (1994, 1996), Dyson (1996, 2003), FAO (1996, 2003a, 2003b) and Smil (2000)—while acknowledging that the world food situation has many problems, are cautiously optimistic and predict progress in reducing undernourishment in many regions. FAO estimates that the global total of food-insecure people will decline in the future, although by 2015 it will still amount to some 675 million (FAO, 2003a). The outlook seems to be best in countries with fast rates of economic growth, adequate investment in agriculture, motivated political leadership, and an institutional setup that creates a development-friendly environment for men and women alike. Prospects are much worse for countries which lack sufficiently developed infrastructure and adequate systems of governance and which suffer from recurring

natural and/or man-made disasters, low social expenditure, and high rates of HIV/AIDS and other diseases. Such countries must take much more concerted political action to overcome these constraints.

Demographically speaking, it is the combination of fast population size, HIV/AIDS-associated morbidity and mortality, marked gender inequality, and high levels of urbanization, forced migration and refugee movements which poses the greatest demographic threat to achieving the MDG targets on poverty and hunger (Alexandratos, 1995). These features typify many countries in sub-Saharan Africa and—together with widespread poverty, low agricultural yields, limited application of modern production technologies, socio-political instability, and scarce water and land resources—they contribute to making it the region with the grimmest food situation prognosis. But demographic growth is likely to complicate efforts to improve food security also in South-Central Asia where recent trends in food demand and food production, coupled with the likelihood of considerable future population increases, do not augur well for a major reduction in the proportion of hungry people (UNEP, 2009).

In other parts of the developing world, population size per se appears to be less of a problem, but other population factors—such as rapid urbanization, demographic ageing and low social status of women—could significantly affect agricultural developments, and thereby also progress towards achieving the MDG objectives. The challenge for governments, as well as for international bodies such as the United Nations, is to develop a sound understanding of the relationships among population dynamics, natural resources, agriculture and food security, and then design and implement policies which take these relationships fully into account. (UNEP, 2009).

The role of agriculture in reducing poverty is therefore crucial. Its rapid growth can lower and stabilize the cost of food to poor consumers living in rural and urban environments. Where, as in the Green Revolution, small-scale agriculture has been a major beneficiary, it has been associated with an unprecedented reduction of poverty. Rapid agricultural growth, achieved on smallholdings using labor intensive methods, remains the best hope for poor people to enhance their prospects to achieve sufficient availability of food, and sufficient access to work or land to afford it. But this will happen only if farming is more lucrative. In view of the fact that expansion

of the current agricultural area is uneconomic in most parts of the world, this can be achieved only by the enhancement of yields. (UNEP, 2009).

Land reforms and fairer agricultural policies in the developed world can help in several ways. First, more equitable distribution of land and access to it could enable more people to benefit from agriculture. Secondly, trade barriers to agricultural imports from poor countries could be lowered, which would increase markets for developing countries. Thirdly, reducing subsidies to farmers in developed countries would reduce the glutting of world markets for agricultural products, which depresses prices and consequently the attractiveness of agricultural production in developing countries. However, history suggests that these situations will improve only slowly. Moreover, even changes in global trading rules will do little to help the many very poor farmers in developing countries, especially those in Africa, who are in substantial food deficit. Many of those with significant land operate with such poor quality seeds, and such recalcitrant soil-water environments, that their land and labour productivity are too low for them to feed themselves adequately (UNEP, 2009).

While conventional plant breeding has achieved some improvements for parts of Africa, especially for maize, similar advances are lacking with respect to the most important crops of the very poor, such as millet, sorghum, yams and coco yams. We conclude that resuming and spreading rapid sustainable growth of farm yields, especially for food crops in developing countries, still remains crucial to achieving better income and food security for the world's poor (UNEP, 2009).

2.6 Theoretical Framework

This study was based on Amartya Sen's entitlement theory of famine (Sen, 1981) which forms the conceptual basis of all agencies' approaches to assessing food security. Sen explained that famines occur not because there is not enough food, but because people do not have access to enough food. Of course, the availability of food near to the household is a prerequisite of food security. Availability is influenced by factors such as a community's proximity to centers of production and supply, or by market forces, restrictions on trade and international policies that affect food supplies. All of these are key to food-security analysis.

Sen's work was nonetheless a radical breakthrough; before him, the availability of food was thought to be the overriding determinant of famine. According to (Sen, 1981), people's 'exchange entitlements' (or their livelihood sources) reflect their ability to acquire food. Sen subdivided these entitlements as follows:

- i) Production-based entitlements (crops and livestock);
 - ii) Own-labour entitlements (waged labour and professions);
 - iii) Trade-based entitlements (trading artisan products and natural resources like forestry products); and
 - iv) Inheritance and transfer entitlements (from the state, or private gifts and loans).
- Famine occurs when a large number of people suffer a complete collapse in their exchange entitlements. This relates well with the interventions provided to farmers by the organization.

2.7 Conceptual Framework

The conceptual framework below aimed at showing how the various factors are linked to the improved food security. The study explored the influence of independent variables stated (farming methods, farmers' literacy levels, Farm inputs and population growth) on the dependent variable (food security).

