FOOD INSECURITY IN PROTRACTED CRISIS: CASE STUDY OF MADOGO WARD, TANA NORTH SUB COUNTY, KENYA

By

SUADA IBRAHIM SHEIKH ABDULLA

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DECLARATION

I declare this project is my original work and that it has not been submitted in any other college or institution of higher learning for award of academic credit.

Signature ---------- Date……

SUADA IBRAHIM

REG NO: C50/70616/2008

This research project has been submitted with my approval as the University Supervisor

Signed ---------- Date……..

Dr. Robinson Ocharo

Supervisor

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ABBREVIATIONS AND ACRONYMS

ASAL:	Arid and Semi-Arid Lands
CBO:	Community Based Organization
CDD:	Community Driven Development
EMOP:	Emergency Operations Programme
FAO:	Food and Agricultural Organization
FFA:	Food for Assets
GFD:	General Food Distribution
GIEWS:	Global Information and Early Warning System
HIV/AIDS:	Human Immunodeficiency Virus/ Acquired Immunodeficiency Syndrome
IFRC:	International Federation of the Red Cross
KFFSG:	Kenya Food Security Steering Group
KRCS:	Kenya Red Cross Services
NGO:	Non-Governmental Organization
PR:	Protection Ration
PRRO:	Protracted Relief and Recovery Operations
SFP:	Supplementary Feeding Programme
SMP:	School Meals Programme
SPSS:	Statistical Package for the Social Sciences
UN:	United Nations
UNEP:	United Nations Environmental Programes
UNISDR:	United Nations International Strategy for Disaster Reduction
WFP:	World Food Programme

ABSTRACT

The study focuses on factors that sustain food insecurity in protracted crisis with a specific focus on Madogo ward, Tana North Sub County. To address food insecurity there is need to understand factors that make households vulnerable to it. The objectives of the study were to establish factors that make household's food insecure and also establish the current food insecurity status of households in Madogo ward, Tana North Sub County which is an area in protracted crisis. The study used both quantitative and qualitative research techniques to collect primary and secondary data. Key informant interviews and household data collection was achieved by the use of interviews .Secondary data was collected through a desk research and review of documents relevant to food security. Findings from the study showed that the households in Madogo Sub County were severely food insecure with hunger as per the Household Food Insecurity Assessment (HFIA) score. Main factors contributing to this included large household sizes, low productivity in agriculture, low income levels and lack of basic services and infrastructure in the area. There is much dependence on government and other well-wishers for relief food and monetary support during food shortages in the area and negative coping mechanisms such as charcoal burning were utilised to cope. The recommendations arising from the study are promotion of irrigation projects in the area, improved agricultural practices; establish cooperatives and credit facilities, the associated activities such as improvement in education, health and other forms of infrastructural developments.

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

The Food and Agricultural Organization (FAO) defines food security as a state where there is accessibility to safe, affordable and sufficient amount of food that meets the needs of the population of a particular geographical region (FAO, 2002). It is estimated that approximately 842 million people from different parts of the world experienced shortage of food between 2011 and 2013. A significant majority of those who experienced shortage of food were from developing countries, where there is a challenge of undernourishment for 14.3 per cent of the population (FAO, 2013).

Worldwide, food security is determined by the response measures which are implemented in case of a likelihood of food insecurity such as holding the right amount of stock and making arrangements for food distribution in case of emergency situation. Food security is determined by the manner in which technologies are put in place to reduce the risks of shortages in food supply due to unpredictable ecological conditions associated with the present production systems (Tanse & Rajotte, 2008).

There has been a rise in the number of disasters, increase in conflicts and a number of humanitarian crises situations. According to the anticipations of climatologists, there are still possibilities of weather disasters that will affect food availability. This requires response measures such as disaster management skill acquisition with the focus on managing food scarcity and preventing hunger. The situation is likely to be aggravated by the increase in rural-urban migration and the increase in number of aging population who do not have productive capacity in the society (Harvey et al., 2010).

The Global Information and Early Warning Systems (GIEWS) by FAO provides a classification of a country as being affected by food emergency when there is a reduction in food supply in comparison to the consumption needs in a particular year and cannot be adequately met by the available resources, and thus require external food supply. When such assistance is not available, there will be a state of undernourishment of a significant

part of the population. The reduction in food supply may be caused by natural hazards or human activities that have an impact on food availability.

Approximately half of Kenya's 40 million people live below the poverty line where 7.5 million experience extreme poverty, while about 10 million experience nutritional deficiency diseases due to lack of access to quality foods. It is estimated that in the previous decade, approximately 2 million people required access to food assistance after short and long rain periods. When drought occurred, there was an increase in the number of people who needed aid. Kenya has experienced the need for food supply to not less that of 1 million people in the last 12 years. The main factors that have contributed to the increase in food unavailability in some parts of Kenya include: seasonality of rain, high cost of food, unavailability of migration options, and increase in drought in a number of areas, resulting into strained coping methods and an exacerbated poverty status, specifically in arid and semi-arid (ASAL) regions in Kenya (WFP, 2010).

The state of food insecurity in Kenya has been described as 'chronic' or 'in transition'. Food insecurity occurs when there is inadequate supply of food and results from limited capacity of households to produce foods that meets their basic needs, while 'transitory' food insecurity is a state where the community is not able to produce the right amount of food that meets their economic demands. Food shortages in Kenya are mainly of transition forms and are caused by occurrences of droughts, and the failures of institutions to implement the right food policies (Mayanga et al., 2003).

