INFLUENCE OF NON GOVERNMENTAL ORGANIZATIONS INTERVENTION STRATEGIES ON FOOD SECURITY IN ARID LANDS: THE CASE OF WATER FOR LIVESTOCK PROGRAMME IN GARISSA COUNTY, KENYA.

BY

MBURUGU FRANKLINE GIKUNDA

A Research Project Report Submitted in Partial Fulfillment of the Requirements for the Award of Master of Arts Degree in Project Planning and Management of the University of Nairobi

2015

DECLARATION

This research project report is my original work and has never been presented for any academic award in any other University.

Signature: _____ **Date:** _____

Mburugu Frankline Gikunda

Reg: No: L50/72294/2008

SUPERVISOR

This research project report has been submitted with our approval as the University of Nairobi supervisor.

Signature: _____**Date:** _____

Dr Kyalo Dorothy Ndunge

Senior Lecturer,

School of Continuing and Distance Education

University of Nairobi

DEDICATION

This research project report was dedicated to my loving daughter Chinnelle Makena, wife, dad, mum, my brothers and sisters together with all the extended family and friends who have seen me through this study.

ACKNOWLEDGEMENT

First and foremost, I would like to acknowledge my supervisors Dr Kyalo Dorothy.Ndunge for her time and technical guidance in the development of this project report. Her advice and support has been very valuable in the entire process.

Gratitude also go to all my lecturers and entire staff of the University of Nairobi, Department of Extra Mural Studies for their support and efforts, I accessed massive information and materials that played a big role in the development of this project proposal. This included access to exclusive online databases at the University of Nairobi library.

More acknowledgement to all my friends and family members for their continuous support and encouragement while undertaking this work.

LIST OF ABBREVIATIONS AND ACRONYMS

ACTS: African Centre for Technological Studies

CBO: Community Based Organization

CCCCD: Canadian Coalition on Climate Change and Development

FAO: Food and Agricultural Organization

FEWSNET: Famine Early Warning Systems Network

GOK: Government of Kenya

IFPRI: International food policy research institute.

NFNSP: National Food and Nutrition Security Policy

NGO: Nongovernmental Organization

USAID: United State Agency International Development

WFP: World food programme

Adeso: African development solutions

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

The purpose of the study was to assess the influence of nongovernmental organizations strategic intervention on food security in arid lands of Kenya focusing on Lagdera Sub County, Garissa County. The gap being addressed was to empirically establish whether there was influence of the below stated strategic interventions on food security. The goal of the study was achieved through the specific objectives which included; establishing the extent to which training for capacity building, improved access to market information, assessing county infrastructures, adoption of modern storage and food production technology, have had any influence food security. Three NGOs in collaboration with government agencies have been implementing various food security strategic interventions as mentioned above. Despite the implementation of said strategies, the targeted beneficiaries still rely on relief food from the donors and the government agencies. This raises questions as to whether the strategic interventions adopted have had any significant influence in enhancing food security in Garissa County especially for Lagdera Sub County. The study adopted descriptive survey research design to collect and analyze data. The target population was determined with reference to the documented government census and population report of 2009 and a sample size was determined by getting 10% of accessible respectively to arrive at a sample of 121 respondents. Descriptive, correlations and cross tabulation was adopted for data analysis using SPSS. Tables, figures and texts will be used for data presentation.Non governmental organizations were found to be the most provider of training for capacity building. NGOs had a small significance to provision of market information, majority were found to supply food to the local markets. From the findings it was concluded that NGOs did not carry adequate trainings though trainings had a positive correlation meaning that it influenced food security bin the region. The data analysis shows that some strategic interventions are likely to influence food security as shown by some positive correlations such as , accessibility to market information, access to food storage information in areas where food production technology.

Following the data analysis an indication of possible influences between variables under investigation, it was recommended that further studies on these areas may focus on establishing the possible cause effects relationship between Training on food security, accessibility to market information, kind of development agencies, access to food storage information and areas where food production technology is used are likely to influence saving, engagement in food production activities, access to food and its availability respectively.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

The Existence of food insecurity in the world community has literally kept community development players busy in trying to find intervention strategies. Similarly, massive efforts are continuously being made to involve both governmental and nongovernmental organizations in partnership that is expected to alleviate food insecurity in most of the marginalized communities. By 2011-2013, 842 million people accounting for about 12.5% or a eighth of the world population (FAO, 2013). Even as these huge efforts are being made with the support of key stakeholders in the world, statistics still show that more people are increasingly becoming vulnerable to food insecurity due to biting poverty. This finding is further supported by United Nations Office for the Coordination of Humanitarian Affairs (UN OCHA) and WFP indicating that about 53% of the requested funding for food security interventions is available with WFP indicating that there is continued supply of relief food to the most vulnerable households in the pastoral areas and marginal agricultural lowlands including north eastern part of Kenya (WFP, 2013).

In Africa, poverty and hunger is common where the FAO, IFAD and WFP report on State of Food Insecurity in the World -The multiple dimensions of food security indicates that by 2011-2013 24.8% of the population in sub-Saharan states where Kenya belong are food insecure (FAO, 2013). It was suspected that development players may not have stopped to establish how their strategic interventions influence the status of food security. A case in a point is Kenya where despite vibrant programme Jaa Marufuku (eradicate poverty) implementation, people still depend on relief food (Njoroge et al 2013). According to Poverty Baseline report, 53% of the population in Kenya lives below the poverty line and 51% are food poor (Kenya National Bureau of Statistics, 2010).

For Kenya, food insecurity is one of the issues of concern by many development players. The study by USAID, GOK, WFP and FEWSONET partnership indicates that the overall food insecure population is likely to increase from 2.2 million to at least 2.4 million people by August as the lean season intensifies despite many organizations involved with diverse interventions (FEWSNET, 2012).

Besides FAO, WFP and USAID, report the study by the government of Kenya through the Kenya Food Security Steering Group (KFSSG) of the 2010 short rains season assessment report has pointed out that Garissa the focus area of this study is among the most food insecure zone in Kenya (KFSSG, 2010). An estimated 1.3 million out of the 2.2 million vulnerable people were targeted in June through various food security interventions strategies aimed at asset creation, resilience building, and immediate relief.

According to national development plan 2002-2009 for Garissa district, Availability and accessibility to food by households in Garissa district is inadequate and highly unstable, deteriorating rapidly in face of the frequent and prolonged droughts (GOK, 2002). A common feature of livelihoods systems in the district is dependence on the livestock sector for revenues and the markets for most of their food purchases. Availability of water for domestic and livestock use is a major problem and households have to walk for long distances to get the scarce commodity. This has prompted many NGOs undertaking community development programmes to consider incorporating a component of food security projects. Based on district development plan, many of the NGOs have designed programmes with food security intervention strategies. However, there is limited empirical information on how the stated strategies influence food security among the target beneficiaries especially in north eastern part of Kenya especially in Lagdera Sub County the focus of this study County belong. Therefore this study is an attempt to establish the existence relationships between nongovernmental programe intervention strategies and food security.

To achieve the goal of this study, this document is organized into three chapters. chapter one highlight the background of the study, statement of the problem, Purpose, Objectives, Research Questions, Basic assumptions, Significance, Scope, Limitations, and Definition of significant terms and Organization of the study. Chapter two discusses literature review and proposed methodology is covered in chapter three.

1.2 Statement of the Problem

Over the past three decades, the role of NGOs in food security and development in general remains an area of substantial debate. Many NGOs have become major players in the field of social economic and environmental affairs particularly focusing on poverty in marginalized

areas in African developing countries. In connection to this, many studies have been conducted but not many that seem to have focused their effort on establishing whether the NGOs intervention strategies have influence on food security particularly in arid lands of Kenya narrowing on Garissa County. An example is a study "The Impact of Donor Aided Projects Through.

NGOs on the Social and Economic Welfare of the rural poor" by Busiinge Christopher. According to national development plan 2002-2009 for Garissa district, Availability and accessibility to food by households in Garissa district was inadequate and highly unstable; the same report indicated that a total of 600,000 people from the county were food insecure. Therefore this study seek to explore four selected strategies namely; capacity building training, improved access to market information, introduction of modern storage facilities, infrastructure improvement and utilization of new technology as some of the strategies adopted by Adeso organization. The gap being addressed by this study is to empirically establish whether there was influence of the stated strategic intervention specifically on food security in arid lands in Garissa County covered by Adeso programmes.

1.3 Purpose of the Study

The purpose of that study was to assess the influence of nongovernmental organizations strategic intervention on food security in arid lands of Kenya focusing on Adeso programme area in Garissa County.

1.4 Objectives of the Study

The study seeks to achieve the following objectives.

i. To establish the extent to which training for capacity building programmes by NGOs influenced food security in Garissa County.
ii. To establish whether access to market information provided by NGOs influenced food security.
iii. To establish the extent to which adoption of modern storage technology promoted by NGOs influenced food security.
iv. To assess the influence of county infrastructures on food security.

v. To establish the extent to which utilization of modern food production technology promoted by NGOs influenced food security.

1.5 Research Questions

i. To what extent does training for capacity building programmes provided by NGOs on livestock farming influences food security in Lagdera Sub County?
ii. To what extent does improved access to market information provided by NGOs influence food security in Lagdera Sub County?
iii. Is adoption of modern storage technology promoted by NGOs influencing food security in Lagdera Sub County?
iv. Are county infrastructures having any influence on food security in Lagdera Sub County?
v. To what extent does utilization of modern food production technology influences food security in Lagdera Sub County?

1.6 Basic Assumptions of the Study

The study was conducted under the following basic assumptions:

i. Indicators selected to measure food security and its influencing factors under investigation are reflection of the variables being measured. Therefore this assumes linear relationship.
ii. Since Adeso (African development solutions) mission was that of community capacity building and empowerment through strategic intervention, it was assumed that the target beneficiaries have adopted new storage and food production technology.
iii. The target respondent for the study had strong feeling of their development agenda as the primary beneficiaries hence expected to be committed in our schedule for interaction throughout the process of that study and their responses were reflection of reality.

1.7 Significance of the Study

The study was partially useful in providing information to assist in advocating for planning programs that mainstreams strategic intervention choices when developing a sustainable food

security plan. That was important because the findings provided basis for understanding how to establish a capacity building and empowerment framework based on strategic choices that seek to promote common and systematic approach to alleviating food insecurity not only in study target areas but also other places.

The finding from the study through a case study was a stimulant for further and extended investigation on other programmes dealing with food security. It aimed at enticing other scholars to do further research to support the need for carrying out community capacity assessment for particular projects policies and program strategies that would assist in developing tools for community capacity building and empowerment in ensuring sustainable food security. That would provide encouragement and support to eliminate the blanket assumptions on reasons for inappropriate or inadequate information required for planning food security projects.

1.9 Limitations of the Study

The anticipated limitations of this study are inherent to the process involved. Some of the limitation and their remedies include the following: Time and resources constraints always pain the researchers because Limited time and resources have been allocated for the completion of this study. However, effort will be make to keep on schedule by avoiding diversionary and side show. Research findings accuracy increases with increase in sample size, due to other limitations; Small sample size may be a concern that may raise question on representativeness. However, all effort will be made to generate a representative samples using scientific methods.

Access to rural people in a sparsely populated county of Garissa is likely to be difficult. Most of the people living in arid areas are somehow used to many development actors collecting data from them. Collecting data from the people experienced in donor's interviewers fatigue may prove to be very difficult for the researcher. Many can avoid giving any interview and those not found reluctant can be passive in their responses. Effort will be made to ensure rapport and understanding that data going to be collected will be for academic purpose.

1.10 Definition of Significant Terms

Food security: This is 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. It is a situation in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.

Food security indicators: Indicators are constructed from a set of observations, or measurements, of food security-related conditions, which are classified according to a set of criteria, aggregated, and placed in some program relevant perspective. Food security involves both physical and economic access to food to meet people's dietary needs. According to this definition food security is defined by the following states.

Food availability: Status where sufficient quantities of food are consistently available to all individuals within Lagdera Such food can be supplied through household production, other domestic output, commercial imports, or food assistance.

Food access: Status where households and all individuals within them have adequate resources to obtain appropriate foods for a nutritious diet. Access depends on income available to the household, on the distribution of income within the household, and on the price of food.