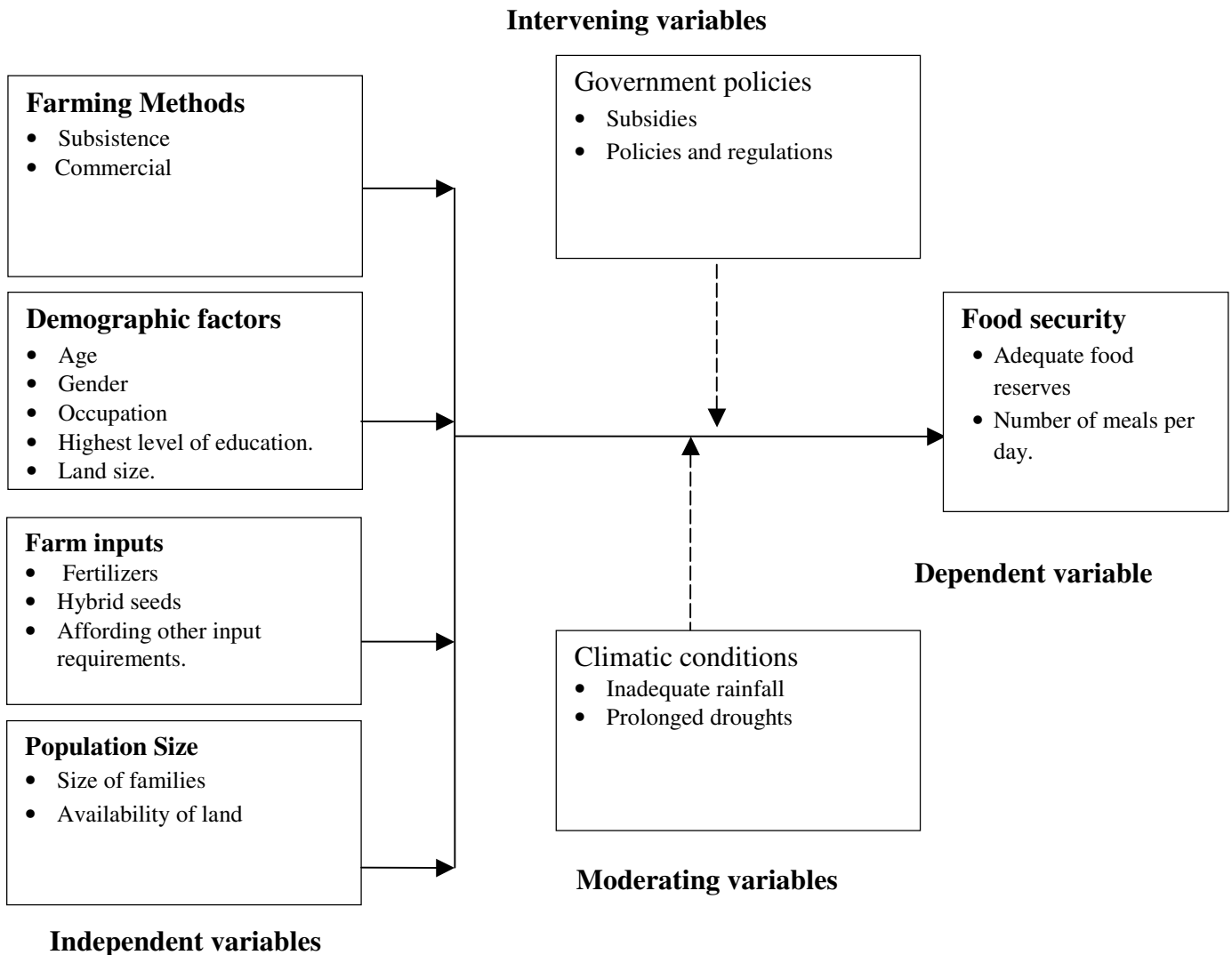


Figure 1: Conceptual framework, Source: Researcher.

2.7.1 Discussion of Conceptual framework.

The figure 1 shows that the problem of food security is a function of various independent factors including population size, farm inputs, farming methods and demographic factors. It also shows various indicators that can provide platform on which food security can be assessed on.

2.9 Knowledge gaps.

Many researchers globally have done studies on the subject food security in Kenya with solutions based on findings implemented. Fertilizers and hybrid seeds have been given prominence with the expectation that farmers would get enough food. This has not been the case in many parts of the county. It is possible that there are significant factors that influence food security which have not been brought to light. According to Dorward et al., (2008) and FANRPAN (2008) who argued that Agricultural Input Subsidy Programme (AISP), with significant development aid support is only one of the factors able to significantly improve smallholder agricultural productivity, improve food and cash crop production, and reduce vulnerability to food insecurity and hunger. There are indeed other factors that need to be explored hence the research. It is on this basis that this study sought to investigate factors influencing food security in Kenya focusing attention on Bungoma south sub County.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter covers the following areas which were employed in the study: research design, target population, sample size and sampling procedure, data collection methods, data collection procedures, validity and reliability of research instruments, ethical considerations, data presentations and analysis techniques and operational definitions of variables.

3.2 Research Design

This study was carried out in Bungoma South Sub County, Bungoma County. It employed a descriptive survey research design and it incorporated elements of both qualitative and quantitative approaches in terms of instruments and data analysis. Descriptive survey design involves collection of data from a sample of a population in order to determine the current status of that population with respect to one or more variables (Mugenda and Mugenda 2003). The use of descriptive survey design in this study enabled the researcher to find out facts without manipulation of data, sought opinions, described, analyzed and interpreted on Factors influencing food security in Bungoma South Sub county ,Bungoma County.

3.3 Target Population

This study was carried out on farmers who are currently receiving the interventions under the One Acre Fund program. According to the records from the monitoring and evaluation department, Bungoma South Sub County currently has a total number of 1679 farmers and 20 staff members actively involved under the program. Important information could also be captured from 1 official from the Ministry of Agriculture. Therefore the study considered the target population, to be, 1,700 respondents. This is because the objective of the study was to explore Factors influencing food security among the farmers under One Acre Fund program in Bungoma South Sub County Bungoma County'. Farmers and staff were chosen to participate in the study.

3.4 Sampling Size and Sampling Technique

This section described the sample size and sampling procedure to be employed for the study.

3.4.1 Sample Size

According to Mugenda (2003), for a descriptive study, 10% of the accessible population is enough for sampling. Simple random sampling technique was then be used to select a sample of 170 (10% of 1,700) farmers, staff of One Acre Fund and Officials from the ministry of Agriculture.

3.4.2 Sampling Technique

A simple random technique helped to purposely select 10 staff out of the 20 while an agricultural official was purposively selected to participate. For the purpose of this study, stratified sampling technique was to ensure equal representation of farmers from all the sub-locations in the district.

These farmers were grouped into sub-locations through stratification technique then respondents selected by systematic sampling technique. Ten staffs were selected targeting those who are involved in fieldwork in the areas using simple random technique by balloting to ensure there was no biasness.

3.5 Research instruments

Two instruments were used; questionnaires and interview schedules.

3.5.1 Questionnaires

This instrument was chosen since it is a convenient tool as it facilitates quick and easy derivation of information; likewise the sample size of 170 farmers was quite large and given the time constraints questionnaires was the ideal tool for collecting data (Onen & Oso 2009). Data collected was presented and discussed based on the responses in the questionnaires.

Open and closed ended questions were used as they allowed appropriate flexibility of the respondent as well as restrict them to relevant issues. Questionnaires were used to collect data from the farmers. Themes that were covered in the questionnaire included the demographic

information like respondents' characteristics such as gender, educational level, occupation, village and sub-location and aid in seeking opinions and feelings of the farmers and staffs about the variables and their influence on factors influencing food security. It also captured the recommendations to aid the stakeholders on Factors influencing food security in Bungoma County.

3.6 Data Collection Procedure

The researcher obtained a letter of introduction from the Coordinator Extramural Centre University of Nairobi, Kakamega which was presented alongside letter of transmittal to the village elders or authorities. The researcher and the trained assistants administered the questionnaires to the sample population by face to face and retaining them after filling. A cover letter accompanied each questionnaire explaining the purpose of the study and assurance of confidentiality.

3.7 Validity of research instruments

Validity refers to the extent to which research results can be accurately interpreted and generalized to other populations. It is the extent to which research instruments measure what they intend to measure (Oso & Onen, 2008). Validity of the instruments was done by experienced researchers to ascertain their suitability. To further establish the instrument validity, a pilot study was conducted in one of the districts not in the sample. The purpose of the pilot study was to assess the clarity of the instrument items in capturing information regarding Factors influencing food security in, Bungoma South Sub county Bungoma County.

3.8 Reliability of research instruments

Reliability refers to the degree to which scores obtained with an instrument are consistent measures (Kothari, 2008). This study used the pre-testing technique to ascertain the reliability of the data collection instruments. The researcher administered questionnaires to the farmers in the neighboring Bumula Sub County with similar characteristics as the sampled in the (Mugenda 2003). One week after, another set of questionnaires containing the same items as the previous set of questionnaires was administered to the same farmers. Responses in the second set of questionnaires were coded using the same criteria applied to the earlier set. Analysis of correlation was carried out on the two sets of responses. A Pearson's moment coefficient of

reliability (r) was computed by the help of SPSS. A value of 0.7 was obtained and was high enough to be accepted as a reliable measure of consistency of the questionnaires.

3.8 Data presentation and analysis techniques

Quantitative data collected from close-ended questions was analyzed based on the objectives and research questions of the study. The descriptive statistics applied involved frequencies and percentages. After receiving the data, it was classified according to their sources; farmers, OAF staff as well as the agricultural officials. The data generated was analyzed and presented using frequency tables and percentages with the help of SPSS computer software. Results were presented in tabular format with an explanation after every table.