At the basic level, food from external supplies constitutes an important form of assistance for the sections of the population that have been affected by shortages of food supply. This is mainly important in arid areas that are frequently affected by droughts and failures of crops. Imports of food products are increased to enable the achievement of food requirements for the vulnerable groups in case of calamities such as fires, droughts, or community displacement due to civil conflicts. By improving the access to quality food among the people who are affected by inaccessibility to food, it will enable the achievement of human capital formation objectives and enhance an increase in agricultural output activities (FAO, 2004).

Tana River County is a county located in Coast Province of Kenya and has an approximate area of 38.446 km^2. Its population is approximately 240,079 according to the 2009 census. The capital of the county is Galole. There has been a continuous shift in the composition of the county's population due to an increase in the number of outsiders such as nomads from other counties that are settling in the county in search of pasture for their livestock. The main sub-counties found in Tana River County include: Tana North, Tana Delta, and Tana River sub-counties. The main ethnic communities in Tana River County include: the Pokomo, Orma whose main occupation is nomadic, and other ethnic groups such as Munyoyaya, Malakote, Somali, Wata, Bajuni and Mijikenda. A number of villages are located along the River Tana where farming constitutes the main economic activity. The pastoral communities are based in the hinterland and they live in manyattas located near water points such as dams, wells and boreholes.

The major livelihood zones in Tana River County include: Marginal Mixed Farming (which accommodates 49% of the population), Pastoral (14%) and Mixed Farming (37%). Many parts of the county receive inadequate rains with an exception of April and June when high rainfall is experienced. Short rains are also experienced in the periods between October and December. The average annual rainfall is estimated to be 220mm to 500mm except in Mixed farming areas where the rainfall is between 750mm to 1250mm per annum. The estimated temperature range for Tana River County is 21oC and 38oC. Areas where Mixed Farming is practice experience short rains while other areas experience heavy rainfall. Since the only permanent source of water is River Tana, the entire community has been increasingly dependent on seasonal rivers and their river beds (laga) when there is drought. The estimated number of people who live below the poverty level in Tana River District is 72 per cent, consequently, have little access to adequate amount of food and dependent on relief aid and support from charitable organizations (Tana River District Development Plan 2008).

The county generally experiences drought and incidences of conflicts occur between farmers and nomadic groups over access to water. During rains, flooding occurs due to heavy rainfall that occurs upstream of the Tana River.

Agriculture is the main economic activity in the district. The county has an area of 33,448m² of which 23% is considered arable .Nearly 85% of the annual earnings accruing to the households are derived from this sector directly or indirectly. Livestock production, mainly nomadic pastoralism is the most prominent activity and over 50% of the population is engaged in it. The total stock, comprising the major livestock types (cattle, sheep and goats) is estimated at 1 million. Insecurity, underdeveloped livestock markets due to poor infrastructure, water and pasture scarcity due to frequent droughts and high disease incidences are the major constraints faced in this sub-sector.

Food crop production has remained low and unpredictable due to unreliable weather patterns. In 2005 for instance, the district produced only 2,370 MT as compared to its demand of 31,280 MT in the same year. Food importation from other counties account for major fractions of food consumed in the county with market purchases accounting for a greater proportion of staple foods (rice and meat) consumed by households.

Despite the district's agricultural and economic potential, approximately two-thirds of the Population live in poverty and do not meet their minimum basic needs. The key factors leading to poverty include persistent droughts, unreliable rainfall, high illiteracy levels (37%), unemployment (12.6) and poor agricultural practices due to poor technology. Traditionally, the residents of Tana River have relied on livestock and its products such as milk and blood for food. The scenario is compounded by high and variable prices and food shortages in markets during dry spells. Consequently, households in the county rely on relief food for most parts of the year. As a result of insufficient supply and access to food, most households can hardly meet their minimum food requirements, let alone balanced diets. Cases of malnutrition, rising with deteriorating food security conditions during droughts are common. Efficient utilization of food is also hindered by high prevalence of diseases such as malaria and diarrhoea and inadequate health facilities.

1.2 Statement of the problem

A significant percentage of poor people in the world have not achieved the recommended outcomes in the management of hunger or achieving the required level of sustainable livelihoods. The basic strategy for managing food insecurity is a measure aimed at

enhancing agricultural development and improving availability of food to meet the needs of the population in rural areas, and contribute to management of shocks due to food unavailability (FAO, 2008).

Countries that rely on assistance for a longer duration of time are categorized as protracted crisis. This is an environment that has a significant number of its population who are vulnerable to diseases, death, and an interference with their livelihood over a longer duration of time (Macrae & Harmer, 2004). Kenya is categorized to be within the protracted state category according to the classifications by the FAO i.e. a country that requires external intervention in more than 8 of the past 10 years. They are also countries that receive 10% of their humanitarian support from external sources since 2000 and also have high number of its population that have low income and have deficit in food supply.

The main hazards that contribute to shortages of food supply are floods and droughts that have an impact on farming activities. The occurrence of floods and droughts occur in alternating manner so that people in the affected areas experience twin disasters. There has been an increase in the cycle frequency from 5-7 years to 2.3 years making drought and famine management a major concern of the county government of Tana River. Highest levels of poverty are experienced in the areas that are vulnerable to floods and drought in the county (UNISDR, 2008).