Food utilization: This is the proper biological use of food, requiring a diet providing sufficient energy and essential nutrients, potable water, and adequate sanitation. Effective food utilization depends in large measure on knowledge within the household of food storage and processing techniques, basic principles of nutrition and proper child care, and illness management.

Strategy: This is a plan for action/intervention and change within their community, department, organization or business developed by the development agency such as Lagdera. In this case Food security intervention strategies are approaches, methods or programs designs

	with aims of ensuring that there is an increased food availability, access, and utilization of the community targeted by food security programs.
Government policy:	These are regulations put in place to cub the menace of food security
Cultural values:	These are community taboos or ways of living.
Capacity building:	This is training or educating people on food security matters
Modern food production technology:	These are latest method of food production.

1.11 Organization of the Study

The study is organized into Five Chapters. Chapter one covers background of the study, statement of the problem, purpose of the study, objective of the study, research questions, significance of the study, limitations of the study, delimitation of the study, assumptions of the study and definition of significant terms. Chapter two is literature review which gives an overview of food security and several strategic interventions locally and globally with a theoretical framework and conceptual framework. Chapter three Research Methodology covers research design, target population ,sampling procedure and sample size, methods of data collection, validity of the research instruments, reliability of the research instruments, methods used for data analysis, ethical consideration issues and operationalization of variables. Chapter four covers data analysis, presentation, interpretation and discussions of the research findings. Chapter five covers, introduction, summary of the findings, conclusions, recommendations and recommendations for further research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The central objective of this chapter is to review literature and discuss a theoretical framework providing basis and assumption for this study. Theory is crucial in building the foundation of studies by providing basis of thinking for people involved in community development research. In this chapter there is focus on literature containing theories of the relationship between NGOs strategic interventions on food security in marginalized community. The sources of information include; academic documents review, administrative document, development agencies reports, previous studies, official economic development records, journals and internet.

This chapter covers literature that is relevant to the study. This included global food security status, food security status in Africa, food security status in Kenya, food security status in Garissa county, Strategic Intervention on food security, Theoretical Frameworks, Food security indicators, summary and Conceptual Framework.

2.2 Global Food Security Status

According to (FAO, 2013) a total of 842 million people in 2011–13 were estimated to be suffering from chronic hunger and regularly not getting enough food to conduct an active life. The number still is predicted to increase despite many development agencies diverse strategic interventions. The united nation agrees with this finding because they have predicted that by 2050, over 200,000 people in the world will require attention in terms of food supply among other demands. Although there is significant improvement in attaining millennium development goals in general, FAO indicates that sub Saharan African still remains in chronic hunger (FAO, 2013). This observation leaves questions on the intervention strategies being adopted in these regions. Countries such as.

2.3 Africa Food Security Status

Citing FAO status report on food security, Kingori in his research project indicates that Currently Africa is the main recipient of relief food in the world (Kingori, 2013**).** This includes Kenya with majority leaving in the marginalized areas where a great percentage is in north eastern province. It is further observed that the number of undernourished people in the African continent has steadily increased since the early 1990s from 175 million to 239 million today. From the 36 countries requiring external food assistance, 28 countries come from African countries accounting to over 50% of the African countries. These include countries which are large net importers of cereals and fuels, with generally low per capita incomes, relatively high levels of malnutrition, and for which there is a strong transmission of high international food prices (FEWSNET, 2012 and FAO, 2010).

2.4 Kenya Food Security Status

With regard to food security status overview in Africa, we have indicated that Kenya is one of the countries forming part of statistics of countries still depending on relief food and other food security related aids. According to National Food and Nutrition Security Policy (NFNSP), about 38.5 million people are poor, and some 7.5 million people live in extreme poverty where over 10 million people suffer from chronic food insecurity and poor nutrition. In recent years, it is estimated that at any one time about two million people require assistance to access food (NFNSP, 2011). This observation is further supported by the consequent study carried out by the USAID, GOK, WFP and FEWSNET in July –December 2012 which indicates that the Kenyan population who are food insecure was likely to increase from the 2.2 million to 2.4 million toward the end of 2012 (FEWSNET,2012).

Food insecurity affects economic development of any country and for that reason the government has indicated commitment in alleviating food insecurity in Kenya. policy issues pointed to be addressed regarding food security include; food availability, food safety and standard control; nutrition improvement, school nutrition and awareness, food security information, early warning and emergency management, institutions and legal, financing framework and strategic approach for implementing, monitoring and evaluation food intervention strategies. It is proposed that a strong, logical and realistic strategic framework

is required, with associated programmes and action plans. Actions must be purposefully linked and coordinated with one another and with sectoral initiatives of government and partners at national and sub-national levels (MOA, 2011). However, it is not clear how each strategy will be assessed to establish particular impact on particular sector of the community.

2.5 Garissa Food Security Statuses

Garissa County is one of the counties in the marginalized north eastern part of Kenya that heavily depend on livestock assets for income and food needs. It is also prone to rain failure and cyclical droughts that have severely hampered pasture growth, livestock rearing and agricultural activities leading to pronounced food insecurity. According to Garissa district development plan 2005-2011, it is indicated that food production in Garissa district is limited and variable due to unreliable weather patterns. It further point out that for example in 2005, the district produced a mere 152 MT of grain as compared to its population requirement of 70,650 MT (**WFP/ALRMP/FEWSNET, 2003).** The district is a net importer of food and over 94% of households staples (mainly rice and maize) are sourced from the market. Thus accessibility to the markets forms a critical component of household food security in the district (GOK, 2005).

According to food security district profile Garissa district, there are many development players including NGOs all focusing their effort on ensuring food security. Many of these agencies have come up with three general development strategies namely production sector, infrastructure; development and community development strategies (Garissa district office, 2008). With reference to this study, currently the three NGOs and government agencies as focused by this study who have been engaged on food security strategy implementation. Community capacity building through training, dissemination of market information, infrastructural development, promotion of modern production and storage technology are their common strategies. However how each strategic intervention influence food security in Garissa County is suspected not to have been established.

2.6 Food Security Indicators

In general food security can be measure by focusing on the level of food availability, access and utilization by the people in question (FAO, 2013). Following this observation, it is implied that any food security intervention should be related to food availability, access and utilization. Although the issue of food security has attracted many players who are attempting to get solutions, majority are likely not to be keen on relating particular strategies on food security indicators. Problems on food insecurity remain unmoved because dependence on useful policy prescription on accurate information is largely missing in Africa (Mellor et al (1987) and Maxwell, 1989). Most observers of sub-Saharan Africa such as Barrett and Arcese (1998), Barrett (1999) agree that food policy analysis is often formulated on an inadequate base of knowledge about a country's food situation. It ought to be axiomatic that food security planning must begin with an analysis of 'who is food insecure and why': only by combining classification of food insecurity with an analysis of why it occurs can appropriate interventions be planned and their effects predicted. This argument prompts the mind of researcher so that they approach the issue on food security indicators and its relationship with strategic interventions as discussed in this literature review.

2.6.1 Food Availability

Food availability is the capacity of the household to have enough food to fulfill the nutritional need of the family as a whole. Food availability can be viewed as the physical existence of food, either from own production or from the markets (NFNSP, 2011). At the national, district or local level, food availability is a combination of food production, food stocks, commercial food imports and food aid at that respective level. According to our case study, Food production in Garissa district is limited and variable due to unreliable weather patterns. In 2005, the district produced a mere 152 MT17 of grain as compared to its population requirement of 70,650 MT (Garissa District Office, 2008). The district is a net importer of food and over 94% of households staples are sourced from the markets Thus accessibility to the markets forms a critical component of household food security in the district (GOK, 2005).

2.6.2 Food Access

Food access is ensured when all households and individuals within those households have sufficient resources to obtain appropriate foods for a nutritious diet (FAO, 2013). It is dependent on the level of household resources – capital, labour and knowledge – and on food prices. Following this argument then, to address food security strategies that improves capital, effective labour and knowledge is required. This calls for community capacity building as discussed later in the study.

2.6.3 Food Utilization

Food utilization is about how people biologically benefit from the food they take so that they can lead healthy and productive lives. According to FAO, food utilization focuses on biological needs of particular age group in a given population (FAO, 2013 and NFNSP, 2011). The amount of nutrients and its variety required for each age group determine the food utilization. Different age groups in the population in human lifecycle require different diets which determine productivity of people. Maternal and new born diets; early childhood, late child hood adolescence, and adult and older people diets are important factors to be considered (NFNSP, 2011). In this case, strategic intervention targeting food security should also address the issue of diets required by various members of the community.

2.7 Strategic Intervention on Food Security

In Garissa County, there are many development players involved in activities for alleviating food insecurity. According Garissa district development plan, strategic priorities have been identified as production sector, infrastructure and community development for implementation to address food security (GOK, 2005 and Garissa District Office, 2008). This is in line with the proposed policy intervention developed by the government of Kenya in 2011(NFNSP, 2011).

The focus of this study is to explore the influence of different food security interventions adopted by three NGOs operating in Garissa County. Training for capacity building, improving access to market information, infrastructure development, adoption of modern food production and storage technology are the strategies selected for investigation.

2.7.1Training for Capacity Building and food security

Information is power and this power is require for community development. Access to health environment services, infrastructure and technology alone is not enough for members of community to develop food security capacity (IFPRI, 2004). Capacity is simply the ways and means needed to do what should be done to improve the quality of life in a particular individual, community or organization or institutions. No one is without capacity, but often we need to develop it through training Mwaniki, 2003, FAO, 2010 and Njoroge et al 2013). Community capacity building involves many aspects and considerations among them including extension services and provision of material support (CCCCD, 2009). According to FAO and IFPRI on declaration of Alama-ata in 1978 and Kaloi et al, (2005) individual advancement is commonly based on appropriate and adequate information or educations which are likely to influence community adoption on food security strategies.

2.7.2 Improved Access to Market Information and food security

Many studies have indicated that food security is related to poverty level of the people affected. This argument is supported by various literature including FAO, 2013, IFPRI, ACTS, 2012 and 2004, Njoroge et al 2013, and MOA, 2011. Though these are few literature reviewed, it is hinted that poverty is one of the main cause of food security. In this literature it is argued that members of community should have appropriate and adequate market information so that they can sell their produce at competitive prices that will boost their income. When the income is improved, people are able to access food at the right quantity and quality.

According to Inter American Development Bank (IDB,2013), to maintain or increase agricultural growth and to face the challenges of feeding an increasing population and adapting to the impacts of climate change, there is a need to help farmers increase their productivity with greater access to markets, better agricultural services and increased investments.

2.7.3 Infrastructure Development and food security

Road networks, information and communication technology, water, health and sanitation facilities among other social facilities determine community productivity (FAO, 2010 and IFPRI, 2004). Many of the rural community waste a lot of time, energy and resources on travelling to market places or watering points. In cases where some rural areas are agriculturally productive, many people despite having spent a lot of resources on farms to produce crops or animal products, they end up not taking them to market. If these products are not taken to market, then many other people will not access food and the producer will incur post harvests losses (Njoroge et al 2013, CCCD, 2009 and ACTS, 2012).

2.7.4 Adoption of Modern Storage Facilities and food security

One of the greatest challenges for farmers in rural areas is the access to the market due to poor infrastructures. Inadequate storage constitutes a public health and earning threat when people consume spoiled food, causes supply fluctuations and exacerbates prices, all of which are key causes of food insecurity and malnutrition. If farm produce do not reach to the market, many people will not have access to adequate food and the producer will suffer post harvest losses and this sound realistically as a double blow to the rural community. Storage for produce awaiting good market or for preservation is one of the strategies proposed and adopted by many people (Njoroge et al 2013, CCCCD, 2009 and FAO, 2013).

According to MOA, 2011, a significant proportion of the food produced is lost due to post-harvest spoilage and wastage, including in some cases from toxin causing micro-organisms. Losses are often substantial for grain and produce (fruits and vegetables) along with spoilage of animal products including milk, meat and fish. Losses of stored maize are estimated to be a staggering 30-40% per annum. Whether this could be the case in other part of the country for other agricultural produce remain to be investigated. This brings us to assess whether storage has influence on food security in Adeso of Garissa County as proposed in this study.