3.9 Operational Definitions of Variables

Table 3.1 Operational Definitions of Variables

Objectives	Variable	Indicators	Scale	Data collection method	Tool of analysis
To investigate how farming methods affect food security in Bungoma South district	Dependent variable: Food security	-types farming methods -yields per type	Interval	Questionnaires and interviews	Frequency and percentage tables
To determine how farmers' demographic characteristics affect food security in Bungoma South district	Independent variable: Food security	-level of education -ability to translate and understand information	Ordinal	Questionnaires and interviews	Frequency and percentage tables
To establish how poverty affects food security in Bungoma South district.	Independent variable: Weekly farm education	-household income - affordability of needs	Ordinal	Questionnaires and interviews	Frequency and percentage tables
To examine how population Size affects food security in Bungoma South District.	Independent variable: Market facilitation	-sizes of families -food adequacy	Ordinal	Questionnaires and interviews	Frequency and percentage tables

3.10 Ethical Consideration

Respondents were made to understand the aim of the study and the importance of the information they provided. They were also informed that they would be free to withdraw whenever they deemed fit and were assured of confidentiality and that information got from them would be used for intended purpose only, this was guaranteed by ensuring anonymity where respondents were not required to disclose their names and schools.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSIONS.

4.1 Introduction

This chapter includes the presentation, analysis and interpretation of the findings. Data was categorized and interpreted on the basis of each research objective because this was a qualitative research. Descriptive statistics was applied namely frequency distributions and related percentages. All analyses findings were discussed.

4.2 The Response Rate

The researcher distributed 170 questionnaires as per the sample size. 120 questionnaires were retrieved representing a 70.59 percent response rate. This response rate was considered satisfactory as it greatly contributed towards the overall success of the field study.

4.3 Socio-economic Characteristics of the Sampled Farmers

The socio-economic characteristics presented under this section include: gender, age, highest level of education, Occupation of the respondent, other characteristics include: the overall size of their farms in acres, the main activities done on their farms and the length they had been doing the activity/activities on their farms.

4.3.1 Gender

The study sought to find out the gender distribution of farmers in Bungoma sub county, Bungoma County. The respondents were asked to indicate their gender and the results were recorded in Table 4.1.

Table 4.1: Gender distribution of respondents

Gender	F	Percentage %
Male	87	72.5
Female	33	27.5
Total	120	100

Source: Field survey 2015

Results from the table 4.1 shows that 72.5 percent of the respondents were male while 27.5 percent were female. This shows that majority of those that were involved in the study were male. Though there was a lack of parity in gender, the reality did not impact unfavorably on the final outcome of the field study because gender issues were not involved.

4.3.2 Age Distribution

The study sought to find out the age distribution of farmers in Bungoma south sub county, Bungoma County. The respondents were asked to indicate their age and the results were recorded in Table 4.2.

Table 4.2: Age Distribution

Age (Yrs)	Frequency	Percentage (%)
Under 25	12	10.00
26-35	56	46.67
36-50	29	24.17
50 and above	23	19.17
Total	120	100

Source: Field survey 2015

The results in table 4.2 showed that majority of the respondents representing 46.67 percent were aged 26-35 years, they were followed by 24.17 percent who were aged between 36 and 50 years and 19.17 percent were aged 50 and above. Lastly, there were 12 respondents aged less than 25 years. This shows that most of the respondents were mature adult people, who are the farmers.

4.3.3 Education Level

The study sought to find out the highest educational levels of the respondents in Bungoma South Sub County. This was to determine the level of understanding of food security in the sub-county. To help understand this, respondents were asked to state their highest educational level. The results are recorded in Table 4.3.

Table 4.3: Education Level of the respondents.

Level	F	%
University	00	00.00
Tertiary	15	12.50
Secondary	46	38.33
Primary	55	45.83
None	04	03.33
Total	120	100

Source: Field survey 2015

From the table 4.3, majority of the respondents (45.83%) possessed primary level of education as the highest level of education, followed by those possessed secondary level of education as the highest level of education (38.33%) and (12.5%) possessed tertiary level of education as the highest level of education and 03.33% had no formal education. Therefore, most of the farmers had low academic qualifications, which means they had basic education.

The researcher sought to find out the occupation of the respondents. In addition to farming, (20%) said they were Unemployed,(21.67%) were employed,(31.67%) were Operating other types of business while(26.67%) practice farming as the only occupation.

When asked to give their overall size of their farms in acres, (11.67%) had Less than 1, (28.33%), had between 1 and 3, (38.33%) had between 3 and 5 and (21.67%) had between 5 and above.

The main activities done on their farms included Crop farming (10%) ,Poultry keeping(13.33%) ,Dairy farming Mixture of crop and poultry farming, Mixture of crop and dairy farming Mixture of poultry(16.67%) and dairy farming(16.67%) and Mixture of crop, poultry and dairy(43.33%).

When asked the length of time they had been doing the above activity/activities on their farms, (10%) had worked for Less than 1year,(28.33%) had worked for between1 and 3 years,(51.67%) between 3 and 5 years and (10%) for above 5 years.

4.4 Analysis as per the objectives

The study only focussed on factors influencing food security and the interventions provided to farmers by One Acre Fund towards improving the production capacities of majority of farmers who participated in its programme over the years since its inception. Data was analyzed in terms of objectives.

4.4.1 Farming methods and food security

The study sought to establish the farming methods used in the area of study that could influence food security. Respondents were asked why they practice farming. 62.5% of the respondents said they do farming for both subsistence and commercial. 30% of the respondents do it for subsistence while 7.5% do farming for commercial purpose. Majority of farmers practice farming both for subsistence and commercial. Even though subsistence agriculture is declining in rural areas, efforts have been made to improve its contribution, especially to household food security. From the Labour Force Surveys conducted between 2000 and 2004 (Aliber, 2005) it can be seen that the proportion of households that practiced agriculture as a main source of food declined from 33% to 6%, whereas those who used it as an extra source of food increased from 54% to 88%. This may imply that rural 'people are practicing agriculture less intensively as they find other, more remunerative, economic activities' (Aliber, 2005).

The respondents were to indicate if most farmers around utilized Best Management Practices (BMPs) and conservation practices related to nutrient management, pesticide use, grazing methods and soil protection. Their responses were tabulated in the table below:

Table 4.4: Utilization of BMPs and conservation practices related to nutrient management, Pesticide use, grazing methods and soil protection

Utilization of BMPs and
Conservation practices related
to nutrient management,
Pesticide use, grazing methods

And soil protection **Frequency** **Percentage (%)**

Strongly agree	13	10.83
Agree	85	70.83
No opinion	10	08.33
Disagree	12	10.00
Strongly disagree	00	00.00

Total	80	100.00
--------------	-----------	---------------

The results from table 4.4 showed that (70.83%) respondents agreed that most farmers around utilized BMPs and conservation practices related to nutrient management, pesticide use, grazing methods and soil protection. It also indicated that (10.83%) strongly agreed, (10%) disagreed and (8.33%) had no opinion. By utilizing BMPs and conservation practices related to nutrient management, pesticide use, grazing methods and soil protection, production of crops need to be high. These seem not to agree with Amani (2004; 2005) who said that most smallholders do not practice high-yield farming methods, and produce mainly for subsistence.

The respondents were to also respond to if around there most farmers cared about protecting the environment including soil, air and water quality. Responses were as follows:

Table 4.5: Farmers caring about protecting the environment including soil, air and water quality

Farmers cared about
Protecting the environment
Including soil, air and
Water quality

	Frequency	Percentage (%)
Strongly agree	18	15.00
Agree	82	68.33
No opinion	00	00.00
Disagree	20	16.67
Strongly disagree	00	00.00
Total	120	100.00

From the table 4.5,(68.33%) agreed that farmers cared about protecting the environment including soil, air and water quality,(15.00%) strongly agreed while (16.67%) disagreed. Farmers seem to care about the environment due to the benefits they receive from it. However, study by Lemke et al (2010) contradicts this by saying that some farmers were not interested in any practice of protecting the environment, regardless of the agency conducting the outreach.