Tana River County is classified in a protracted crisis and is a target county under the World Food Programme Protracted Relief and Recovery Operations (PRRO). An arid, disaster prone and under-developed area, Tana River is subjected to recurrent floods and droughts. Those who are affected by food insecurity constitute more than 70% and have been affected by clashes between Orma and Pokomo groups. Clashes in Tana River are mainly resource based. The county has been on Emergency Operations Programme (EMOP) since September 2004 which has since May 2009 been phased out and replaced with the Protracted Relief and Recovery Operations (PRRO) and continuing to date. The PRRO consists of five programmes namely; the School Meals Programme (SMP), Supplementary Feeding Programme (SFP), Protection Ration (PR), General Food Distribution (GFD) and Food for Assets (FFA).

In Tana River the target population identified for food assistance has however been changing based on the short and long rains assessments conducted by the Kenya Food Security Steering Group (KFFSG). The initial target figure from October 2004 was 45,000. From April to September 2007 the target figure was 64,500; October 2007 to February 2008 is 35,537. In 2011, during the worst drought in 60 years, the caseload was at 61,890. In 2012, a total of 57,715 beneficiaries were targeted and in 2013, 50,800 beneficiaries were targeted. These figures are inclusive of both General Food Aid Distribution and Food for Asset Programmes.

The Kenya Food Security Steering Group (KFSSG) is involved in determining the regions to be provided with food supplies. To make its decisions, the KFSSG conducts analyses of information provided by the Geographical Review Team in addition to a number of technical information in the areas affected by food insecurity such as satellite information, price data and field assessments results, and a livelihood economy context. In addition to this, other agencies such as Kenya Red Cross have been active in relief distribution in the area during flooding experienced after the rains that results in destruction of crops, homes, livestock and road networks and during inter clan conflicts (KRCS Reports).

Over the last few decades, vulnerability to climate change-induced hazards has increased and intensified as a result of varied factors, yet the actual critical and systemic issues that keep people vulnerable have received less attention than they deserve among researchers, academics, policy makers and programme staff.

The study of food insecurity requires understanding the incidences of lack of adequate food supply as well as identification of people and households who face the risk of experiencing food shortages in the future. The major procedure followed during the analysis of the issue of food insecurity in order to achieve food safety in the future is vulnerability analysis.

This study is therefore conducted in compliance with the following research questions;

1) What is the prevalence of food insecurity in households in Madogo ward, Tana North Sub County.
2) What are the factors that make households vulnerable to food insecurity

1.3 Overall Objective

The general objective of this research is to study and establish factors that make households food insecure and also establish the current food insecurity status of households in Madogo ward, Tana North Sub County which is an area in protracted crisis.

1.3.1 Specific Objectives

1) To determine the prevalence of food insecurity in households in Madogo , Tana North sub county
2) To find out the main causes of vulnerability to food insecurity

1.4 Justification for the Study

Much research has been done on beneficiary targeting during emergencies and impact of food aid, however there remains a gap in understanding food security programming in protracted crisis. The awareness of the factors that contribute to food shortages can be important in providing policy makers with the framework for developing policies to be used during addressing of food shortages among the vulnerable groups and create an opportunity for the achievement of food security.

1.5 Scope and Limitations of the Study

The study focused on one of the eight divisions of Tana River County. Tana River is comprised of 8 divisions where food aid programmes were targeted. These included Galole, Bura, Garsen, Wenje, Tarassa, Madogo, Bangale and Kipini. This study focused on Madogo ward as it is one of the poorly ranked divisions in food security in the Long Rains Assessment and Short Rains Assessment conducted by the KFFSG and affected by

drought and floods. Food security constitute a broad area of study with a number of social, economic, political and health-related features that need to be examined in order to address the food availability concerns in the society. This study only focused on the socio economic determinants of food insecurity in order to establish food security status of households.

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

Food is among the basic human requirements to survive, improve one's health and become productive in economic development (Smith et al., 2006). Food security occurs when all people at all times have physical and economic access to sufficient food leading to a healthy life. (FAO, 2001). Food security refers to a state where people have access to sufficient amounts of food resulting from domestic production activities or imports, as well as accessibility to food by households and individuals for a nutritious diet either through production, purchase or transfer (UNEP, 2002). Being food secure means that people are confident that adequate food required for a healthy life will be available at all times (Hubbard, 1995; Braun, 1995).

Globally food insecurity is becoming a perennial problem as a result of an increase in the use of grains and oilseeds overtaking the rate at which production takes place caused in part by poor policies (especially in developing countries where focus for many years has been put on export crops) but also extreme weather conditions. Whilst food is available at the global level and countries that have production shortfalls can import from other parts of the world, though stock levels have diminished rapidly since the turn of the century (Evans, 2009), the problem of food insecurity in the African context can be seen largely as one inability to buy food (Obasanjo, 1992).

2.2 Socio Economic Factors and Food insecurity

The main contributing factor to food insecurity in developing countries is the incapacity of people to access the right amount of food due to high cost of food and low supply from external sources (FAO, 1986). The main contributing factor to food insecurity in Africa is its low level of development in agricultural activities due to high dependence on low fertility soil for farming needs, reduced use of external farm inputs, environmental degradation, loss of crops prior to harvest due to drought, and reduction in value-addition

due to procedures used during food storage and preservation that results into reduced quality of stored food and a resulting commodity price fluctuation (Mwaniki, 2006).