2.7.5 Adoption of Modern Food Production Technology and food security.

The government of Kenya commitment to alleviating food security is indicated in national development plan, ministry of agriculture and nation food and nutrition policy. According to

Ministry of Agriculture (2007), Vision 2030 recognizes the role of science, technology and innovation in a modern `economy, in which new knowledge plays a central role in wealth creation, social welfare and international competitiveness. Food and Agriculture Organization (2010), reported that modern technologies and advances in the agricultural sector, such as inorganic fertilizer, pesticides, feeds, supplements, high yielding varieties, and land management and irrigation techniques have considerably increased production. This has been fundamental in meeting the food needs of a growing population and in generating economic growth needed for poverty reduction. The uptake of modern farming technologies in Kenya remains low despite the dilemma in cyclical hunger crisis engulfing Kenya and much of East Africa (Mwololo, 2013). This can be attributed to lack of sufficient information on modern farming practices, extension services, marketing and post harvest support. He further stated that technological innovation in food production in Kenya is no longer an option but an imperative. This is due to the recent climatic change, regional drought and famine, and chronic food insecurity. That is, rain fed agriculture is unsustainable and must be replaced by alternative mechanisms driven by technology. Therefore this study focuses on assessment of the influence of technologies on food security among households particularly for Garissa County.

2.8 Theoretical Frameworks

In this study, we acknowledge that food security and its indicators is a complex issue that requires review of relevant literature and theoretical backgrounds. Development theorist view is that measuring food security requires a multidimensional approach (FAO, 2013). As a matter of facts there are myriads of theories that explain or can be related to food security issues and its relation with strategic intervention adopted. This study is based on two bodies of theories namely asset based community development model and sustainable development theory.

2.8.1 Asset Based Community Development Models

While there may be many theories of development, in this study Community Development theory is perhaps the most practical framework for community capacity building practitioners. It focuses on the centrality of oppressed people in the process of overcoming

externally imposed social problems which should be addressed on basis of community assets and sustainability issues. Community development is the process of employing community structures to address social needs and empower groups of people (Mendes, 2008). The unique focus on the employment of community structures in the process of change is based on Community Development theory and theory of community capacity become relevant hence recognizing members of community as assets and not a liability.

Policy makers regard community capacity as a key success factor in a range of policy interventions (ODPM, 2003). However, it has been alleged that many policy makers and development agencies adopt negative view or deficit/victim approach to community capacity building. On the other hand, others approach community capacity building in a positive light also called latent or asset based approach. In his guide book on Building Community Strengths, he differentiates the two approaches deficit and latent (Skinner, 1997). In deficit approach, community is viewed as object or victim of problem assumed to have no skills, need to be taught new skills, method of capacity building is usually passive, and done traditionally, characterized by one way of communication, cannot be trusted with credit and capacity builder does not focus on innovation. In latent or asset based approach, the assumption is that the community has capacity that requires activation. In his argument skills are released from people to do work, method for building capacity is progressive, communication is two way, level of trust in community credibility is high and the role of capacity builder is facilitating innovation or creativity. The latter forms the basis for this study thus informing on the reason for investigating community project management capacity at different stages of project development.

Comparing the two approaches, there is a need to shift to the latent capacity building approach-Asset Based Approach that instead of treating people as "empty vessels" in often top-down and patronizing ways, communities will be seen as essential partners whose skills and knowledge are vital. This view of capacity building acknowledges that communities already have resources- skills, knowledge, talents, expertise, material goods among others that need to be harnessed, not built. Asset based approach sees communities as active and equal partners that need to be engaged in new ways of working at all stages of community

project development. This view provides a significant challenge to the system to build new and positive relationships with communities based on trust and mutual benefit which are precursor for sustainable development.

In agreement with the theory, empowerment refers to the process by which people gain control over the factors and decisions that shape their lives (WHO, 2013). It is the process by which they increase their assets and attributes and build capacities to gain access, partners, networks and/or a voice, in order to gain control. It assumes that people have their own assets, and the role of the external agent is to catalyze, facilitate or accompany the community in acquiring power. Community empowerment implies community ownership and action that explicitly aims at social and political change. Community empowerment is a process of re-negotiating power in order to gain more control. Community empowerment necessarily addresses the social, cultural, political and economic determinants that underpin health, and seeks to build partnerships with other sectors in finding solutions. However, poor people's empowerment and their ability to hold others to account, is strongly influenced by their individual assets (such as land, housing, livestock, savings) and capabilities of all types such as good health and education, social (such as social belonging, a sense of identity, leadership relations) and psychological (self-esteem, self-confidence, the ability to imagine and aspire to a better future) (DFID, 2013). Also important are people's collective assets and capabilities, such as voice, organization, representation and identity. In conclusion people are endowed with resources or assets and what is required are strategies for ensuring effective and efficient mobilization those resources in order to benefit them.

2.8.2 Sustainability Theory

Sustainable development is a development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs (Bossel, 1999). The need for sustainable development has become an issue in any part of the world. However in order for one to know what is a sustainable development, knowledge of what is important for the viability of the systems and how that contributes to sustainable development is necessary. When assessing the community capacity in managing projects

understanding sustainability issues is important. That is to say any capacity building strategies need to examine the interconnected nature of both the local and larger networks.

The theory of sustainable development indicates that the concern of Sustainable development is management of the process of change, not on setting an end goal with fixed outcomes. It recognizes that uncertainties exist, necessitating flexible and ongoing processes. It also supports diversity and differences within the local setting. Inherent in this concept is consideration of the social, political, economic, and cultural relationships fundamental to development agenda. In this theory, sustainable development requires a broad picture view-global thinking and local action of communities, while constantly thinking critically about and fine-tuning the small intricacies of the relationships that ultimately shape these communities.

Looking at the focus of this study, sustainable development theorist informs us that in order to identify community needs and set priorities, there is a need to determine community preferences and balance competing interests. In this argument, people and their social institutions must be included in the community planning process to increase the probability of achieving a successful outcome because lasting change generally comes from local involvement.

Many good programmes fail because the proponents have never stopped to assess community capacity or asset before rolling out the programmes. Long-term goals of the sustainable development should seek to empower people, increase community participation, foster social cohesion, enhance cultural identity, strengthen institutional development, and promote equity and fairness (Carol et al, 1999).

Sustainable development theory suggests that human and social capital should be treated much like natural resources. Efficient and effective use of these resources provides long-term, sustainable benefit to local communities. The investigation in this study borrows from sustainable development theorist emphasis that capacity assessment is crucial foundation for community participation in development projects.

2.9 Conceptual Framework

The conceptual frame work is shown in figure 1 in following page. The issues of investigation in this study are Strategic intervention on food security in adios division of Garissa County. The selected food security considered for this study and treated as dependent variables include; Food availability; Food access and Food utilization.

As mentioned earlier in the assumptions of behind this study, it is expected that any strategic intervention undertaken by NGOs in the area focused by this study is likely to influence the state of food security in Lagdera Sub County. The proposed problem under investigation is to establish whether there is a relationship between strategic interventions and food security in Lagdera Sub County. In this case our independent variables includes; Training for Capacity Building; Improved access to market information; physical infrastructures; adoption of modern food storage technology and utilization of food production technology.

However, there are other factors like cultural values and government policy that may influence the relationship between strategic interventions and the status of food security in Lagdera Sub County in Garissa County. The variables discussed will be measured by identifying the respective indicators as explained and illustrated here under.

2.10 Extraneous Variables

The issue of concern is to establish whether there is a relationship between strategic intervention and food security. This is based on assumption of linear relationship but other factors can bring interplays by moderating or intervening. In this study there are extraneous variables likely to influence the relationship and this include target beneficiaries cultural values and government policy variables related to other development agencies and the socioeconomic status of the target population respectively.

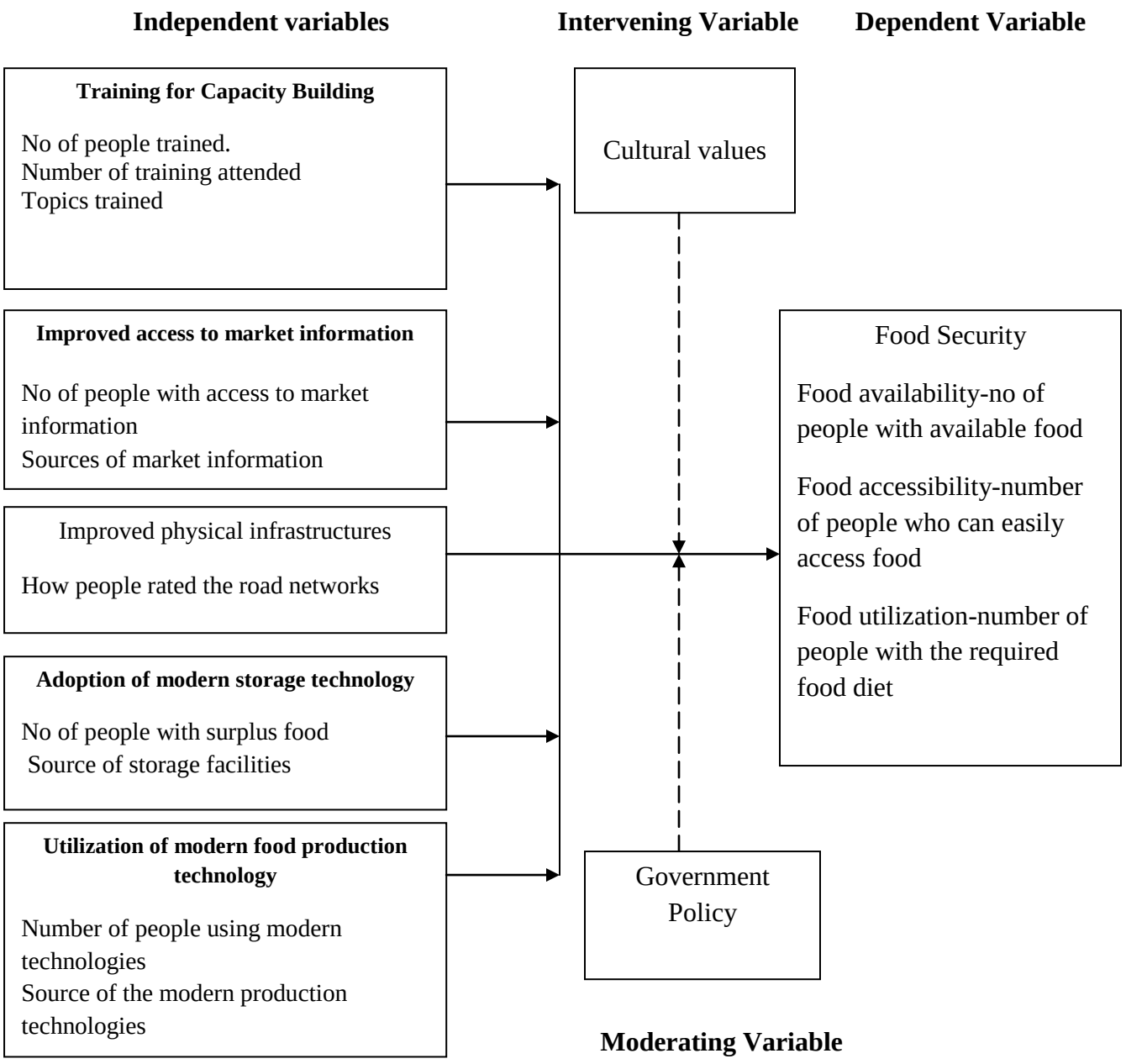

Figure 1. **Conceptual Framework**

2.11 Summary of Literature Review

From the literature reviewed, there is agreement that strategies for alleviating food security are multisectoral and dimensional. However, all literatures agrees that training for capacity building, development of infrastructures, promotion of access to market information,

promotion of food storage and production technology have some influence on food security, it is indicated that all the studies and report reviewed takes a generalist approach or target other places. This leaves a gap that requires one to establish how the stated strategies influence food security in arid areas specifically in Adeso of Garissa County.

This study is based on community asset based and sustainability theory. In asset based capacity building as a strategy for community development provide that practioners should view community as people with latent resources that require someone to trigger them for exploitation.

Sustainability theory explains that capacity building strategies should consider the interaction of local and global diversities for the sake of benefiting the current generation without compromising the future generation. This theory has a strong relation to asset based model of community development providing that development practitioners are not supposed to view communities as needy people but rather as people with potentials. This explains reasons for exploring community capacity in order to establish their areas of strength and capitalize on it for sustainable development.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the proposed methods to be adopted for this study. Research design, target population, sample size and sample selection, data research instruments, validity, reliability of research instruments, data collection procedure and data analysis techniques.