The study was also to establish if farmers around there regularly participated in Farm Service Agency (FSA), Natural Resources Conservation Service (NRCS), Soil Water Conservation Services (SWCS) and Extension programming. Respondents gave the following responses:

Table 4.6: Farmers regular participation in FSA, NRCS, SWCS, and Extension programming

Farmers around there
Regularly participated in FSA,
NRCS, SWCS, and

Extension programming	Frequency	Percentage (%)
Strongly agree	12	10.00
Agree	90	75.00
No opinion	05	04.17
Disagree	13	10.83
Strongly disagree	00	00.00
Total	80	100.00

The results from table 4.6 showed that (75%) respondents agreed that farmers regularly participated in FSA, NRCS, SWCS, and Extension programming. (10.83%) disagreed, (10%) strongly agreed while (4.17) had no opinion. Practices that increase production or that cut costs and conserve soil are most likely to be adopted but must still be easy to incorporate into existing farming system. Sanders and Cahill (1999) found that conservation projects will succeed only if they provide immediate and obvious benefit to the farmer.

4.4.2 Farmers demographic characteristics and food security

The study sought to establish farmers' demographic characteristics and how it affects food security in the sub-county. First, the respondents were asked if the household head was educated. Their responses were tabulated as follows:

Table 4.7: Education of household head

Household head educated	Frequency	Percentage (%)
Strongly agree	18	15.00
Agree	82	68.33
No opinion	10	08.33
Disagree	10	08.33
Strongly disagree	00	00.00
Total	120	100.00

From table 4.7, (68.33%) respondents agreed that their household heads were educated. (15.00%) strongly agreed, (08.33%) had no opinion and (08.33%) disagreed. This information shows that the respondents were surrounded with people who are educated and can get some guidance from them on various matters including farming. Najafi (2003) agrees that educational attainment by the household head could lead to awareness of the possible advantages of modernizing agriculture by means of technological inputs, enable them to read instructions on fertilizer packs and diversification of household incomes which, in turn, would enhance households' food supply.

The study also sought to establish if education for rural people was a key factor in fighting food insecurity in the country. Respondents had the following responses:

Table 4.8: Education for rural people as a key factor in fighting food insecurity

Education for rural people

Is a key factor in fighting

Food insecurity in

the country.

	Frequency	Percentage (%)
Strongly agree	10	08.33
Agree	92	72.67
No opinion	08	06.67
Disagree	10	08.33
Strongly disagree	00	00.00

Total	120	100.00
--------------	------------	---------------

From the table 4.8, (72.67%) respondents agreed that education for rural people was a key factor in fighting food insecurity in the country,(08.33%) strongly agreed,(08.33%),(08.33%) disagreed and (06.67%) had no opinion. There is need to recognize the inter-linkages between rural people deprivations such as lack of education on the one hand, and food insecurity and malnutrition on the other hand. Najafi (2003) conquered with this and said that it is possible to have a framework in which both ends and instruments for development are well identified.

To determine if there were limitations in coordination, harmonization of methodologies, analysis and dissemination as well as in scope and geographical coverage, focusing on major markets and commodities, respondents gave the following when asked.

Table 4.9 Limitations in coordination, harmonization of methodologies, analysis and dissemination as well as in scope and geographical coverage, focusing on major markets and commodities.

There are limitations in

Coordination, harmonization

Of methodologies, analysis

And dissemination as well

As in scope and geographical

Coverage, focusing on

Major markets and

Commodities.	Frequency	Percentage (%)
Strongly agree	10	08.33
Agree	72	60.00
No opinion	10	08.33
Disagree	20	16.67
Strongly disagree	08	06.67

Total	120	100.00
--------------	------------	---------------

The table 4.9 shows that (60.00%) of the respondents agreed that there were limitations in coordination, harmonization of methodologies, analysis and dissemination as well as in scope and geographical coverage, focusing on major markets and commodities. Another (16.67%) respondents disagreed, (08.33%) strongly agreed, (08.33%) had no opinion and (06.67%) strongly disagreed. Limitations could be visible in Market information systems that are operated by various institutions that coordinate farmers' welfare.

The study was also to find out if a number of opportunities existed to improve market and trade information, including the use of mobile phones, short message. The table below has the responses.

Table 4.10: Existence of opportunities to improve market and trade information, including the use of mobile phones, short message.

**A number of opportunities
Exist to improve market
And trade information, including
The use of mobile phones,
Short message.**

	Frequency	Percentage (%)
Strongly agree	19	15.83
Agree	32	66.67
No opinion	14	11.67
Disagree	42	35.00
Strongly disagree	13	10.83
Total	120	100.00

Notably from table 4.10, (35.00%) respondents disagreed that a number of opportunities existed to improve market and trade information, including the use of mobile phones, short message. (66.67%) respondents agreed, (15.83%) strongly agreed, (11.67%) did not have any opinion and (10.83%) strongly disagreed. Part of the sub-county is in the rural set up. This could be the reason why most respondents seemed not to know and agree that opportunities existed to improve market and trade information. The study also does not agree with Najafi (2003) whose study showed that a number of opportunities existed to improve market and trade information, including the use of mobile phones, short message service (SMS) and others.

The researcher asked the respondents if any organization provided farmers with training on how to use these technologies. The table 4.11 contains the responses:

Table 4.11: Providing of farmers with training on how to use these technologies by the organization

The organization provides

Farmers with training on how

to use these technologies	Frequency	Percentage (%)
Strongly agree	12	10.00
Agree	82	68.33
No opinion	06	05.00
Disagree	14	11.67
Strongly disagree	06	05.00
Total	120	100.00

The researcher found out that (68.33%) agreed that organizations (One Acre Fund) provided farmers with training on how to use these technologies. (11.67%) disagreed,(10.00%) strongly agreed,(05.00%)strongly disagreed,(05.00%) had no opinion. Despite majority of the respondents disagreeing that opportunities existed to improve market and trade information, by use of mobile phones and short message, they acknowledged that the organization- One Acre Fund provided some farmers with training on how to use these technologies. This too agrees with Najafi (2003).

The researcher also questioned if local field officers provided extensive training to farmers in the fields where they live and work.

Table 4.12 Provision of Local field officers extensive training to farmers in the fields

Local field officers provide

Extensive training to farmers

in the fields where

they live and work

	Frequency	Percentage (%)
Strongly agree	05	04.17
Agree	70	58.33
No opinion	12	10.00
Disagree	20	16.67
Strongly disagree	13	10.83
Total	120	100.00

The researcher found out that (58.33%) respondents agreed that local field officers provided extensive training to farmers in the fields where they live and work.(16.67%) disagreed, (10.83%) Strongly disagree, (10%) had no opinion and (4.17%) Strongly agreed.

The researcher asked the respondents if the training included simple techniques such as fertilizer micro-dosing, which teaches farmers to apply a bottle cap of fertilizer for each seed to ensure the appropriate amount is used.

Table 4.13: Simple techniques such as fertilizer micro-dosing as training

The training includes
Simple techniques such as
Fertilizer micro-dosing, which
Teaches farmers to apply
A bottle cap of fertilizer for
Each seed to ensure the
Appropriate amount is used

	Frequency	Percentage (%)
Strongly agree	18	15.00
Agree	62	51.67
No opinion	04	03.33
Disagree	18	15.00
Strongly disagree	18	15.00
Total	120	100.00

Based on table 4.13 (51.67%) respondents agreed that the training included simple techniques such as fertilizer micro-dosing, which teaches farmers to apply a bottle cap of fertilizer for each seed to ensure the appropriate amount is used.(15.00%) strongly agreed,(15.00%) disagreed, (15.00%) Strongly disagree and (03.33%) did not have any opinion on this. This study agreed with Najafi (2003) whose works found out that local field officers provided extensive training to farmers in the fields where they live and work and the training includes simple techniques such as fertilizer micro-dosing, which teaches farmers to apply a bottle cap of fertilizer for each seed to ensure the appropriate amount is used. Through this, a link between weekly farm education and food security is met.