Salih (1994) argues that food security cannot merely depend on the availability of food per head in the community but on numbers of other social cultural and environmental factors.These factors include distributional considerations, person's age and gender, metabolic rate and body size, level of activity, health status, climatic environments, social conditions, education and medical knowledge and access to medical services. Food security is usually affected by the above enumerated factors and limitations of these will have adverse effects of household food security.

Poor infrastructural investments in developing countries have major implications in furthering food insecurity not just in terms of production but also link to markets which provide an incentive for productivity in the agricultural sector as it promotes the competitiveness of produce prices by reducing the cost of inputs as well as distribution. The state of infrastructure has a great effect on the distributional channels of food produced within a country and in turn the prices of commodities hampering access to food in certain parts of a country.

Population growth is another important factor contributing to food insecurity with Africa being the world's fastest growing region as its population growth is estimated at 2.4% annually (UNEP, 2002). The characteristics of these demographics are also changing with a huge proportion of the being below 15years of age. Diseases and infections have greatly affected the African continent in its effort to achieve food and economic stability. Diseases that have contributed to loss of productivity in most parts of Africa include: tuberculosis and HIV/AIDS. These diseases have resulted into a reduction in both the availability of man-hours to agriculture and the abilities of households to acquire food, but also contribute to an increase in the burden of food acquisition (Mwaniki, 2006).

The problem of urbanization where many of rural people moves to urban areas has brought about food insecurity in the urban areas. People who usually move to the urban areas tend to be the most productive lot from the rural areas who prior to their movement were involved in agricultural production but due to limitations and non-viability of the

sector as a result of structural, policy and climatic factors, they find themselves having to move into urban areas in search of employment which is not easily available as the market (particularly in the developing countries) does not have the capacity to absorb all the people who move from the rural to urban areas; leaving these migrants with no means of support to meet their basic needs requirements of which food is at the top of the list. This raises the question on the ability of the urban poor and the disadvantaged classes of society to survive due to food insecurity (Salih, 1994).

2.3 Effects of Food Insecurity

Food insecurity is a major concern to people specifically children in areas that have been devastated by natural calamities. If nutrition is not provided to children in a proper manner, child development can be greatly affected. Inadequate availability of food can result into a significant impact on the physical and mental health of the child which can also have an impact on his academic success for future prosperity.

2.4 Responses to Food Insecurity

The World Food Programme (WFP) has Emergency Operations Programme (EMOP) to assist disaster hit communities get back on their feet. EMOPs is involved in the provision of assistance to populations that require food supplies in addition to other projects such as giving food aid in exchange for reconstruction works. The activities of EMOPs are facilitated by the provision of funds by donors who respond to the appeal for such assistance from the WFP. The response operations to food insecurity last for a period of 3 to 12 months and if there is the need for additional assistance, the organization applies for a protracted relief and recovery operation.

Tana River division had been on Emergency Operations Programme (EMOP) since September 2004 which has since May 2009 been phased out and replaced with the Protracted Relief and Recovery Operations (PRRO) and continuing to date. The PRRO consists of five programmes namely; the School Meals Programme (SMP), Supplementary Feeding Programme (SFP), Protection Ration (PR), General Food Distribution (GFD) and Food for Assets (FFA).

The county has also been supported through a number of non-food interventions that have included water trucking, veterinary services, destocking and provision of animal fodder.

2.5 Food Security Policies

According to Salih (1994) there is need for revision of the current food polices in Eastern and Southern Africa as the common features of these policies are those that were formed by the colonial governments as a method of integrating colonies into urban trading networks and provide food security to the settler populations. As there has been no change over the years in the trade patterns which were shaped during the colonial era, there has been export of primary commodities leading to lack of technological investments in Eastern and Southern African countries to improve production within the food sector in order to address food insecurity.

According to the World Bank (1986), Eastern and Southern African countries, as well as countries in Asia that are considered to have high levels of food insecurity, need to look at three major interventions to improve food security. This entails influencing food supply through changes in the volumes of domestic production, imports, or exports without affecting the domestic price of food. The other initiative is aimed at lowering the prices of key food commodities without affecting the prices at the producers' level using government resources to support a subsidy scheme; and the third intervention will look at income supplementation either through subsidies for non-food commodities or by providing food or income transfers.

2.5.1 Food Security Policies in Kenya

2.5.1.1 Legal Framework

Food security is enshrined in the Constitution of Kenya, the highest law of the land, under the Bill of Rights (economic and social rights section) where it states that "every person has the right to be free from hunger, and to have adequate food of acceptable quality" (Constitution of Kenya, 2010). Given that the state has the fundamental duty of respecting, protecting, promoting and fulfilling the fundamental freedoms in the Bill of

Rights, the Government of Kenya is responsible for having all measures (including financial, technical and human resources) in place to ensure that every Kenyan has adequate food.