3.2 Research Design

The study adopted a descriptive survey research designed to collect and analyze data because it enabled the researchers to summarize and organize data in an effective and meaningful way (Mugenda and Mugenda, 2008). The design would help in describing the state of affairs as they existed, without manipulation of variables (Kothari, 2004).

Data was collected from five NGOs sampled among twenty NGOs operating in Lagdera Sub County in Garissa County. Survey was preferred because it made it easier for one to collect data from a sample rather than from every member of the population, and make descriptive inferences. That made the research to consume less time and cost. It also utilized questionnaires with both open ended and closed ended questions, which constituted items on strategic intervention and food security. The design was also be used in exploring the existing status of two or more variables at a given point in time. A survey is an attempt to gather data from members of a population in order to determine the current status of that population with respect to one or more variables (Mugenda 1999). Most of the data involved was qualitative where the information was sought through semi structured questionnaires, interviews and self observation.

To counter the limitation of the survey design, effort were made to visit the project sites and seeking appropriate background information seeking from other stakeholders connected to the development projects dealing with food security programmes. To avoid the influence of interviewer subjectivity, the questions was standardized. The programmes were to be described using information in a project context by applying semi structure questionnaire that

allowed respondent option of being open on the basis of the project context to minimize withholding of some information.

3.3 Target Population

A population is defined as the total collection of elements about which a researcher wish to make some inference (Mugenda 1999). According to 2009 population census report Garissa county had a total population of 623,060.A study carried out by coverage monitoring network, "semi-quantitative evaluation and coverage in Garissa county " on November 2013 indicated that Lagdera sub county had a population of 82,167 and an average village population of 1226.The study involves five sets of populations derived from the Lagdera sub county served by three NGOs operating in Garissa County: CBOs officials, community members, NGOs officials, government agencies and private enterprise owners accounting for approximately 30,100,40,110, and 30 people respectively making a total of 1210.

This population will be stratified into two strata's for male and female adult at ratio of 1:4 giving approximately 242 and 968 women and men respectively. This technique produces estimates of overall population parameters with great precision (Kothari, 2004).

For the purpose of this study and due to the limitation of time and cost factors, the researcher will randomly sample the population as explained below.

3.4 Sample and Sampling Procedure

A sample is a group on which information is gathered and the finding after analysis can be used to make generalization about a population (Kothari, 2004 and Mugenda, 1999). The argument of the two authors is that by selecting some of the elements in a population one can draw conclusions about the entire population based on a sample.

In this study, the sample will be drawn from five sets of population which include; six sets of populations derived from the Lagdera sub county served by three NGOs namely care international, Adeso water for livestock programme and TDH; CBOs officials, community

members, NGOs officials, government agencies and private enterprise owners operating in Lagdera sub county in Garissa County.

Simple Random and stratified sampling will be used in this study. In statistics, a simple random sample is a group of subjects chosen from a larger group where every individual has a chance of being selected (Cooper, 2006). In this study a sampling procedure will adopt Mugenda's model of sampling in social research that guide on determine accessible population. According to Mugenda 1999, accessible population is enough for sampling and therefore we adopt mugenda's model of determining the accessible population that will make our sample size. Mugenda 2004 recommends 10% is appropriate for the sample drawn from accessible population. The target population was stratified as shown below.

Table 3.1: Sampling Procedure

Sno.	Category	Target Population 100%	Sample Size 10% of access population
1	CBOs officials	30	3
2	Government agencies officials	110	11
3	NGOs officials	40	4
4	Enterprise owners	30	3
5	Adult female and male community members	1000	100
	Total	**1210**	**121**

3.5 Method of Data Collection

Date collection was collected in the month of November, 2014 and was scheduled to take two weeks involving both primary and secondary data. A Research Permit was obtained from the national commission for Science, Technology and innovation (NACOSTI) and clearance letters by the county Commissioner. The five sets of population discussed earlier participated in the main study and personally were visited by the researcher and three research assistants. During that exercise, the respondents were assured that strict

confidentiality would be maintained in dealing with their responses as provided by professional code of ethics in research procedures.

The target NGOs leaders were requested to provide the information on the projects selected in Lagdera Sub County. Since the NGOs official played the facilitative role, they were required to help a researcher identify the project coordinators and community based organizations leaders involved with the selected cases. After identification of the projects for this study, the active project coordinators and CBOs project leaders were contacted and explained the purpose of the study. The researcher used Primary and Secondary data collection methods.

3.5.1 Primary Data

In the study two primary data collection instruments were used; a questionnaire and an interview guide. These are preferred primarily due to their practicability, applicability to the research problem and the size of the population as well as their cost effectiveness (Denscombe, 2008). A self–administered questionnaire with both open and closed ended questions were developed and administered to obtain information from the 21 respondents. On the other hand, the interview guide was used to obtain data from key informants who were drawn from the relevant Government line ministries officers in the County. The statistical package for social sciences (SPSS) was used for data analysis, whereby frequencies, percentages, mean and standard deviations generated from the various data categories were computed and represented in different tables and figures.

3.5.2 Questionnaire Survey

Data was collected through questionnaire from a sample of 121 people as shown in table 1. A questionnaire is a set of questions used to gather information in a survey. It has a technique designed for collecting primary data by eliciting written responses from the subject. The survey involved a sample of 3, 11, 4, 3 and 100 people derived from CBOs officials, GOK officials, NGOs officials, enterprises owners and members of community respectively. The questions were both open and close ended. Some part of it was designed to get opinions and comments on specific issues from the research participants. Close ended questions were used

to save time and open ended questions to get in-depth knowledge and insight; as well as personal experiences and observations. Questionnaires were administered directly to the respondent which was expected to increase high rate of return and reduce the cost. The approach also allowed the researcher to have an opportunity to explain the study and answer any question that the respondent may have before completing the questionnaire.

The questions to be included were based on the dependent and dependent variables namely food security strategic intervention and food security status. Data was collected on selected Indicators of food security namely food availability, food access and food utilization. Strategic food security interventions are independent variables where the data will be collected on five strategic intervention indicators namely capacity building programmes: improved access to market information; modern storage technology; infrastructures and utilization of modern food production technology.

Each questionnaire bear seven parts with part one seeking responses on background information and the remaining five focuses on seeking information five strategic food security intervention and last one focus on food security indicators. Since five sets of population were involved, five sets of questionnaires were developed for each category sampled from the target population based on sampling procedure in table 1.

3.5.3 Interview

Although a sample from the government and NGOs officials was required to fill a questionnaire, they were requested for interview in order to provide information that would clarify some responses from them and other respondents.

Interview schedules

An interview guide was used to conduct the interviews with the sampled CBOs and members of community where a respondent might get it difficult to read the questionnaire. In order to avoid biasness, rapport was established between the interviewer and the respondent prior to the interview. The interviewers were also to undergo an ethical consideration orientation regarding data collection. To ensure the research assistants collect data effectively. The

researcher was effectively involved and the research assistants from the time of translating the interview guide schedule to Swahili or appropriate language in some cases local language. The research assistants also participated in the pilot study.

3.5.4 Secondary Data

A research cannot be considered complete if no thorough literature review has been considered. To give good insight about the research topic, secondary data was gathered through content analysis. It was used for the reanalysis of previous literatures, collected and analyzed data. It was collected from CBOs, NGOs and partners documents; journal articles, published books, government documents, policy papers, manuals, related Acts/Rules/Regulations, research reports, internet documents etc. The books and published documents relevant to the study were collected from various sources like from appropriate institutions of learning, research and training.

3.6 Pilot Study

According to Sekaran (2003) a pilot study is necessary for testing the reliability of data collection instrument. Pilot study is thus conducted to test weaknesses in design and instruments to provide proxy data for selection of a sample. The pilot study was done on 1% each category of access population who were not being included in the study. This was done to determine the possibility of flaws, weaknesses and ambiguities in any of the question. It also helped to know if the questionnaires would elicit the type of data desired and anticipated, if the data desired could be meaningfully analyzed in relation to the stated research questions and find out whether the time, cost and staff requirements estimated is valid. After pretesting, the questionnaires were edited before the final data collection done. However the findings from the pilot study were not included in the final results.

3.7 Research instruments

Semi structured questionnaires were designed as the instrument for collecting and facilitating data collection. The questionnaire included the component of community driven development information as well as component of food security and strategic intervention indicators. The instrument for data collection focused on food security indicators namely

food availability, food access and food utilization; and five Strategic food security interventions indicators namely capacity building programmes: improved access to market information; modern storage technology; infrastructures and utilization of modern food production technology.

The instrument underwent several drafting with objective of making it valid and reliable for data collection. The instrument was given to community development and social development expert to help in fine tuning before the same is forwarded to the research supervisor Dr. Kyalo D.N of university of Nairobi for comment and correction and later finalization.

3.8 Validity of Research Instruments

Validity is the accuracy and meaningfulness of inferences, which are based on the research results (Mugenda A. G, 2003, O'Donoghue, 2003 and Kothari, 2003). This refers to whether the research truly measures that which it was intended to measure or how truthful the research results are. The validity of research instruments in this study was tested through a pilot study and was done on a population similar to the target population.

3.9 Reliability of Research Instruments

Reliability is a measure of the degree to which a research instrument yields consistent results after repeated trials implying that circumstances under which the measurement will take place will be consistent (Mugenda 1999 and Kothari.2003). Reliability is the extent to which a measuring instrument contains variable errors, that is errors that appear inconsistently from observation to observation during any one measurement attempt or that vary each time a given unit is measured by the same instrument.

Reliability was achieved by making sure that other exterior causes of variation such as boredom, exhaustion and fatigue minimal as possible. That was attained through creating comfortable surroundings prior to the research study to the research assistants and to the respondents during data collection. Lively and friendly environment was created before

carrying out the research. The researcher also trained the research assistants thoroughly to increase reliability.

The internal consistency of the items and reliability coefficients was calculated from the pilot study data. According to Roscoe (1969), the split half method is used to establish the coefficient of internal consistency. Split- half test will be done to obtain the correlation coefficient (r) using the Pearson Products Moment Correlation. Coefficient Formula indicated below:

r = [_ xy- (_X) (_Y) / N]; where; _ XY= Sum of the cross product of the values for each variable (_X) ((_Y) = product of the sum of X and sum of Y

N= Number of pairs of scores

To obtain the reliability coefficient (r e) of the entire instrument, the Spearman Brown Prophecy

Formula indicated below will be applied

Re= 2r/ (1+ r), where; Re = reliability of the original test, R= reliability coefficient resulting from correlating the scores of the odd statements with scores of the even statements.

3.10 Data Presentation and Analysis

Quantitative and qualitative data analysis methods were used to analyze the data. In view of this study, we acknowledge that measuring the indicators of food security may be difficult. In this case, the quality description was converted into quantitative information. The important evaluation techniques considered for the study was survey, beneficiaries' assessment and semi structured and guided interviews. The information gained through these techniques was used to calculate nominal measures, rank ordering of categories and frequency distribution in analysis.

Data cleaning and editing was done to confirm the completeness. Data was coded and analyzed. Since the study focus was to establish the relationship and its direction between variables, descriptive, correlation and tabulation was used. Data was then be interpreted and a report was generated. The analysis technique used enabled the researcher to derive to meaningful information that arrived at useful conclusions and recommendations.

The descriptive statistics was done to analyze demographic information of respondents and to compute scores for the various factors under consideration. The open ended responses were categorized after identifying the theme and assigned numbers to them. Measures of central tendency include; median, mean and mode and variability including range, standard deviation and variance were measured.

The statistical Package for Social Science (SPSS) components such as correlations, cross tabulations were used in analyzing data. The software was chosen because is the most widely used package for analyzing survey data. Besides being the most used package, the software has the advantage of being user friendly. It can also be easily used to analyze multi response questions, cross section and time series analysis and cross tabulations. The data was presented on tables and figures proceeded by explanations.