To find out if education not only endowed one with the power to read and hence be informed, but also allowed one to communicate, respondents had the following for the researcher:

Table 4.14: Education for power to read and communication

**Education not only endows
one with the power to read
and hence be informed, but
it also allows one to**

Communicate	Frequency	Percentage (%)
Strongly agree	10	08.33
Agree	74	61.67
No opinion	16	13.33
Disagree	20	16.67
Strongly disagree	00	00.00

Total	120	100.00
--------------	------------	---------------

From table 4.14 (61.67%) respondents agreed that education not only endowed one with the power to read and hence be informed, but also allowed one to communicate.(16.67%) disagreed, (13.33%) had no opinion while (8.33%) strongly agreed. As an intervention to food security, education must go beyond the level of reading and writing to that of transfer of knowledge. To be useful, information transfer should be two way. This is according to Najafi (2003).

The researcher also asked respondents to indicate if education had opened avenues to better farming methods and marketing strategies. Responses were tabulated as follows:

Table 4.15 Education and avenues to better farming methods and marketing strategies.

Education has opened avenues

To better farming methods

And marketing strategies. Frequency Percentage (%)

Strongly agree	14	11.67
Agree	85	70.83
No opinion	07	05.83
Disagree	11	09.17
Strongly disagree	03	02.50

Total 120 100.00

From the table 4.15, (70.83%) agreed that education had opened avenues to better farming methods and marketing strategies. (11.67%) strongly agreed, (09.17%) disagreed, (5.83%) did not have any opinion and (2.5%) Strongly disagreed. The poor are supposed to be the primary beneficiaries of food security related policies. Education opens avenues for understanding better farming methods and off - farm employment. According to Najafi (2003) it includes food preservation at the village level, alternative medicine to make health more affordable to its people, creating more efficient agricultural extension, options for improving soil fertility, best approach to manage the different agricultural systems, and marketing strategies that would work best for a given group of farmers. Najafi (2003) too states that care should be taken to modify available technology to suit community setting and not the other way round. For benefits to be realized in all areas, infrastructure development must be given high priority.

4.4.3 Farm inputs and food security

The respondents were asked to state the amount of crops they produced in one acre of land for the years 2012/2013 and 2013/2014. The average household production was given in the table 4.16:

Table 4.16: Average household Production by farmers in Bungoma South sub-county for two consecutive seasons of giving inputs by one acre fund

Crop	Average Kg per Acre	Average Kg per Acre
	2012/2013	2013/2014
Maize	1440	3600
Rice	-	-
Groundnuts	720	1080
Cassava	1400	1530
Sweet potatoes	1770	2040
Millet	360	720
Sorghum	240	560

The Table 4.16 shows that there was a general increase in yields during the years in which one acre fund was subsidizing and giving farmers input on credit. For maize, the yields per acre more than doubled during the first year of One acre fund subsidizing and giving farmers input on credit. For other crops, the yields per acre also doubled during the years of One acre fund subsidizing and giving farmers input on credit. Yields is projected to continue to increase in the subsequent production seasons. This agrees with Dorward et al., (2008) and FANRPAN (2008) who argued that Agricultural Input Subsidy Programme (AISP), with significant development aid support is able to improve smallholder agricultural productivity, improve food and cash crop production, and reduce vulnerability to food insecurity and hunger.

The respondents were also asked to state the food availability in terms of producing their own food and purchasing. Their responses were as follows:

Table 4.17: Average Food availability per household.

Food type	Mode of acquisition and quantity acquired	
	Own-produced (Quantities in kgs)	Purchased (Quantities in kgs)
Green Maize	650	None
Maize grain	1000	None
Maize flour	600	None
Local rice	None	12.5
Imported rice	None	8.5
Millet grain	7	None
Millet flour	20.67	None
Sorghum grain	17.33	None
Sorghum flour	23.33	None
Cowpea grain	8	4.5
Groundnut (shelled)	20	None
Groundnut (unshelled)	43.33	None
Soybean grain	37.33	None
Soybean flour	None	11

From the table, the productivity of staple food production is low, due mainly to the decline in the use of improved input packages by farming households. This could be reason why some foods are purchased by the respondents. This is partly due to the reduction in support for farmers to continue taking up the improved input packages as a result of structural adjustment programs. The use of improved input packages could be increased by reinstating some ‘smart or targeted’ input subsidies (Bryceson, 2002; Smale et al., 2009). These inputs should be made available at affordable prices and tailored to the local climate and soil conditions. It should be noted that

smallholder farmers in most parts of sub-Saharan Africa rely heavily on informal channels to access inputs (Smale et al., 2009). Some of these channels for seed access include on-farm seed saving, farmer-to-farmer exchange and unregulated sales.

4.4.4 Population Size and food security

To establish how population Size influences food security in the sub-county, the study sought to establish the size of family members of the respondents. Their responses were recorded in table 4.18:

Table 4.18: The size of family members

Size of family members	Frequency	Percentage (%)
1-2	09	07.50
3-5	60	50.00
6-10	32	26.67
10-15	10	08.33
Above 15	09	07.50
Total	120	100.0

The study found out that (50.00%) respondents had a family size between 3-5, (26.67%) had a family size of 6-10,(8.33%) had a family size of 10-15 and (7.5%) had 1-2 and above 15. It was noted that majority of the respondents had family sizes of between 3-10 meaning they have quite a number of people to feed. According to Smil (2000), increasing numbers of people often drive up demand for food, which typically results in additional use of arable land and water. This is especially true in the absence of adequate food production technology and integrated programs that simultaneously address community needs for food and reproductive health. The Food and Agriculture Organization (FAO) projects that by 2050, population and economic growth will result in a doubling of demand for food globally.

The respondents were also asked to give in their own opinions if the food they produced was enough to cater for the family members. (66.67%) respondents agreed while (33.33%) said that the food was not enough for the family members. However it needs to be noted that Africa has the highest population growth rate in the world. According to UNEP (2009), by 2050, even if fertility rates decline, the population of the region is projected to more than double. This area also holds the largest proportion of food-insecure people, with one in four people undernourished. Sub-Saharan Africa also has the lowest agricultural productivity in the world and the highest percentage of people living in poverty. Massive population growth, rising incomes and growing consumption of meat are driving the demand for food. Food production has increased substantially over the past century sustained by increasing yields due to irrigation, fertilizer use and expansion into new lands. But there has been little consideration of food energy efficiency or the ability to minimize the loss of energy from food during the harvesting, processing, consuming and recycling stages (UNEP, 2009).

The respondents also indicated that sometimes they have excess food during production. With the excess food you produce,(66.67%) of them do not distribute to the rest of the relatives while(33.33%) did distribute to relative; 100% said that they do not give to relatives; 100% stored for future use/consumption and the same figure of respondents sold/converted into cash for other uses. According to UNEP (2009), the role of agriculture in reducing poverty is crucial. Its rapid growth can lower and stabilize the cost of food to poor consumers living in rural and urban environments. Where, as in the Green Revolution, small-scale agriculture has been a major beneficiary, it has been associated with an unprecedented reduction of poverty. Rapid agricultural growth, achieved on smallholdings using labor intensive methods, remains the best hope for poor people to enhance their prospects to achieve sufficient availability of food, and sufficient access to work or land to afford it.