2.5.1.2 Policy Framework

a) Poverty Reduction Strategy Paper (2001-2004)

Food security in Kenya is outlined as a key issue to address within the agricultural sector in a number of its development policies and strategies as it has in the past been viewed mostly as an issue of there not being enough food produced. In the Poverty Reduction Strategy Paper (2001-2004), food security was addressed under Agriculture and Rural Development sector. Within this sector, crop and livestock development were identified as the priority areas due to inadequate extension services, lack of financial services in rural areas, inadequate infrastructure in rural area and lack of target marketing and distribution systems. Though these policies have a huge bias on rural areas, their impact on the urban dwellers is substantial due to the impact in pricing of commodities in the urban markets. The challenge for the Government has and continues to be the mobilization of the required resources and providing institutions with the capacity to apply the recommended measures as described in the PRSP (Gitu, 2004).

b) Strategy for Revitalizing Agriculture (2004-2014)

The Strategy for Revitalizing Agriculture (2004-2014) is a joint strategy for the Ministries of Agriculture, Livestock and Fisheries development and recognizes that low productivity is the main constraint in the agricultural sector hence affecting food security. According to the strategy, the low productivity is as a result of poor extension services, limited research into appropriate productivity enhancing technology, and limited financial services for farmers to access productivity enhancing technology; issues that the strategy seeks to address in revitalizing the agricultural sector (Gitu, 2004).

The strategy is therefore the agricultural sector's contribution to the Economic Recovery Strategy whose priorities were:

- To examine and develop the legal framework for food supply and distribution
- Improve the research activities, and the provision of extension and advisory support services to farmers in marginal areas
- Create a structure of management of private and parastatals in order to achieve efficiency, accountability, and effectiveness
- Improve accessibility to inputs for improving allocation of financial services aimed at obtaining them,
- Develop National Food Security Policy and Programmes
- Improve access to markets by improving roads in rural areas and internal taxes

c) First Medium Term Plan (2008-2012)

Under the First Medium Term Plan (2008-2012), which is Kenya's national development master plan for achieving the Kenya Vision 2030, the government is seeking to address food security as part of its agricultural development priorities by focusing on the improvement of productivity through reducing the cost of farm inputs, investing in appropriate productivity enhancing technologies (including investment in irrigation projects), investment in value addition such as small-scale processing of fruits and honey; production of detergent and individual production of body lotion and body oil, livestock development (including investment in processing facilities) and promotion of production of traditional food crops.

d) National Food Security and Nutrition Policy

The National Food Security and Nutrition Policy (2007) identifies food as a basic human right with the main objective of the policy being to ensure the access to food for all Kenyans in their life cycles in the right quantities and quality to enable the achievement of their nutritional requirements for optimal health. The policy moves away from the past policies and strategies that looked at food security mostly from the point of food availability. It addresses food security from four dimensions i.e. availability (looking at production), accessibility (distribution chain and purchasing power), stability (cushioning

against shocks that affect availability, accessibility) and achieving nutritional needs (Republic of Kenya, 2008).

The government intends to achieve this objective by improving the availability of funds for food and agricultural sectors by at least 10% of the national budget, and develop support programs that promote farming and enhanced food production to achieve sustainability. Support measures will also be put in place in order to bring improvement to security and the capacity to access land and water by women, livestock farmers, and provide support for regional entrepreneurships. The government also has the objective of conducting a review on wages to account for nutritional requirements, rates of inflation, and labor efficiency. By applying this policy, the government plans to transform the Strategic Grain Reserve into Strategic Food Reserve that includes a number of important food products such as stocks and cash to ensure sustainability in food availability (Republic of Kenya, 2008).

e) The Food Security and Nutrition Strategy

This strategy was developed in 2008 based on the food security and nutrition policy (2007) and is a plan aimed at providing a method that enables the government implement strategic actions that results into improvement of the food availability and nutrition of the Kenyan population in a comprehensive and coordinated manner. The strategy identifies key programme areas that the government should focus on in order to deliver the food security and nutrition policy. These programme areas include improved productivity within the household, nationwide access to food, affordability of food, and food safety and quality consideration during food production, improvement of nutritional food services in institutions (and among partners, consumers) and food and nutrition in schools. The strategy looks at food and nutrition security from a multi-sectoral approach and recognizes the need for an approach that integrates the economy, agriculture and other related sectors (Republic of Kenya, 2008)

2.6 Theoretical Framework

2.6.1 General Systems Theory

A system according to the definition of Russel Ackoff, constitutes two or additional elements composed of the following characteristics:

1. Each element contributes to the functioning of a whole system.
2. Each all elements have are affected by other elements.
3. All possible subgroups of elements are composed of similar characteristics

According to the systems approach, the world is composed of integrated systems that are irreducible. It emphasizes on providing attention as whole, in addition to creating an interrelationship among its components. This theory was initially formulated by biologist Ludwig von Bertalanffy in 1928. It is based on the assumption that a system is composed of interactions of its elements and the nonlinearity in the manner in which such interactions occur.

2.6.2 Relevance to the Sstudy

A social condition such as unavailability of food is attributed to the manner in which the social system functions as a whole. That is there is a continuous interaction of the social systems to create a state of food availability or unavailability. The understanding of food security requires the understanding of the social system as a whole (Byrne 2005). In order to enhance food security in a complex social system, there is the likelihood that a number of interventions will need to be implemented. Food security according to the FAO is a state where there is access to food, availability, and utilization of food. These three elements of food security are interrelated. While the availability of food is required, it is not sufficient in order to achieve food accessibility. In a similar manner, the achievement of food access does not imply that food utilization is achievable.