3.11 Ethical Considerations

The study participants were debriefed on the purpose of the study and made to understand that participation was purely voluntarily. The respondents were informed on the sensitivity of some of the questions that were to be asked. The respondents were made aware that the information given would be treated with confidentiality and they would remain anonymous. The participants were asked to give an informed consent for their voluntary participation. A Research Permit was obtained from the Ministry Education Science and Technology (MOEST) and clearance letters by the county Commissioner and other offices that may be affected by this research.

3.12 Operation Definition of Variables

The operation definition of variables is a graphic framework adopted in this study to show the hierarchical relationships between variables and their indicators and measurement while showing the measurement scales, data collection methods and proposed tools for analysis. The framework showed how the proposed study objectives were to be achieved. It showed the independents and dependent variables with their respective indicators and how they were measured. Operation definition of variables is a basic tool that a researcher would use in formulating the questions for use in the questionnaire, interview and interview schedule. For that explanation refer to table 2.

Table 3.2. Operation definition of variables

Variable	Indicators	Measurement	Scale	Data Collection Method	Tools For Analysis
Dependent					
	1. Food availability	Number of people Percentage of responses	Nominal Ratio	Questionnaire Document review Interview	Correlation and cross tabulation
	2. Food access	Number of people Percentage of responses	Nominal Ratio	Questionnaire Interview Historical analysis	Correlation and cross tabulation
Food Security	3. Food utilization	No of responses on training Number of people	Nominal Ratio	Questionnaire Document review Interview	Correlation and cross tabulation
Dependent **Food Security Strategic Interventions**	1. Training for capacity building	Number of people Percentage of responses	Nominal Ratio	Questionnaire Document review Interview	Correlation and cross tabulation
	2. Improved access to market information	Number of people Percentage of responses	Nominal Ratio	Questionnaire Document review Interview	Correlation and cross tabulation
	3. Infrastructures	No of responses on training Number of people	Nominal Ratio	Questionnaire Document review Interview	Correlation and cross tabulation
	4. Adoption of modern storage technology	Number of people Percentage of responses	Nominal Ratio	Questionnaire Document review Interview	Correlation and cross tabulation
	5. Utilization of modern food production technology	Number of people Percentage of responses	Nominal Ratio	Questionnaire Document review Interview	Correlation and cross tabulation

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter consists of results and findings of the research conducted on the influence of nongovernmental organizations intervention strategies on food security in arid lands: a case of water for livestock programme in Garissa County. The important areas covered include background information, data analysis, interpretation, conclusion and recommendation. The study involved Adult female and male community members, CBOs officials, NGOs officials, Enterprise owners and Government agencies officials making a target population of 1210.

A simple random sampling and Mugenda's model of getting a sample from a target and accessible population was adopted giving a sample of 121 people (Mugenda 2004). Thirty two (32) questions were formulated and questionnaire used to get responses where the return rate was 99%. Selected question for key variables under investigation were considered. The respondents were required to respond to questions on background information, strategic interventions which are independent variables indicators namely training, access to food produce market, Infrastructures, Adoption of modern food storage technology and Utilization of modern food production technology. On food security considered dependent variables, respondent were requested to answer questions on Food availability, access and utilization. Descriptive and correlation analysis was adopted

4.1.1 Background Information

The important background information considered was gender and age. Respondents were requested to indicate their age and gender as illustrated in table (3) below.

Table 4.1: Gender and Age of` the Respondent.

Age of the Respondents	Female			
	Frequency of age category	Age category %	Frequency of age category	Age category %
20	3	5.0%	3	50.0%
22			5	100.0%
24	1	1.7%	2	66.7%
25	7	11.7%	5	41.7%
26			1	100.0%
28	4	6.7%	4	50.0%
30	3	5.0%	10	76.9%
32	3	5.0%	7	70.0%
34	3	5.0%	2	40.0%
35	6	10.0%	8	57.1%
36	2	3.3%	1	33.3%
38	1	1.7%	4	80.0%
40	10	16.7%	2	16.7%
42	3	5.0%	2	40.0%
44			1	100.0%
45	7	11.7%	2	22.2%
46	1	1.7%		
50	3	5.0%	1	25.0%
52	4	5.0%		
Total	61	100.0%	60	50.0%

From table (3) above, the number of female and male respondents is 61 and 60 respectively accounting for 51% and 49% for each case. Majority of the respondents involved in the study were aged thirty years (30) accounting for 8.3% of the total. Majority of the male respondents were aged 40 years accounting for 16.75. For female was 30 years accounting for 76.9% of the total. The study also indicates that there were more men aged over 40 years

who responded compared to women in the same age category. In both age categories and gender, fewer people below 30 years responded to this study. The observation made here will later be related to the results of the variables under investigation in this study to partly inform conclusion and recommendation.

4.2 Strategic Interventions and Food Security

In this study, strategic interventions are some of the factor suspected to influence food security in Garissa County. Within the scope of this study, strategic interventions are investigated to establish their influence on food security. Food security in this case is considered to be a dependent variable being predicted as discussed in the sections that follows.

4.2.1 Food Security Strategic Interventions

The food strategic interventions considered as independent variables in this study includes; training; access to market information; Infrastructure development; storage facility and adoption of modern food production technology. In this section, the data on indicators for both variables were collected analyzed, discussed and presented as shown in tables that follow.

4.2.2 Training for Capacity Building in Food Security

In this study respondents were asked to provide information on need for food security training, on whether they attended any training in food security, indicate food security training provider, Number of times respondent attended training and Areas of food security training attended. Descriptive data on the stated indicators are as shown in table (4) below.

Majority of the people indicated that there is a need for food security training accounting for 84.2% which translate to 101 people out of the total interviewed. On training, only 8.3% and 7.55 indicated that there is no need for training and not sure respectively.

Table 4.2. Responses on Training Indicators

Category	Frequency of each category	Each category percentage	Cumulative Percentage
Respondent indicating the need for food security training			
Yes	101	84.2	84.2
No	10	8.3	92.5
Not sure	9	7.5	98.3
Total	120	100.0	100.0
Respondent indicating having attended training in food security			
Yes	45	37.5	37.5
No	69	57.5	95.0
Not sure	4	3.3	98.3
No response	3	1.7	100.0
Total	121	100.0	
The respondent food security training provider			
Government	41	34.2	34.2
NGOs/CBOs	47	39.2	73.3
Radio/TV	11	9.2	82.5
Self development books	7	5.0	87.5
No response	15	12.5	100.0
Total	121	100.0	
Number of times respondent as attended training on food security			
Once	17	14.2	14.2
Twice	26	21.7	35.8
Thrice	32	26.7	62.5
Several times	23	18.3	80.8
No responses	23	19.2	100.0
Total	121	100.0	
Areas of food security respondent got training			
Production	31	25.8	25.8
Nutrition management	18	15.0	40.8
Food marketing	6	4.2	45.0
No response	66	55.0	100.0
Total	121	100.0	

When asked to indicate whether they attended any training on food security, majority accounting for 57.5% indicates that they did not attend any training on food security. For respondent indicating having attended a training on food security accounted for 37.5%. Out of the total responses, 3.3% and 1.7% were not sure and did not give response respectively. Majority making 39.2% indicated that their training providers were NGOs or CBOs. The rest indicates that their training providers were government, media and self development books accounting for 34.2, 5.0 and 9.2% respectively. However, a significant number of respondents accounting for 12.5% did not respond to the question.

The respondents were also required to indicate the frequency of attending training. It was observed that when asked to indicate the number of times they attended training, majority had attended training three times this accounting for 26.7%. The remaining group accounting for 14.2%, 21.7% and 18.3% had got training once, twice and severally. However, 19.2% of the respondents did not respond to the question probably reflecting consistence with the number of people indicating that they did not attend any training though with a significant variation.

For Areas of food security training, majority accounting for 25.8% indicate that the training offered was on food production. The remaining group indicates that their training was on nutrition management and Food marketing accounting for 15% and 4.2% respectively. It is also indicated that on areas of training, majority did not give their response and this account for 55% which in a way correlate with responses on people indicating that they did no attend any training which account for 57.5%.the research indicated that NGOs being the most service provider on training there was need to improve for majority responded having not been trained on food security. This will justifies the need to do more on training according to FAO and IFPRI (2004)

4.2.3 Access to Food Market Information

In this study, access to information on food market was suspected to influence food security. For that reason access to food market information as a variables was measured through selected indicators namely; respondent engagement in food production, rating of food market

information accessibility, respondent view on current support on food security and source of information. The respondents were requested to provide information and summarized as shown in table (5) below.

Table 4.3: Access to Food Market Information Indicators

Category	Frequency of each category	Each category percentage	Cumulative Percentage
Respondent indicating being engaged in food production to supply others			
Yes	63	52.5	52.5
No	42	35.0	87.5
Not sure	16	12.5	100.0
Total	121	100.0	
Respondent rating of market information for his/her products			
Good	55	45.8	45.8
Fair	44	36.7	82.5
Poor	22	17.5	100.0
Total	121	100.0	
Respondent indicating access to support in terms of products market information			
Yes	56	46.7	46.7
No	40	33.3	80.0
Not sure	8	5.8	85.8
No response	17	14.1	99.2
Total	121	100.0	
Respondent source of information for his/her products			
Government	10	8.3	8.3
NGOs/CBOs	25	20.8	29.2
Radio/TV	71	59.2	88.3
Other people	9	6.7	95.0
Self development books	6	5.0	100.0
Total	121	100.0	

From table above, majority of the respondent accounting for 52.5% made up of 63 people indicates that they are engaged in food production activities. The remainder of the sampled people, 35% indicates that they were not involved in food production activities whereas 12.5% were not sure. On the way the respondents rated accessibility to food market

information, 45.8% indicated that the accessibility to food market information was good. 36.75% and 17.5% of the respondents indicated that their access to market information is fair and poor respectively. When requested to give information on how they viewed support on food security, 46.7% making majority indicated that they had support for food security. 33.3% and 5.8% indicated that they did not have support and not sure respectively. However, a significant number of people accounting for 14.1% did not respond to the question. On where the respondent gets information on food security, the results reveal that majority accounting for 59.2% get information from radio or television. Government, NGOs/CBOs, other people and self development books were indicated to be source of food security information accounting for 8.3%, 20.8%, 6.7% and 5.0% respectively. This research indicated that NGOs insignificantly had contributed to provision of market information to the communities living in Lagdera Sub County. According to Inter American Development Bank (IDB,2013), to maintain or increase agricultural growth and to face the challenges of feeding an increasing population and adapting to the impacts of climate change, there is a need to help farmers increase their productivity with greater access to markets, better agricultural services and increased investments.

4.2.4 Infrastructure Development

Infrastructure development is one of the factors likely to influence food security. Following this, this study focused on a few selected indicators to measure infrastructural development in Garissa County. The indicators used include respondent view on the state of road networks, rating of road network increase, respondent means for ferrying their food produce to market, respondent identification of other development contributing to food security, the development that contribute most and areas where NGOs and CBOs have contributed most. Table (6) below illustrate the descriptive data on the selected indicators.