4.5 Analysis from the interview

Respondents were asked to state any constraints that faced agricultural extension that affected food security. The respondents indicated that in most cases the problem with science in agriculture and extension is that it has a poor understanding of the knowledge from very poor, indigenous rural people. For many scientists, in order to develop those rural people, formal research and extension has to transform their knowledge into another knowledge system, because

their knowledge is considered as unscientific and primitive. This is true when it comes to the case of agricultural extension. In most cases, the approach is top-down, whereby technologies are developed somewhere and the farmers are told what to do by the development agents.

Another shortcoming is from the linkage of extension with research in the Bungoma South sub-County. Under normal conditions, agricultural extension service serves as a farmer organization that expresses the concern and feeling of farmers to the public and conveys information from research institute to farmers and from the farmers back to research institutes. Contrary to this fact, agricultural research in Bungoma South sub- county is poorly linked to extension because of the fact that extension and research activities have been carried out under different institutions(e.g from the agriculture sector and non-governmental organization like One Acre Fund) with zero or minimal coordination between them . According to Birkhaeuser et al (1991), agricultural extension service needs agents for two main activities: in the first place to transfer required information to the farmers and secondly to project the problems faced by the farmers.

To summarize, research process and agricultural extension services in Bungoma South sub-County lack preferences, criteria and conditions of the farmers and a well-articulated national research and extension policy is not yet developed in the county .In general, all of the above mentioned programs came up with some inputs which are totally or partly external to the traditional farming system. This has an impact on the farming system in general and the diversity of the farmers' crop variety in particular.

It was discovered that factors such as inadequate access to credit facilities, poor access and use of modern inputs such as planting materials, fertilizer and agrochemicals, small farm size together with low level of technology as well as the continuous dependence on rain instead of developing irrigation systems significantly affected the yields/output which endangers food security in Bungoma South sub County. Of particular relevance is the issue of access to credit. While there exists opportunity for many of the farmers to obtain loans from the Banks, conditions attached to loans deter farmers from applying for such loans. This therefore has the potential to affect the increase in production of the farmers.

These factors identified above have radically served as a great deal of challenge for the small holder farmers especially in their attempt to improve upon their farms by increasing their

productive capacity. The low productivity of the farmers as the study revealed is also linked to the lack of access to market for the produce of the farmers.

Sometimes the high transport cost sometimes serves as a challenge with respect to selling their products. In this regard, many of the farmers experience a post-harvest loss which in turn threatens food security in the study area.

Lastly, smallholder farmers, in their quest to make better their livelihoods by improving their incomes through diversification strategies that are constrained in terms of capital opportunities.

This study revealed that most of the smallholder farmers are ambitious to carve alternative income earning opportunities out of their incomes to be in the position to withstand food insecurity and other livelihood threats but their incomes are woefully inadequate. These diverse set of complex Factors influencing the smallholder farmers, call for a change in policy praxis and institutional support in order to improve smallholder farms thereby enhancing food security and incomes of the farmers.

Long term measures of improving food security situation will include empowering smallholder farmers by letting them realize their human rights through investing in their education and health. It is through education that they would explore other livelihood opportunities and readily accept new innovations. Strengthening their physical capital by bringing health facilities to their doorsteps is also very important. Government sectors such as the Ministry of Agriculture and Adult education are charged to expand and intensify their services to benefit smallholder farmers.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

The study endeavored to investigate the factors influencing food security in Bungoma south Sub-county. This chapter focuses on the summary of the findings, related discussions and recommendations.

5.2 Summary of findings

On gender, the study revealed that, 72.5 percent of the respondents were male while 27.5 percent were female. The results showed that majority of the respondents representing 46.67 percent were aged 26-35 years, they were followed by 24.17 percent who were aged between 36 and 50 years and 19.17 percent were aged 50 and above. Lastly, there were 12 respondents aged less than 25 years. Majority of the respondents (45.83%) possessed primary level of education as the highest level of education, followed by those possessed secondary level of education as the highest level of education (38.33%). In addition to farming, (20%) said they were Unemployed, (21.67%) were employed, 38 (31.67%) were Operating other types of business while (26.67%) practice farming as the only occupation. When asked to give their overall size of their farms in acres, (11.67%) had Less than 1, (28.33%), had between 1 and 3, (38.33%) had between 3 and 5 and (21.67%) had between 5 and above The main activities done on their farms included Crop farming (10%) ,Poultry keeping(13.33%) ,Dairy farming Mixture of crop and poultry farming, Mixture of crop and dairy farming Mixture of poultry (16.67%) and dairy farming(16.67%) and Mixture of crop, poultry and dairy(43.33%) .When asked the length of time they had been doing the above activity/activities on their farms, (10%) had worked for Less than 1year, (28.33%) had worked for between1 and 3 years, (51.67%) between 3 and 5 years and (10%) for above 5 years.

On farming methods used in the area of study that could influence food security the study established that 62.5% of the respondents said they do farming for both subsistence and commercial. (70.83%) respondents agreed that most farmers around utilized BMPs and

conservation practices related to nutrient management, pesticide use, grazing methods and soil protection.(68.33%) agreed that farmers cared about protecting the environment including soil, air and water quality.(75%) respondents agreed that farmers regularly participated in FSA, NRCS, SWCS, and Extension programming.

On demographic characteristics and how it affects food security in the sub-County, the study established that (68.33%) respondents agreed that their household heads were educated. (72.67%) respondents agreed that education for rural people was a key factor in fighting food insecurity in the country. (60.00%) of the respondents agreed that there were limitations in coordination, harmonization of methodologies, analysis and dissemination as well as in scope and geographical coverage, focusing on major markets and commodities. Notably, (35.00%) respondents disagreed that a number of opportunities existed to improve market and trade information, including the use of mobile phones, short message. The researcher found out that (68.33%) agreed that organizations (One Acre Fund) provided farmers with training on how to use these technologies. The researcher found out that (58.33%) reliability of research instruments respondents agreed that local field officers provided extensive training to farmers in the fields where they live and work. (51.67%) respondents agreed that the training included simple techniques such as fertilizer micro-dosing, which teaches farmers to apply a bottle cap of fertilizer for each seed to ensure the appropriate amount is used. (61.67%) respondents agreed that education not only endowed one with the power to read and hence be informed, but also allowed one to communicate. Lastly,(70.83%) agreed that education had opened avenues to better farming methods and marketing strategies.

On farm inputs and its influence to food security, respondents were asked to state the amount of crops they produced in one acre of land for the years 2012/2013 and 2013/2014.The average household production was given. There was a general increase in yields during the years in which one acre fund was subsidizing and giving farmers input on credit. For maize, the yields per acre more than doubled during the first year of One acre fund subsidizing and giving farmers input on credit. . For other crops, the yields per acre also doubled during the years of One acre fund subsidizing and giving farmers input on credit .Yields is projected to continue to increase in the subsequent production seasons. The respondents were also asked to state the food availability in terms of producing their own food and purchasing. The productivity of staple food production

is low, due mainly to the decline in the use of improved input packages by farming households. This could be reason why some foods are purchased by the respondents.

On population Size and its influence to food security in the sub-county, the study sought to establish the size of family members of the respondents. The study found out that (50.00%) respondents had a family size between 3 to 5, (26.67%) had a family size of 6 to 10, 10 (8.33%) had a family size of 10-15 and (7.5%) had 1-2 and above 15. The respondents were also asked to give in their own opinions if the food they produced was enough to cater for the family members. (66.67%) respondents agreed while (33.33%) said that the food was not enough for the family members. The respondents also indicated that sometimes they have excess food during production. With the excess food you produce, (66.67%) of them do not distribute to the rest of the relatives while(33.33%) did distribute to relative; 100% said that they do not give to relatives; 100% stored for future use/consumption and the same figure of respondents sold/converted into cash for other uses.