2.6.3 Rational Choice Theory

Rational choice theory was proposed by Homan (1961) and states that human beings are purposive and goal oriented in their preferences or utilities that are set hierarchically in

the society. it begins with the assumptions that men have different wants, goals and values but live within the world of scarcity and therefore must select between alternative courses of action that leads towards the most preferred goal (Health, 1976).People examine and make calculations involving various alternative action open to them and compare amount of rewards associated with each course of action and likelihood of receiving it (Ritzier, 1992)

2.6.4 Relevance to the study

This theory explains household decision making process on how best to deal with food security; how the household members come up with a strategy on the best way to access food for the household. The theory gives an understanding into household choices in as far as food expenditures are concerned in their adoption of alternative ways of coping with food insecurity such as diversifying livelihood,credit,consumption of wild fruits, reduction in number of meals, sharing of food with neighbors and migration to urban areas.

2.7 Conceptual Framework

According to FAO's definition of food security, 'It occurs when all people, are provided with economic access to the right amount of food, in a manner that meets their nutritional needs and enhances their life activities' (FAO, 2003). The definition is composed of the following four dimensions:

The right amount of food availability

- Ability of people to access food at low cost,
- Utilization that involves an improved quality and safety of food,
- Stable availability of food without the incidences of seasonal changes in food supply;

The role of these factors contributes to a number of socio-economic challenges faced by farmers and those who do not have the resources for improved farming methods. These

components are affected by various factors such as climate, conflict, income, assets, markets, education and policies.

Food availability is influenced by increased production, trade and food aid in country. Production is determined by a number of factors which include access to land, appropriate inputs (seeds and fertilizer), policies that promote agriculture, road and market infrastructure.

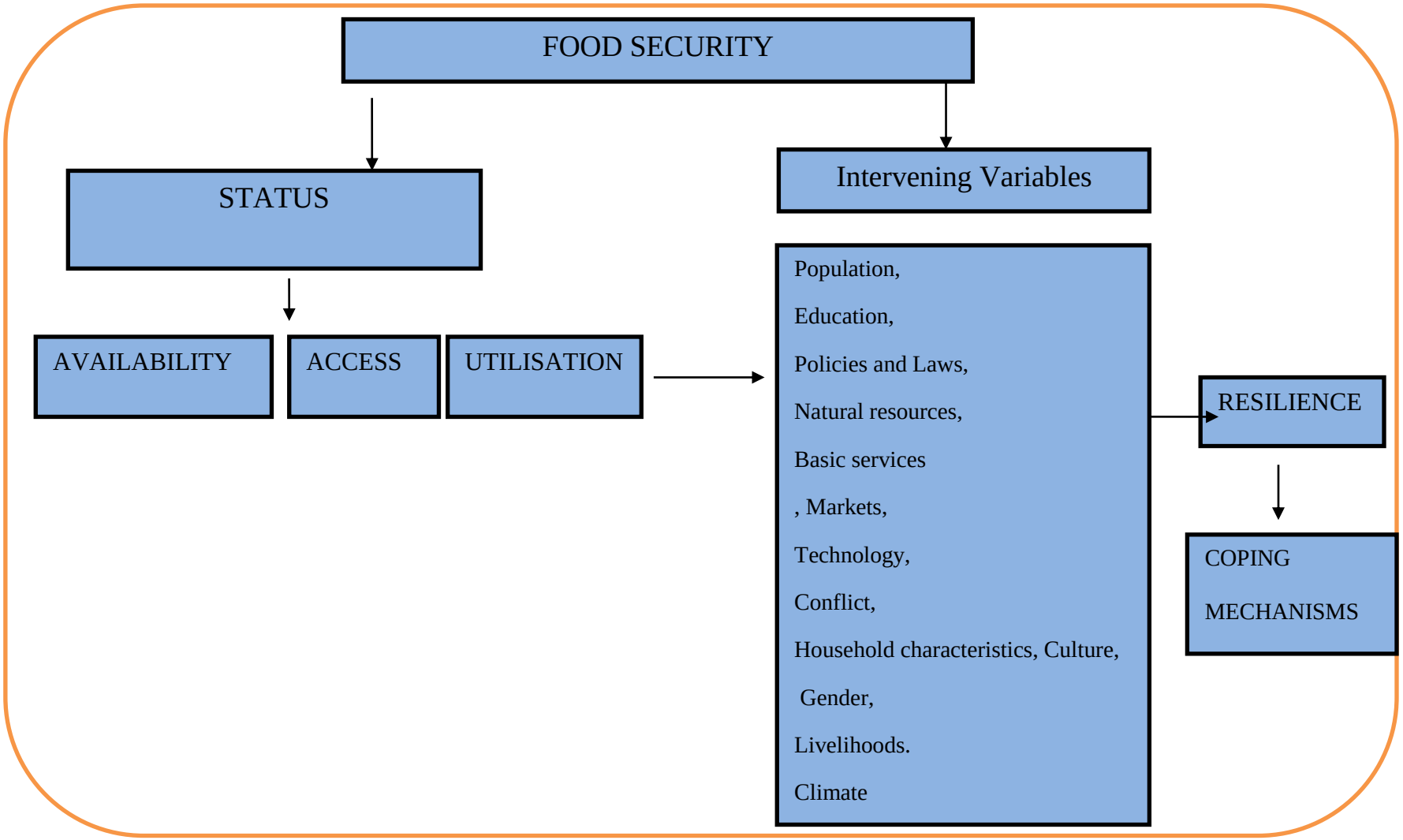
Household food availability refers to a condition where a house is able to access food of the right amount and quality to obtain a safe and nutritious diet (FAO 2006). This is dependent on the household having income and resources to access the food and food prices .Access is also complemented through in kind transfers of food by the government and humanitarian agencies. Household income generation is also dependent on a number of other factors such as education and health status of individuals.