On road networks, majority of the respondents accounting for 47.55 indicated that their road network was poor. For the remaining group, 11.7% and 37% rated road network as good, fair respectively. However, 0.8% and 2.5% indicated that they do not know and did not respond to the question respectively. On whether there has been road network increase, 35.8% indicated fair increase in road network. 27.5% and 23.3% indicated that road network

increase is good and poor respectively. The remaining group accounting for 10.8% and 2.5% indicates that they do not know and no response respectively. Considering the means the respondents use in ferrying their food produce to market, majority accounting for 36.7% uses motor vehicle. Walking, boda boda, animals and other means accounts for 19.2%, 20%, 13.3% and 7.5% respectively. This has been summarized in the table (6) below

Table 4.4. Infrastructure Development Indicators

Category	Frequency of each category	Each category percentage	Cumulative Percentage
Respondent rating of road network for community food transportation			
Good	14	11.7	11.7
Fair	45	37.5	49.2
Poor	57	47.5	96.7
Do not know	2	0.8	97.5
No response	3	2.5	100.0
Total	121	100.0	
Respondent rating of road network increases from 2010-2014			
Good	33	27.5	27.5
Fair	43	35.8	63.3
Poor	28	23.3	86.7
Do not know	13	10.8	97.5
No response	4	2.5	100.0
Total	121	100.0	
The means the respondent use for taking products to market			
Walking	23	19.2	19.2
Boda boda/bicycle	24	20.0	39.2
Motor vehicle	44	36.7	75.8
Animals	16	13.3	89.2
Others	9	7.5	96.7
No response	5	3.3	100.0
Total		100.0	
	121		

Other development the respondent feel has improved food security			
Many road network	18	15.0	15.0
Use of ICT	14	11.7	26.7
Development of WATSAN projects	69	57.5	84.2
Electricity connectivity	6	5.0	89.2
Modern food production technology	12	10.0	99.2
No response	2	0.8	100.0
Total	121	100.0	
The development respondent feels has contributed to food security most			
Many road networks	22	18.3	18.3
Use of ICT	9	7.5	25.8
Development of WATSAN projects	70	58.3	84.2
Electricity connectivity	5	4.2	88.3
Modern food production technology	13	10.8	99.2
No response	2	.8	100.0
Total	121	100.0	
The development that respondent feels NGOs/CBOs have contributed most			
Many road networks	32	26.7	26.7
Use of ICT	24	20.0	46.7
Development of WATSAN projects	58	48.3	95.0
Electricity connectivity	1	.8	95.8
Modern food production technology	3	2.5	98.3
No response	2	1.7	100.0
Total	121	100.0	

The respondents were asked to indicate other development they felt contributed most to issues on food security. Majority accounting for 57.5% said development of WATSAN projects has contributed to food security most. Many road networks, use of ICT, electricity connectivity and modern food production technology account for 15.0%, 11.7%, 5.0% and 10.85% respectively. 0.8% accounts for people who did not respond to the question. On rating the best

contributing development, 58.3% water and sanitation project contributed most to development where electricity connectivity rated the least at 4.2%.there was a clear indication that the road network in the sub county were rate poor and in accessible and the NGOs contribution was very low. It can be concluded that improvement on road network was vital because if these products are not taken to market, then many other people will not access food and the producer will incur post harvests losses (Njoroge et al 2013, CCCD, 2009 and ACTS, 2012).

4.2.5 Modern Food Production Technology

Adoption of modern technology is likely to influence food security. In this study, key indicators selected include respondent experience in using new technology, reason for using or not using new technology, the source of technology, respondent view of technology benefits or no benefits on food security. Table ( ) below illustrate descriptive data modern food production technology.

When respondents were asked to indicate whether they used any modern technology in food production, majority accounting for 35% did not respond to the question. 6.75 indicated that they were not sure whereas 29.2% said they used and did not use any food modern production technology. On where they used, inconsistence with having or not having used modern technology, 41.7% did not respond to the question. However, 10.8%, 29.2, 6.7 and 11.7% indicated that they used modern technology in storage, refrigeration, value addition and production respectively. On source of technology, 53.3% indicated that they got it from NGOs/CBOs whereas 31.7% and 7.55 indicated that they got modern technology from government, radio/TV and other people.

For those indicated having used modern technology, 37.5% indicated that modern technology helped in food security whereas 38.3% did not respond to the question. 18.3% and 5.8% indicated that technology did not help in food security and not sure respectively.

Table 4.5.Modern Food Production Technology Indicators

Category	Frequency of each category	Each category percentage	Cumulative Percentage
Respondent indicating having used modern food production technology			
Yes	35	29.2	29.2
No	35	29.2	58.3
Not sure	9	6.7	65.0
No response	42	35.0	100.0
Total	121	100.0	
Areas where the respondent uses modern technology			
Storage	13	10.8	10.8
Refrigeration	35	29.2	40.0
Value addition	8	6.7	46.7
Production	15	11.7	58.3
No response	50	41.7	100.0
Total	121	100.0	
Source of technology used by the respondent in food production			
Government	38	31.7	31.7
NGOs/CBOs	65	53.3	85.0
Radio/TV	9	7.5	92.5
Other people	9	7.5	100.0
Total	121	100.0	
Respondent feeling on whether the modern technology is helping in food security			
Yes	45	37.5	37.5
No	22	18.3	55.8
Not sure	7	5.8	61.7
No response	47	38.3	100.0
Total	121	100.0	
Respondent reason for modern technology not helping in food security			
Expensive	17	14.2	14.2
Lack of information	30	25.0	39.2
Lack of community acceptability	42	35.0	74.2
Not sure	30	25.0	99.2
No response	2	.8	100.0
Total	121	100.0	

For those indicating that modern technology did not help in food security, when requested to give reasons, majority accounting for 35% indicated that new technology was not accepted by the community. For technology being expensive and lack of information accounts for 14.2% and 25% whereas 25% of the respondents were not sure. The research indicated that the NGOs were faring well in the provision of food production technologies.

4.2.6 Food Storage Facility

Food storage facility was one of the variables under investigation in this study. The selected indicators were sought by requesting the respondent to indicate whether they experience food surplus, their main food produce, whether they have modern storage facility and where they got modern storage facility if they have it. Data collected were recorded, analyzed and presented in the table below.

On food surplus, 65.8% indicated that they experienced food surplus where only 22.5% and 10.8% indicated that they did not experience food surplus and not sure respectively. Only 0.85 of the respondent did not respond to the question. When asked to indicate their main food produce, majority accounting for 40% indicates that their main produce are pulse food category.

Table 4.6. Food Storage Indicators

Category	Frequency of each category	Each category percentage	Cumulative Percentage
Respondent indicating having surplus food			
Yes	79	65.8	65.8
No	27	22.5	88.3
Not sure	13	10.8	99.2
No response	2	.8	100.0
Total	121	100.0	
The respondents main food produce			
Cereals	16	13.3	13.3
Pulse	48	40.0	53.3
Meat	6	5.0	58.3
Milk	5	3.3	61.7
Cereals, pulse, meat and milk	3	2.5	64.2
Others	10	8.3	72.5
No response	33	27.5	100.0
Total	121	100.0	
Respondents indicating having modern storage facilities			
Yes	22	18.3	18.3
No	79	65.8	84.2
Not sure	3	2.5	86.7
No responses	17	13.3	100.0
Total	121	100.0	
Respondent source of information on modern food storage facility			
Government	34	28.3	28.3
NGOs/CBOs	57	47.5	75.8
Radio/TV	4	2.5	78.3
Other people	9	7.5	85.8
Self development books	12	10.0	95.8
No response	5	4.2	100.0
Total	121	100.0	

The remaining group accounting for 13.3%, 5.0%, 3.3% and 2.5% indicated cereals, meat, milk and combination of cereal, pulse, meat and milk respectively. However, 27.5% did not respond to the question.

When asked whether they have modern storage facilities, 65.8% indicated that they did not have modern storage facility. However, 18.3% and 2.5% indicated that they used modern storage facility and not sure respectively where 13.35 did not respond to the question which reflect the number of people who did not have storage facility. On where they get information on modern food storage facility, 47.5% indicated that they got information from NGOs/CBOs whereas 28.3%, 2.5%7.5% and 10% got information from government, radio/TV, other people and self development books respectively. The research indicated that the NGOs were faring well in the provision of knowledge on food storage facilities though a large percentage of the community members did not have the facilities. According to MOA, 2011, a significant proportion of the food produced is lost due to post-harvest spoilage and wastage, including in some cases from toxin causing micro-organisms. Losses are often substantial for grain and produce (fruits and vegetables) along with spoilage of animal products including milk, meat and fish.

4.3 Food Security

In this study food security is a dependent variable being predicted. It is measure by indicators that measures food availability, access and utilization. Data on food security indicators was collected, analyzed and presented as shown in tables that follow. The respondents were asked to rate food availability in their local market, indicate whether they got all food they needed and if not indicate the reasons. They were also asked to give an estimate of their monthly saving which is a factor in capacity to access food. On food utilization, the respondents were asked to indicate whether they knew of any health facility in their community, indicate whether they have ever attended training on nutrition management, indicate people responsible for their training and their regular diet. The information is as shown in table (9) below.

On food availability, 55.0% of the respondents rated their food accessibility as moderate whereas the rest accounting for 20.8%,21.7% and 2.5% indicating their food accessibility as high, poor and not sure respectively. On whether they accessed all the kind of food they needed, 42.5% indicated that they accessed all kind of food they needed. However, 18.3% and 8.3 indicated that they did not access all kind of food and not sure respectively. A significant number accounting for 30.8% did not respond to the question.

For those who indicated that they did not access all kind of food they needed, they were requested to give reasons where 51.7% were not sure of the reasons but 17.5%,5.8%,11.7%,5.8 and 7.5 indicated poor roads, High price, Poor supply and Lack of information as the reason for not accessing food respectively.

Table 4.7. Food Security Indicators

Category	Frequency of each category	Each category percentage	Cumulative Percentage
Respondent rating of food availability in the local market			
High	25	20.8	20.8
Moderate	66	55.0	75.8
Low	27	21.7	97.5
Not sure	3	2.5	100.0
Total	121	100.0	
Respondent indicating access to all kind of food needed			
Yes	51	42.5	42.5
No	22	18.3	60.8
Not sure	11	8.3	69.2
No response	37	30.8	100.0
Total	121	100.0	
Respondent reason for not accessing all kind of food needed			
Poor road	21	17.5	17.5
Unpredictable weather	7	5.8	23.3
High price	14	11.7	35.0
Lack of information	8	5.8	40.8
Poor supply	9	7.5	48.3
Not sure	62	51.7	100.0
Total	121	100.0	
Respondent average monthly income			
0-500	45	37.5	37.5
500-1000	27	22.5	60.0
2000-3000	17	14.2	74.2
Over 3000	21	17.5	91.7
No response	11	8.3	100.0
Total	121	100.0	
Respondent knowing any community health facility			
Yes	78	65.0	65.0
No	37	30.0	95.0

Not sure	4	3.3	98.3
No response	2	1.7	100.0
Total	121	100.0	
Respondent indicating having attended training on food nutrition			
Yes	60	50.0	50.0
No	48	40.0	90.0
Do not remember	7	5.8	95.8
No response	6	4.2	100.0
Total	121	100.0	
The providers of food nutrition course to respondent			
Government	22	18.3	18.3
NGOs/CBOs	63	52.5	70.8
Own local group	25	20.8	91.7
No response	11	8.3	100.0
Total	121	100.0	
The regular diet of the respondent			
Cereal food from own farm	28	23.3	23.3
Animal products	34	28.3	51.7
Vegetables and pulses	45	37.5	89.2
Other foods from others sources	2	1.7	90.8
No response	12	9.2	100.0
Total	121	100.0	

Since saving is a factor in capacity to access food, when requested to indicate their monthly saving, majority accounting for 37.5% indicated a saving range of 0-500 per months. The remaining group accounting for 22.5%, 8.3% and 17.5% indicated their monthly saving as 500-1000, 2000-3000 and Over 3000. However, 14.2% did not respond to the question.

For knowledge on existing of health facility, majority accounting for 65% had knowledge whereas 30% and 3.3% did not know of any health facility and not sure

respectively. For those with knowledge on health facility, when requested to indicate whether they had any training on nutrition management, 50% forming the majority indicated that they had some training on nutrition management whereas 40% indicate not having any training. Further is observed that majority of the respondent accounting for 52.55 indicated that training on food nutrition was provided by the NGOs/CBOS. Own local groups registers a significant number accounting for 20.8% as training providers whereas govern follows where 18.3% indicates that government provided nutrition course.

The respondents were asked to indicate their regular diet and 37.5% who forms the majority indicated that their regular diet was vegetables and pulse food category. Other respondents indicated that other foods from others sources, Cereal food from own farm, animal products and other foods account for 23.3%, 28.3% and 1.7% respectively.

4.4 Correlation between Strategic Interventions and Food Security

The descriptive analysis given above may not point the possible relationship between strategic interventions and food security. To predict the possibility of relationships between the two variables under investigation, correlation Pearson correlation analysis was carried out and presentation given as shown in the tables that follows;

4.4.1 Training and Food Security

The key indicators selected to predict the relationship between training and food security include number of respondent indicating having attended training, number of times the respondent has attended training and areas of training in food security. On food security, the key indicators selected include rating of food availability in the local market, number of respondent indicating access to all kind of food needed and average monthly saving. The data collected on indicators were recorded, correlated and presented as shown in table below.