5.3 Conclusion.

On farming methods and influence to food security, findings revealed that increasing prices of food and subsistence production is important to improve household food security. This will reduce dependence on market purchases, especially among the rural poor, as they can exploit natural resources for food or to generate income. Moreover, rural households continue to value the pursuit of farming activities for home consumption. Seemingly, the number of households engaging in agriculture as a main source of food is declining, but there is a considerable increase in the number of households that engage in subsistence production to supplement market purchases. Also, the smallholder/subsistence agriculture sector's productivity is known to be very low, and thus there is a need to significantly improve the productivity of the sub-sector if it is to achieve a significant impact on food security.

On farm inputs and influence to food security, findings showed that the low productivity of subsistence agriculture is largely a result of poor access to productive resources and improved inputs. The productivity can be improved by increasing access to household assets such as land, water and human capital, and by encouraging farmers to intensify production through the use of improved inputs. This includes the use of fertilizer, organic inputs and conservation investments.

However, there is also a need to develop and/or improve input and output markets so as to reduce risks and transaction costs. The development and/or improvements to bolster subsistence agriculture require substantial or improved investments and support into research and development,

extension, other agricultural services (including access to credit, markets, skills and/or “re-skilling”).

On Farmers’ demographic characteristics and its influence to food security, findings showed that Agricultural extension could be one tool in attaining the millennium development goal related to the reduction of extreme poverty and hunger in developing countries like Kenya and could improve food security.

5.4 Recommendations

On the basis of the findings and conclusion above, this section presents the recommendations of the study.

The study recommends that the Government of Kenya to have policy interventions that target access to resources such as land, technology, credit and training; promotion of irrigation and rainwater harnessing technologies; improving access to credit by the poor, including women; improving access to food production and food processing technologies, particularly technologies for women.

The study also recommends that the Government of Kenya to formulate and implement policies that enhance the ownership and exchange entitlement of the poor in the trade of agriculture and food sectors; and improve household food security by commercializing agriculture to increase income and employment generation among food-insecure households.

The study also recommends that the Government should come up with strategies for opportunities to improve market and trade information, including the use of mobile phones, short message so as farmers can use it to improve productivity in farming.

5.5 Suggestions for Further Research

The researcher conducted the study in Bungoma South sub-county, Bungoma County, Kenya. The following observations were noted for further research; Influence of Agricultural extension on food security in the sub-counties and the county as a whole. It is also suggested that a similar study be done in other sub-counties and other counties in the country.

REFERENCES

- Aliber, M.(2005). Synthesis and conclusions, in: Aliber M, De Swart C, Du Toit A, Mbhele T & Mthethwa T (eds.). Trends and policy challenges in the rural economy: four provincial case studies. Employment and Economic Policy Research Programme research monograph. Cape Town: Human Sciences Research Council.
- Aliber, M .(2009). Exploring Statistics South Africa's national household surveys as sources of information about food security and subsistence agriculture. Unpublished project, Centre for Poverty Employment and Growth, Human Sciences Research Council, Pretoria.
- Amaza, P.S., Umeh J.C, Helsen,J and Adejobi. A.O. (2006). Determinants and measurement of food insecurity in Nigeria: some empirical policy guide". Presented at international and food security status of farming households in Kwara State, North-Central Nigeria.
- Anand, S. and Sen. A. K. (1997). Concepts of Human Development and Poverty: A Multidimensional Perspective. Human Development Papers 1997: Poverty and Human Development. New York: UNDP.
- Anwar, T., Qureshi, S.K. and Ali, H (2004). Landlessness and Rural Poverty in Pakistan. The Appropriate Technology, Vol 39, No 3
- Babatunde, R.O., Omotesho, O.A. and Sholotan, O.S. (2007). Socio-economic characteristics and Growth in Agriculture: Strategies and Interventions. University of Agriculture,
- Bashir, M.K., Bajwa, Z.N. Bakhsh, K. Maqbool, A. and Chattha, M.W.A. (2007). Food security Development and Food Security. Washington D. C.: IFPRI Faisalabad, Pakistan. pp.150.
- Bashir, M.K., Naeem, M.K. and Niazi, S.A.K. (2010). Rural and peri-urban food security: a case of Sub countyFaisalabad of Pakistan. WASJ, 9: 403-41.
- FAO (2010). The State of Food Insecurity in the World 2010; World Bank. 2007; Fight against Poverty. Oxfam International
- Food and Agricultural Organization of the United Nations (FAO). (2010). The State of Food Insecurity in the World 2010. Rome: FAO.
- Food and Agriculture Organization (FAO). (2003). State of Forest and Tree Genetic Resources in Dry Zone Southern Africa Development Community Countries. Compiled by B. I. Nyoka. Forest Genetic Resources Working Papers, Forest Resources Development Service, Forest Resources Division. Rome.
- Gold, M. V. (1999). Sustainable Agriculture: Definitions and Terms, ARS-USDA, Special Reference Briefs Series No. SRB 99-02(updates SRB 94-05), Beltsville, M.D.

- Government of Kenya, (2011). National Food and Nutrition Security Policy, Nairobi, Kenya
- Greenland, D.J. and Szabolcs, I. (Ed.). (1994). Soil Resilience and Sustainable Land Use, CAB
- Hilary, J. (2004). Trade liberalization, Poverty and the WTO: Assessing the Realities. In: The WTO and Developing Countries. Homi Katra and Roger Strange (eds). Palgrave Macmillan. Hopkins University Press
- IFPRI (International Food Policy Research Institute).(2002). Reaching sustainable food security for all by 2020. Getting the priorities and responsibilities right. Washington, D.C: IFPRI
- InterAcademy Council. (2004). Realizing the promise and potential of African International Publication, U.K.
- ISA (Indian Society of Agronomy), (2008), Sustainable Agriculture (Issues, Perspectives and Prospects in
- Iyer, K.Gopal (Ed.), (2010).Sustainable Development-Ecological and Socio-cultural Dimensions Publishing House Pvt.Ltd., NewDelhi.
- Kherallah et al. (2002). Reforming Agricultural Markets in Africa. IFPRI. The Johns
- Kothari, C.R. (2008). Research methodology. Method and techniques. (2nd ed), New Delhi. New Age International (P) Ltd.
- Latham, M. (1997). Human Nutrition in the Developing World. FAO. Rome
- Lemke, A., T. Lindenbaum, T. Perry, M. Herbert,M; Tear,A and Herkert,J (2010). Effects of outreach on the awareness and adoption of conservation practices by farmers in two agricultural watersheds of the Mackinaw River, Illinois. Journal Soil and Water Conservation 65(5):304-315.
- Maxwell, S. and Frankenberger, T. R. eds. (1992). Household Food Security: Concepts, Indicators, Measurements. UNICEF – IFAD. Available on-line:
- Maxwell, S. (1996). Food Security: A post-modern perspective. Food Policy21 (2), 155-170.
- Mugenda, O.M. and Mugenda, A.G. (2003). Research methods: Quantitative and qualitative Approaches. Acts Press, Nairobi
- Nations (FAO). 2008. The State of Food Insecurity in the World 2008. Rome: FAO.
- One Acre Fund (2012) 1742 Tatum St. Falcon Heights, MN 55113, Design: Julie Betters, JB Design www.oneacrefund.org.
- One Acre Fund, (2012). Semi-Annual Performance Project May 2012 – December 2012
- Oso, y. & Onen, D. (2008).A general guide to writing research proposal and Project. A hand Book of beginning Researchers. Nairobi, Jomo Kenyatta Foundation.