Food utilization is the process where a person has the ability to intake a particular diet and absorbs in his or her body. Consequently, food utilization is a state where a person consumes a particular amount of food, but also the quality derived from its consumption. Type of food consumed at the household is dependent on income of the household. The higher the income, the richer the diet of the household that will include staples and vegetables. Education also plays a role on nutritious foods to be consumed in the household. Health status of an individual also affects utilization. When an individual experiences an illness, there is s lesser tendency to eat and the rate of absorption of energy is also likely to be affected (UN World Food Program, 2007).

Food security stability also looks at vulnerabilities and resilience of communities. The impact of negative shocks as result of climate change that includes natural hazards such as drought and floods and man-made hazards such as conflict affect the food security of households. Vulnerability to shocks can increase over time if the household has to cope with repeated shocks. Resilience is the ability of individuals, communities, organizations' or countries exposed to disaster or crisis and underlying vulnerabilities to anticipate, reduce the impact of, cope and recover from the effects of adversity without compromising their long term prospects (IFRC). The characteristics of a resilient

community as per International Federation of the Red Cross (IFRC) recognize the importance of human health and well-being and also individual knowledge and awareness as central to the ability of households individually and collectively to be able to prepare, prevent, respond to and recover from shocks and stresses. Secondly, they acknowledge the importance of assets and access to wider resources beyond the immediate control of the community.

Figure 2.1: Conceptual framework on food security



CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

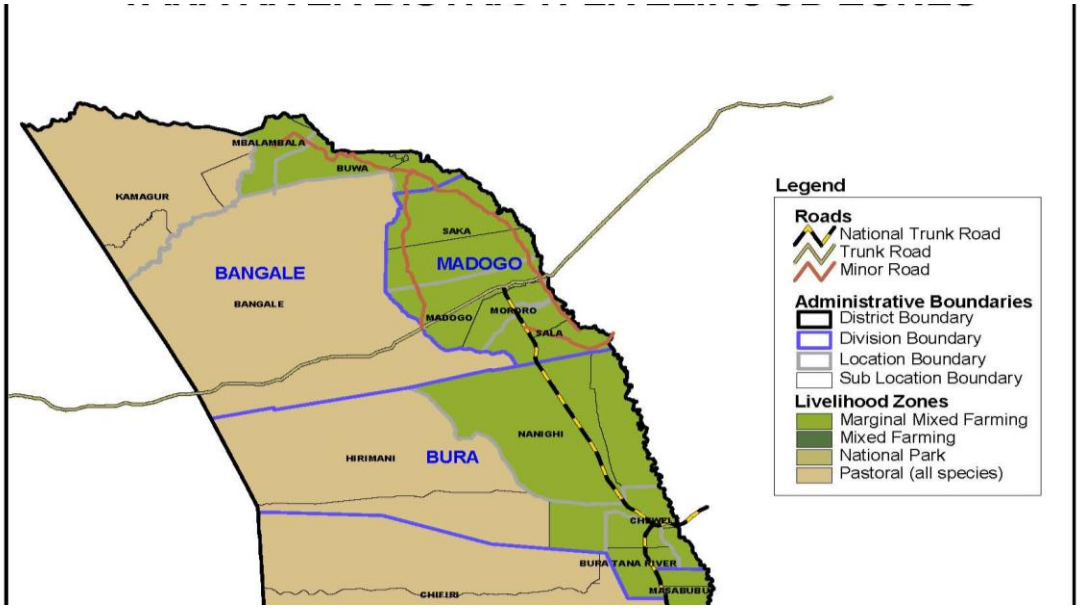
This chapter examined the methodological aspect of the study including sampling design and techniques, data sources and collection methods as well as analysis. The study explored both quantitative and qualitative techniques.

3.2 Site selection and Description

3.2.1 Site Description

Tana North Sub - County is one of the three (3) sub-counties that constitute the Tana River County, (others are Tana River and Tana Delta sub - counties). Madogo ward is situated in Tana North Sub County. It has a population of 21, 731 (2009 census, with 11,708 male and 10,023 female.

Figure 3.1: Map of Madogo



Source: NDMA

3.2.2 Site Selection

The site was mainly selected due to the area being prone to twin disasters of floods and drought with the division located near the River Tana. Farming is also the main livelihood in the area yet Madogo ward has also been ranked as one of the worst of in Tana North Sub-County due to the food insecurity status. The area was also selected due to security being stable and also accessibility. Madogo town lies 5km from Garissa town.

3.3 Research Design

According to Kothari (2004), a research design is the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure hence a blueprint for collection, measurement and analysis of data. The research design used in this research is a survey and a case study where deeper insight on food insecurity is explored. Survey research involves the collection of information from a sample of individuals through their responses to questions.