Table 4.8. Correlation Training and Food Security

	The respondent food security training provider	Number of times respondent as attended training on food security	Areas of food security respondent got training	Respondent rating of food availability in the local market	Respondent indicating access to all kind of food needed	Respondent average monthly income
The respondent food security training provider	1 . 120	.161 .079 120	.237(**) .009 120	.145 .114 120	-.150 .101 120	.010 .915 120
Number of times respondent as attended training on food security	.161 .079 120	1 . 120	.502(**) .000 120	.154 .093 120	-.320(**) .000 120	.169 .065 120
Areas of food security respondent got training	.237(**) .009 120	.502(**) .000 120	1 . 120	.239(**) .009 120	-.652(**) .000 120	.381(**) .000 120
Respondent rating of food availability in the local market	.145 .114 120	.154 .093 120	.239(**) .009 120	1 . 120	-.169 .065 120	.080 .383 120
Respondent indicating access to all kind of food needed	-.150 .101 120	-.320(**) .000 120	-.652(**) .000 120	-.169 .065 120	1 . 120	-.492(**) .000 120
Respondent average monthly income	.010 .915 120	.169 .065 120	.381(**) .000 120	.080 .383 120	-.492(**) .000 120	1 . 120

Note

- ** Correlation is significant at the 0.01 level (2-tailed).
- Sig. (2-tailed)

From table above, the number of respondent indicating training providers in food security correlate positively with the number of times they attended training where coefficient of correlation is +0.161 and probability of relationship being 0.079. the number of respondents indicating areas of training in food security, rating of food availability and income correlate positively with the number of respondents indicating training providers where coefficient of correlation (r) are +0.23,0.1.41 and 0.01 and the probability of their relationship being 0.09,0.14, 0.915 respectively.

The responses on the number of times the respondents attended training, areas of training, rating of food availability in the local market, access to all kind of food needed and income correlate positively at r= 0.502,0.154, 0.320 and 0.69 with a probability of relationship (p) being 0.00,0.93, 0.0.00 and 0.065 respectively.

The responses on areas of training in food security correlate positively with respondents rating of food availability in the market, access to all kind of food needed and respondent monthly saving with r=0.239,0.652 and 0.381 with probability of possible relationship being 0.009 and 0.00 respectively.

The respondents rating of food availability correlate positively with monthly average saving at r=0.383 with a probability of relationship being0.00. However, when correlated with respondent rating on food accessibility the r=-0.169 and probability is 0.065. The responses on access to all kind of food needed correlate negatively with respondent income at r=-.492 and p=0.080

4.4.2 Access to Market and Food Security

The key indicators of access to market used to predict relationship include number of Respondent indicating being engaged in food production to supply others, Respondent indicating access to support in terms of products market information and Respondent source of information for his/her products which was correlated with indicators of food security

namely; Respondent rating of food availability in the local market, Respondent average monthly income and Respondent indicating having attended training on food nutrition respectively as shown in the table below.

The number of respondents indicating being engaged in food production activity correlate positively with the number of respondents indicating having got access to support in food security, sources of food security information, rating of food availability , respondent monthly saving and number of respondent indicating having attended training on food security where their correlation coefficients (r) are 0.511,0.109,0.086,0.35 and 0.244 where the probability of the existing relationship stand at p=0.00,0.23,0.352,0.01 and 0.07 respectively.

The responses on access to support in food security activity correlates positively with respondent source of food security information, respondent rating on food availability in the local market and number of respondents indicating having attended training on food security where r=0.064,0.078 and 0.245 with probability of relationship (p) being 0.489,0.395 and 0.007 respectively. However, responses on information source correlate negatively with number of respondents view on access to food security information where r=-0.337 and p=0.00

Table 4.9.Correlation Access to market and food security

	Respondent indicating being engaged in food production to supply others	Respondent indicating access to support in terms of products market information	Respondent source of information for his/her products	Respondent rating of food availability in the local market	Respondent average monthly income	Respondent indicating having attended training on food nutrition
Respondent indicating being engaged in food production to supply others	1 . 120	.511(**) .000 120	.109 .236 120	-.086 .352 120	-.303(**) .001 120	.244(**) .007 120
Respondent indicating access to support in terms of products market information	.511(**) .000 120	1 . 120	.064 .489 120	-.078 .395 120	-.337(**) .000 120	.245(**) .007 120
Respondent source of information for his/her products	.109 .236 120	.064 .489 120	1 . 120	.046 .621 120	.050 .584 120	.099 .281 120
Respondent rating of food availability in the local market	-.086 .352 120	-.078 .395 120	.046 .621 120	1 . 120	.080 .383 120	.082 .372 120
Respondent average monthly income	-.303(**) .001 120	-.337(**) .000 120	.050 .584 120	.080 .383 120	1 . 120	-.369(**) .000 120
Respondent indicating having attended training on food nutrition	.244(**) .007 120	.245(**) .007 120	.099 .281 120	.082 .372 120	-.369(**) .000 120	1 . 120

** Correlation is significant at the 0.01 level (2-tailed).

The responses on food availability from local market, respondent saving and number of respondents indicating having attended training correlate positively at r=0.080 and 0.82

where probability of relationship is p=0.383 and 0.00 respectively. However, the respondent monthly saving correlate negatively with number of respondents indicating having attended or not attended training on food security where r=-0.369 and p=0.00.

4.4.3 Infrastructure and Food Security

Infrastructure development as a variable in the study was measured by indicators of number of respondent rating of road network for community food transportation, the means the respondent use for taking products to market and the development respondent feels has contributed to food security most. This was correlated with food security indicators namely respondent average monthly income, respondent indicating access to all kind of food needed and respondent rating of food availability in the local market as illustrated in the table below.

Table 4.10. Correlation Infrastructure and Food Security

	Respondent rating of road network for community food transportation	The means the respondent use for taking products to market	The development respondent feels has contributed to food security most	Respondent rating of food availability in the local market	Respondent indicating access to all kind of food needed	Respondent average monthly income
Respondent rating of road network for community food transportation	1 . 120	.175 .056 120	.247(**) .007 120	.070 .450 120	.282(**) .002 120	-.090 .327 120
The means the respondent use for taking products to market	.175 .056 120	1 . 120	.298(**) .001 120	-.104 .259 120	.208(*) .022 120	-.273(**) .003 120
The development respondent feels has contributed to food security most	.247(**) .007 120	.298(**) .001 120	1 . 120	-.049 .596 120	.091 .324 120	-.022 .816 120

Respondent rating of food availability in the local market	.070 .450 120	-.104 .259 120	-.049 .596 120	1 . 120	-.169 .065 120	.080 .383 120
Respondent indicating access to all kind of food needed	.282(**) .002 120	.208(*) .022 120	.091 .324 120	-.169 .065 120	1 . 120	-.492(**) .000 120
Respondent average monthly income	-.090 .327 120	-.273(**) .003 120	-.022 .816 120	.080 .383 120	-.492(**) .000 120	1 . 120

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

From table above, the respondent rating of their road networks, means of transport, their view on development that has contributed most of food security, rating of food availability, access to food and income correlate positively at r=0.175,0.247,0.45,0.02 and 0.37 where probability of the existing relationship is 0.56, 0.45,0.02 and 0.327 respectively.

The number of responses on means of transport, rating on road networks, development view in terms of contribution to food security, rating of food availability and access to food correlate positively at r=0.175,0.298,0.091,0.208 with a probability of relationship being 0.056,0.001,0.359 and 0.22 respectively. The respondent's views on development contributing to food security correlate positively with number of responses on access to food at r= 0.091 and p= 0.324 whereas it relate negatively with responses on availability for food in the market and respondent income at r= 0.49 and 0.22 with p=0.596 and 0.816 respectively.

Responses on access to food correlate negatively with availability of food at r=0.169 with p=0.069 and income at r=0.08 and p=0.383. Responses on access to food and monthly saving correlate negatively with r=0.49 and p=0.00.

4.4.4 Storage Facility and Food Security

The indicator for food storage facility considered for correlation ship include responses on Respondent indicating having food surplus and their source of information on modern food storage facility. These was correlated with food security indicators namely Respondent average monthly income, Respondent rating of food availability in the local market and Respondent indicating access to all kind of food needed as shown in table below.

The responses on food surplus correlates positively with responses on food security source of information and rating of food availability at r= 0.72 and 0.156 where probability of relationship is 0.43 and 0.088 respectively. However it correlate negatively with responses on access to food security information and saving at r=-0.013 and 0.14 with p=0.89 and 0.122 respectively.

Respondents rating of food availability, access to information and saving correlate positively at r=0.117, 0.143 and 0.080 where probability of relationship is 0.204, 0.169 and 0.383 respectively. The rating of food availability and access to food in local market correlate negatively at r=-0.492 and p=0.383.

Table 4.11. Storage Facility and Food Security

	Respondent indicating having food surplus	Respondent source of information on modern food storage facility	Respondent rating of food availability in the local market	Respondent indicating access to all kind of food needed	Respondent average monthly income
Respondent indicating having food surplus	1	.072	.156	-.013	-.142
	.	.431	.088	.891	.122
	120	120	120	120	120
Respondent source of information on modern food storage facility	.072	1	.117	-.135	.130
	.431	.	.204	.143	.157
	120	120	120	120	120
Respondent rating of food availability in the local market	.156	.117	1	-.169	.080
	.088	.204	.	.065	.383
	120	120	120	120	120

Respondent indicating access to all kind of food needed	-.013 .891 120	-.135 .143 120	-.169 .065 120	1 . 120	-.492(**) .000 120
Respondent average monthly income	-.142 .122 120	.130 .157 120	.080 .383 120	-.492(**) .000 120	1 . 120

** Correlation is significant at the 0.01 level (2-tailed).

4.4.5 Modern Food Production Technology and Food Security

Areas where the respondent uses modern technology and number of Respondents indicating having used modern food production technology are indicators used to predict relationship with food security. On food security, the indicators used include Respondent average monthly income, Respondent rating of food availability in the local market and number of Respondents indicating access to all kind of food needed as shown in table below.

Table 4.12: Modern food production technology and food security

	Respondent indicating having used modern food production technology	Areas where the respondent uses modern technology	Respondent indicating access to all kind of food needed	Respondent rating of food availability in the local market	Respondent average monthly income
Respondent indicating having used modern food production technology	1 . 120	-.333(**) .000 120	.554(**) .000 120	-.096 .296 120	-.417(**) .000 120
Areas where the respondent uses modern technology	-.333(**) .000 120	1 . 120	-.448(**) .000 120	.083 .369 120	.346(**) .000 120
Respondent indicating access to all kind of food	.554(**) .000 120	-.448(**) .000 120	1 . 120	-.169 .065 120	-.492(**) .000 120

needed					
Respondent rating of food availability in the local market	-.096 .296 120	.083 .369 120	-.169 .065 120	1 . 120	.080 .383 120
Respondent average monthly income	-.417(**) .000 120	.346(**) .000 120	-.492(**) .000 120	.080 .383 120	1 . 120

** Correlation is significant at the 0.01 level (2-tailed).

From table ( ) above, the responses on the use of modern food production technology correlate positively with number of responses on access to food in local market with r=0.554 and p=0.00, However, it relate negatively with responses on areas the food technology used, rating on food availability and saving with r=-0.33, 0.096 and 0.417 with p= 0.00 in both cases.

The responses on areas where food production technology is used correlate positively with rating of food availability and saving with r=0.83 and 0.346 where p=0.369 and 0.00 respectively. However, it correlate negatively with rating of food accessibility at r=0.492 and p=0.00. The rating on food availability correlate positively with respondents monthly saving at r0.080 and p=0.383.

CHAPTER FIVE
SUMMARY OF FINDINDS, DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter comprises of and is organized into the following subheadings: summary of the Study, discussions of the study findings, conclusions of the study, recommendations of the study and suggestions for further studies.

5.2 Summary of the study

The purpose of this study was to investigate the influence of non governmental organizations intervention strategies on food security in arid lands with the case of water for livestock programme in garissa county that was implemented by Adeso. The study was successful for the data collected and analyzed, helpful conclusions and recommendations were drawn from it. The five objectives of the study were thoroughly it was concluded that each objective had significant influence to food security in one way or the other.

5.3 Discussions of the study findings

It was found that 82% of the respondents saw the need for training on food security but only 37.5% had attended hardly one training. Non governmental organizations were found to be the most provider of training accounting for 39.2%.