- Oxfam. 2002. Rigged Rules and Double Standards. Trade, Globalization, and the
Pak J Nut, 6: 49-58. Pakistan Development Review, 43: 855-874.
- Pinstrup, A P. (2002). Food and Agricultural Policy for a Globalizing World: Preparing for the
Future. Amer. J. Agr. Econ. 84: 1201- 1214.
- Rosegrant et al. (2005). Looking Ahead. Long - Term prospects for Africa's Agricultural
- Rosegrant, M.W; Paisner, M.S; Meijer, S and Witcover. J (2001). 2020 Global Food
Outlook." Washington, DC: International Food Policy Research Institute.
- Sanders, D; and Cahill, D. (1999). Where incentives fit in soil conservation programs. In
Incentives in soil conservation: Theory and practice, ed. Saunders, D.W; Huszar, P.C
Sombatpanit, S and Enters, T 11-24. Enfield, NH: World Association of soil and
water, Science Publishers.
- World Bank. (2007). World Development Project 2008: Agriculture for Development.
Washington, DC:
- World Bank. (2008). Rising Food and Fuel Prices: Addressing the Risks to Future Generations.
Washington, DC: World Bank.
- World Bank; Blas, J. (2009). Number of Chronically Hungry Tops 1bn. Financial Times, 26
March; Food and Agriculture Organization of the United

APPENDICES

Appendix 1: Letter of transmittal.

**The University of Nairobi,
College of education and External Studies
School of Continuing and Distance Education
Department of Extra-Mural studies**

Dear respondent,

I am a post graduate student pursuing a Master of Arts Degree in Project Planning and Management at The University of Nairobi. Currently, I am conducting a research for my final year project which is a requirement for the program. The research topic is **'Factors influencing food security in Kenya; a case of one acre fund in Bungoma South Sub county Bungoma County'**

The findings of this study will enlighten farmers, policy makers and all the stakeholders to put measures in place to ensure that adequate food security is achieved.

I therefore kindly request you to spare some times to fill in this questionnaire. The information obtained will purely be for the purpose of the research and will be treated with confidentiality. You are therefore advised not put your name on the questionnaire. The conclusions of the study will be drawn in aggregate terms, without any reference to specific schools or individual respondents.

Your honest and thoughtful responses will highly be appreciated.

Thank you for your cooperation.

Yours Faithfully,

CHENGE, MICHAEL NDALILA

Appendix 2: Questionnaire for farmers

Dear Respondent,

This questionnaire is designed to gather information on a study being carried out in Bungoma South Sub county entitled **‘Factors influencing food security in Kenya; a case of one acre fund in Bungoma South Sub county Bungoma County’**. You have been requested to kindly provide information that may facilitate the carrying out of the study. The information provided will be treated with the highest level of confidentiality and will only be used for the purpose of this study and not any other. Please respond to the questions as they apply to you and do not write your name or any other form of identification on the questionnaire.

PART I: Back ground information

1. What is your gender?

Female Male

2. Age of respondent:

[] Less than 25 years

[] 26-35 years

[] 36-50 years

[] More than 50 years

3. What is your highest level of education?

[] None

[] Primary

[] Secondary

[] Tertiary

[] University

4. Occupation of the respondent.

[] Unemployed

[] Employed

[] Operating another type of business

[] Farmer

Others (Specify)_____

5. What is the overall size of your farm in acres?

Less than 1

1- 3

3 – 5

5 and above

6. What is the main activity done on your farm?

Crop farming

Poultry keeping

Dairy farming

Mixture of crop and poultry farming

Mixture of crop and dairy farming

Mixture of poultry and dairy farming

Mixture of crop, poultry and dairy

7. For how long have been doing the above activity/activities on your farm?

Less than 1year

1- 3 years

3 – 5 years

5 years and above

PART II: QUESTIONS ON THEMES

1. Farming methods and food security

A) Why do you practice farming?

Subsistence

Commercial

Both

B) Please rate your level of agreement with each of the following statements about Agricultural systems practiced in your Area using the scale described below:

SD = Strongly Disagree D = Disagree NO = No Opinion A = Agree SA = Strongly Agree LI = Lack Enough Information

Statement	SD	D	NO	A	SA	LI
1. Around here most farmers utilize BMPs and conservation practices related to nutrient management, pesticide use, grazing methods and soil protection.						
2. Around here, most farmers care about protecting the environment including soil, air and water quality.						
3. 3. Farmers around here regularly participate in FSA, NRCS, SWCS, and Extension programming						

2. Farmers demographic characteristics and food security

1. The household head is educated

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

2. Education for rural people is a key factor in fighting food insecurity in our country.

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

3. There are limitations in coordination, harmonization of methodologies, analysis and dissemination as well as in scope and geographical coverage, focusing on major markets and commodities.

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

4. Price data also suffer from poor response rates and delays in processing and projecting.

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

5. A number of opportunities exist to improve market and trade information, including the use of mobile phones, short message.

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

6. The organization provides farmers with training on how to use these technologies.

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

7. Local field officers provide extensive training to farmers in the fields where they live and work.

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

8. The training includes simple techniques such as fertilizer micro-dosing, which teaches farmers to apply a bottle cap of fertilizer for each seed to ensure the appropriate amount is used.

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

9. Education not only endows one with the power to read and hence be informed, but it also allows one to communicate.

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

10. Education has opened avenues to better farming methods and marketing strategies.

(i) Strongly agree (ii) Agree (iii) Not sure (iv) Disagree (v) Strongly disagree.

3. Farm inputs and food security

A: state the amount of crops you produced after receiving subsidized inputs or inputs on credit from one acre of land for the years 2012/2013 and 2013/2014.

Crop	Kg per Acre 2012/2013	Kg per Acre 2013/2014
-------------	----------------------------------	----------------------------------

Maize

Rice

Groundnuts

Cassava

Sweet potatoes

Millet

Sorghum

B: Food availability

Below are the common type food crops produced/found in households indicating which and in what quantity do you produce or acquire. (Please TICK where applicable)

Food type	Mode of acquisition and quantity acquired			
	Own-produced	Quantities in kgs	Purchased	Quantities in kgs
Green Maize	[ ]	.....Kgs	[ ]	.....Kgs
Maize grain	[ ]	.....Kgs	[ ]	.....Kgs
Maize flour	[ ]	.....Kgs	[ ]	.....Kgs
Local rice	[ ]	.....Kgs	[ ]	.....Kgs
Imported rice	[ ]	.....Kgs	[ ]	.....Kgs
Millet grain	[ ]	.....Kgs	[ ]	.....Kgs
Millet flour	[ ]	.....Kgs	[ ]	.....Kgs
Sorghum grain	[ ]	.....Kgs	[ ]	.....Kgs
Sorghum flour	[ ]	.....Kgs	[ ]	.....Kgs
Cowpea grain	[ ]	.....Kgs	[ ]	.....Kgs
Groundnut (shelled)	[ ]	.....Kgs	[ ]	.....Kgs
Groundnut (unshelled)	[ ]	.....Kgs	[ ]	.....Kgs
Soybean grain	[ ]	.....Kgs	[ ]	.....Kgs
Soybean flour	[ ]	.....Kgs	[ ]	.....Kgs

4. Population and family sizes

1. What is the size of your family members?

[] 1-2

[] 3-5

[] 6-10

[] 10-15

[] Above 15

In your opinion, is the food you produce enough to cater for the family members indicated above?

Yes

No

What happens to the excess food you produce? Indicate response, TICK where applicable.

	YES	NO
a) Distributed to the rest of relatives		
b) Distributed to the rest of friends		
c) Stored for future use/consumption		
d) Sold/converted into cash for other uses		
e) Other purposes		

Appendix 3: Interview Guide for OAF staff and agricultural officials

1. Explain constraints facing agricultural extension in the county.
2. Explain solutions to food insecurity.