Majority of the respondents (52.5%) were found to supply food to the local markets and termed the access to market information has well. It was notably found that the NGOs had a small significance to provision of market information accounting 20.8% compared to radio and television that dominated with 59.2%.

It was found that Lagdera had poor road networks as responded by 47.5% respondents. Most of the food accounting to 57.5% was transported to the markets using motor vehicles and the NGOs were the highest lacked provider of better infrastructures development accounting to 58.3%.

Majority of the residents were found not to be sure of the modern storage facilities in subject for 35.0% of the respondents did not answer. An equal percentage responded they had used and did not use the modern production facilities. NGOs had contributed a lot in provision of modern production technologies accounting for 53.3% of the total number of respondents.

On food storage it was found that 65.5% of the total population had surplus food production and needed food storage facilities which surprisingly the same percentage responded that they lacked. It was found that the knowledge about the modern storage facilities came from the NGOS.

5.4 Conclusions of the study

From the findings it was concluded that NGOs did not carry adequate trainings though trainings had a positive correlation meaning that it influenced food security bin the region. The data analysis shows that some strategic interventions are likely to influence food security as shown by some positive correlations such as , accessibility to market information, access to food storage information in areas where food production technology. This was likely to influence saving, engagement in food production activities, access to food and its availability respectively. This is indicated by positive correlations and relatively high probability of relationship between indicators investigated.

5.5 Recommendations of the study

This study sought to investigate the influence of strategic intervention on food security by providing description of the situation in relation to variables under investigation. However, the study was limited to description where no inferences have been made. Following the data analysis and indication of possible relationships between variables under investigation, it was recommended that future study on these areas may focus on establishing the possible cause effects relationship between Training on food security, accessibility to market information, kind of development agencies, access to food storage information and areas where food production technology is used are likely to influence saving, engagement in food production activities, access to food and its availability respectively. This would seek to answer the question on how and why the relationships.

In this study, it has been observed that majority of the people who participated in this study were aged over 30 years and mainly men. Further study may seek to establish any influence of gender on food security activities. NGOs/CBOs and water and sanitation projects were rated as the main contributors in food security. This would also be an areas interest to investigate to answer questions “why” and” how”.

REFERENCES

African Centre For Technological Studies (ACTS, 2012). *A case study on climate compatible development in agriculture for food security in Kenya*. Nairobi –Kenya.

Barrett Christopher, B. & Arcese, P. 1998. *Wildlife Harvest in Integrated Conservation and Development Projects: Linking Harvest to Household Demand, Agricultural Production and Environmental shocks in the Serengeti*: Land Economics 74(4), 449- 65.

Barrett, Christopher B. 1999. *Stochastic Food Prices and Slash*. Agriculture. Environmental and Development Economics 4(2), 161- 76.

Bossel. H, (1999). *Indicators for Sustainable Development: Theory, Method, Applications.* International Institute for Sustainable Development Institute; a Report to the Balaton Group

Canadian Coalition on Climate Change and Development (2009). *Enhancing resilience to drought in Kenya arid and semi arid lands.* Centre for Science and Technology Innovation- Nairobi, Kenya.

Department for International Development (DFID), (1995). *Guidance Note on Indicators for Measuring and Assessing Primary Stakeholder Participation*, London: DFID

Denscombe, M. (2008). *Communities of Practice:* A Research paradigm for the Mixed Methods Approach. J. Mix. Methods Res. 2(3):270-283.

DFID, (2013). *Empowerment and Accountability*. DFID, United Kingdom.

EAC, (2011). *East African food security action plan 2011-2015.* East Africa secretariat- Arusha Tanzania

Famine Early Warning Systems Network (FEWSNET), (2012). Kenya Food Security Outlook. Nairobi-Kenya.

FAO (2010). *The state of food insecurity in the world*. www.fao.org>.

Frank R, Nancy M, Bruce, Laura B, and Eric K. (1999); *Food Security Indicators and Framework for Use in the Monitoring and Evaluation of Food Aid Programs*. U.S. Washington, D.C

Food and Agriculture Organization (FAO), (2013). *The State of Food Insecurity in the World the multiple dimensions of food security;* Rome-Italy.

Garissa District Office, (2008). Garissa district food profile- north eastern province.

Government of Kenya (2002a). Garissa District Development Plan for the period 2002-2008.

Government of Kenya (GOK, 2008). Food security in Kenya Report. Kenya Food Security

Government of Kenya (GOK, 2011). National Food and Nutrition Security Policy (NFNSP), Agricultural Sector Coordination Unit (ASCU) Kilimo House, Cathedral Road, Nairobi, Kenya

Government of Kenya (2005). Garissa District Development Plan for the period 2005-2011.

International Food Policy Research Institute (IFPRI), (2002). *Reaching sustainable food security for all by 2020: getting priority and responsibility right;* Washington DC-USA.

International Food Policy Research Institute (IFPRI), (2007). *Rural investment to accelerate growth and poverty reduction in Kenya*: Discussion paper 00723; Washington DC-USA.

IFAD, (2012). *Addressing Poverty through Mobilization of Community Resources*- Central Kenya Dry Area Smallholder and Community Services Development Project (CKDAP) – Seeds of innovation-East and Southern Africa-Kenya

IFAD, (2002). *Participatory Approaches for an Impact-Oriented Project Cycle*- Strengthening the impact orientation of IFAD's project cycle.

www.ifad.org/events/past/impact/impact_e.pdf

Inter-American Development Bank, (2013). *Agriculture and food security*. IDB, Washington, D.C, United States of America.

Njoroge, K, Omketi. N. and Oywaja.A.N, (2013). *Implementation of Jaa Marufuku Kenya intervention in Kajiando county and implication for food security.* Academic journal of agricultural research. academic publishing.

Kaloi, E.B. Tayebwa & B. Bashaasha, (2005). *Food security status of households in Mwingi District, Kenya*. African Crop Science Conference Proceedings, Vol. 7. pp. 867-873

Kenya National Bureau of statistics (KNBS) (2010). *Kenya Population and Housing Census.* Nairobi: Government Printer.

KING'ORI, J. K. (2013). *The Influence of Agricultural Technologies on Food Security among*. University of Nairobi-Kenya.

Kothari, C.R. (2004). *Research methodology: methods and techniques*, (2nded.). New Delhi. New Age International (P) Limited.

Mendes, P. P. (2008). *Teaching community development to social work students:* A critical reflection. *Community Development Journal, 2008.*

Mellor, J. W., Delgado, C. L. & Blackie, M. J. (1987). In: Stanning, J. L. (1987). *Grain Retention and Consumption Behaviour*. Department of Agricultural Economics and Extension, University of Zimbabwe, Harare, Zimbabwe.

MOA, (2011). *National Food and Nutrition Security Policy*. ASCU, Nairobi, Kenya.

Mugenda O, Mugenda A (2008). *Research methods quantitative and qualitative approaches*. Nairobi: Acts Press. Steering Group (KFSG), Nairobi -Kenya

Mwololo, M. (2013). *Role of Technology in Enhancing Food Security*. The daily Nation. Nation media group, Nairobi, Kenya.

Mwaniki, A, (2003). *The utilization of locally grown plants materials in the production of an intervention formulation for malnourished children in marginal areas*. The case of Makindu location Makueni district. Thesis university of Nairobi.

ODPM, (2003). *Capacity building in local government - research on capacity-building needs:* Final report - June 2003, London: ODPM

Skinner, S. (1997). *Building Community Strengths: A Resource Book on Capacity Building.* London, CDF.

WFP/ALRMP/FEWSNET, (2003). *Livelihood Zones Data, Households in Nakuru District, Kenya*. University of Nairobi-Kenya

World Health Organization, (2010). *Community Systems Strengthening Framework-Global fund.* Switzerland Geneva. http://www.who.int

World Bank, (2013). *Africa's Agriculture and Agribusiness Markets Set to Top US$ One Trillion in 2030*.The World Bank group.

APPENDICES

APENDIX I: LETTER OF TRANSMITTAL

FRANKLINE GIKUNDA MBURUGU
UNIVERSITY OF NAIROBI,
P.O. BOX 30197-00100, NAIROBI

DATE…….

Dear Sir/Madam,

REF: STUDENTS' RESEARCH PROJECT

I am a student undertaking Masters of Arts Degree in Project Planning and Management from the University of Nairobi, School of Continuing Education and External Studies, Department of Extra- Mural Studies.

I am carrying out a study seeking to explore the relationship between NGOs food security strategic intervention and community food security in Lagdera Sub County in Garissa County. The study will involve three NGOs, community members and government officials involved with programmes in Lagdera.

In my schedule, I would be visiting five categories of respondents sampled from the target population.

The questionnaire carries three sections which includes; background information, food security indicators namely; food availability, food access, food utilization; and strategic intervention including; training, market information, storage technology, and infrastructure and food production technology.

Kindly provide answers to all the items. Your responses will only be used for the purpose of academic and confidentiality will highly be held.

Thanking you in advance for your cooperation.

Yours Faithfully,

FRANKLINE MBURUGU

APPENDIX II: QUESTIONNAIRE

INSTRUCTIONS: ***Underline where appropriate***

1. Strategic Intervention on Food Security					
Training					
	1	2	3	4	
1. Do you feel training is required for making community food secure?	Yes	No	Not sure	Other people	
2. Have had any training on food security since 2010	Yes	No	Not sure	No response	
3. If yes, who provided the training?	Government	NGO/CBO/FBO	Radio/TV	Self development books	
4. How many times have attended training on food security?	once	twice	thrice	severally	
5. Please indicate the area of food security you were trained.	production	nutrition	management	marketing	
Access To Market Information					
6. Are you engaged in any food production that you can sell to others	Yes	No	Not sure	No response	
7. How do you rate market information access for your product from 2010 to 2014	good	Fair	Poor	No response	
8. Do you get any support in terms of accessing market information?	Yes	No	Not sure	No response	
9. Where do you get the market information for your product	Government	NGO/CBO/FBO	Radio/TV	Other people	Development books.

Infrastructure Development					
10. In your view, how do you rate road network support for the community food produced for the market?	good	Fair	Poor	Do not know	No response
11. How do you rate the increase of road network from 201 0 to 2014	good	Fair	Poor	Do not know	No response
12. What means do you use to take your food produce to the market?	Walking	Boda boda	Motor vehicles	Animals	Others
13. What other development do you feel have improved food production and marketing in your area?	Many road network	Use of ICT	Development of water and sanitation projects	Electricity connection	Modern food production technology
14. Among the development you have indicated above, which one do you feel has contributed to food security most?	Many road network	Use of ICT	Development of water and sanitation projects	Electricity connection	Modern food production technology
15. Which one among the above developments do you feel NGOS operating in your area have contributed most?	Many road network	Use of ICT	Development of water and sanitation projects	Electricity connection	Modern food production technology
Storage Facility					
16. Do you get surplus of the food you produce?	Yes	No	Not sure	No response	

17. What is your main produce?					
18. Do you have any modern storage facilities?	Yes	No	Not sure	No response.	
19. Where did you get the modern food storage facility and knowledge to handle it?	Government	NGO/CBO/FBO	Radio/TV	Other people	development books
Modern Food Production Technology					
20. Have you used any modern food production technology from 2010 to 2014?	Yes	No	Not sure	No response	
21. If yes, where are you using the technology in food production?					
22. Who brought the technology to the people	Government	NGO/CBO/FBO	Radio/TV	Other people	development books
23. Do you feel that the technology is helping in ensuring food security to the community?	Yes	No	Not sure		
24. If no, what could be the	Yes	No	Not sure		

reason?					
Food Security Indicators					
25. How do you rate food availability in the market where community goes to sell and buy food produce?	High	Moderate	Low		
26. Do you get all kind of food you need for proper diet in the market when you need it?	Yes	No	Not sure		
27. If not for question 26 above, kindly give the reason.					
28. What is your average saving per month in KShs	0-500	500-1000	1000-2000	2000-3000	Over 3000
29. Do you know of any health facility in your community?	Yes	No	Not sure		
30. Have you ever attended any training or work shop on how to manage	Yes	No	Not sure		

nutrition.					
31. If yes who provides the training	Government health workers	NGO/CBO/FBO	Own Local group members		
32. Kindly indicate your regular diet	Cereal food from farm or local market	Animal produce food	Vegetable and leguminous grains from farm or local market	Processed cereals from shops	Other foods from other sources