3.3.1 Units of Analysis and Observation

According to Babbie (1994: 5), a unit of analysis is the object of attention. The unit of analysis in this study was food security, while the units of observation are sampled households in Madogo.

3.4 Sampling Design and Sampling Techniques

A sample is a group of cases, participants, events or records consisting of a portion of the target population, carefully selected to represent that population (Cooper and Schindler 2006). The study involved conducting a sample survey in Madogo ward of Tana North Sub County where data was collected to analyze the study objectives and provide research findings. The target population of this research was the households located in Madogo. A sample survey of 105 households was used to get information on indicators of food insecurity and prevalence of household food insecurity.

The research used simple random sampling from cluster sampling where the clusters consisted of sub locations in Madogo Ward. There are seven sub locations in Madogo division namely;

1. Madogo
2. Mulanjo
3. Konoramadha
4. Korati
5. Buwa
6. Asako
7. Pamba

3.5 Selection of Study Respondents

The main participants of the study were 105 household heads who represented households sampled in Madogo Ward of Tana North Sub County and 9 key informant interviews. The study investigated food insecurity situation at the household level which has then been extrapolated to the larger community. Much of the information sought and obtained in the study came from the household heads as respondents. In absence of household heads, any other available adult member of the household who has been dedicated the responsibilities of the household were interviewed.

The unit of analysis for the study was therefore the individual household. In addition, the researcher interviewed 3 Governmental Officers, 2 NGOs representatives, 1 CBO leader and 3 traders operating in Madogo market.

Table 3.1: Distribution of study participants by type and location

1. Household heads		**No. of Households**
Ward	**Sub Location**	
Madogo	Madogo	15
	Mulanjo	15
	Konoromadha	15
	Korati	15
	Buwa	15
	Asako	15
	Pamba	15
Total		**105**

The study area in this case was selected through multistage sampling procedure. This sampling technique moves through series of stages which normally start from the more inclusive to less inclusive sampling units until the desired area is achieved (Kiddler et al, 1986). The first step involved purposive sampling of Madogo Ward of Tana North Sub County. The second stage involved clustered sampling of the 7 sub-locations (Madogo,Mulanjo, Konoromadha, Korati, Buwa, Asako and Pamba,. Then the researcher randomly selected the respondents from each of the 7 sub locations.

The next step involved a selection of 15 households in every village. These were sampled systematically, by interviewing every fifth household along the route followed by the researcher each day until 15 households were achieved in each of the sampled sub location. This culminated in 105 households being identified and engaged in interviews.

Purposive sampling was used to identify representatives of institutions operating in the study area for face to face interviews. Agricultural officer, irrigation officer and the Madogo livestock officer were the government officers identified and involved in the study. Non-governmental institution representatives identified included the managers of 2 NGOs and 1 CBO chairperson operating in the study area. Purposive sampling method was used to ensure that people who were best placed with the appropriate information concerning food security issues in the study area

were selected. The researcher randomly selected 3 traders from food and livestock traders based in Madogo Division.

The table 3.1 shows the distribution of the study respondents.

3.6 Data Collection Methods

3.6.1 Primary data

Data collection was carried out in the month of September and October 2016 through administration of face to face interviews held among 105 household heads, 2 NGO representatives, 3 Government officials, 1 CBO leader and 3 traders based in Madogo Division.

The researcher used structured interview schedules with open - ended and closed–ended questions to collect relevant descriptive data from the respondents. The interviews were guided by structured questionnaires administered by research assistants to the respondents. The study also used key informant interview guide to collect qualitative data to enhance the qualitative data collected.

Additional primary data was obtained through direct non-participant observations. An observation check list was used to aid the researcher in observing and recording phenomena relevant to the study. This included observations on agricultural practices on farms visited, utilization of river water, vegetation cover in the villages visited, and the common economic activities in the area, among others. This method enabled the researcher to confirm the validity of some of responses given by the respondents during the face to face interviews.

3.6.2 Secondary Data

Secondary data relevant to food security was collected from published and unpublished sources through extensive literature review exercise prior to and after the field work. This involved research and recording of available literature on food security particularly in the study area.

3.7 Data Analysis and Interpretation

The obtained data was subjected to descriptive statistics so as to summarize and organize in simple statistical format to enhance understanding. Data was presented using a combination of tables, graphs, chart and statistical commentary.

CHAPTER FOUR: DATA ANALYSIS, RESULTS AND DISCUSSION

4.1 Introduction

This chapter presents the results and interpretation of the research findings drawn from the interview guides and the observation list by way of data analysis. This chapter presents the analysis and findings of the study as set out in the research methodology.

4.2 Response Rate

From the data collected, out of the 105 questionnaires administered to the households in Madogo Division, 98 were filled and returned. This represented a 93.3% response rate, which is considered satisfactory to make conclusions for the study. Out of the 9 interview schedules for institutional leaders, only 5 were returned. This accounted for 55.5% response rate for the interview schedules.

According to Mugenda and Mugenda (2003) a 50% response rate is adequate, 60% good and above 70% rated very good. This also collaborates Bailey (2000) assertion that a response rate of 50% is adequate, while a response rate greater than 70% is very good. This implies that based on this assertion; the response rate in this case of 93.3% is very good and 55.5% response rate was good.

Table 4.1: Response Rate

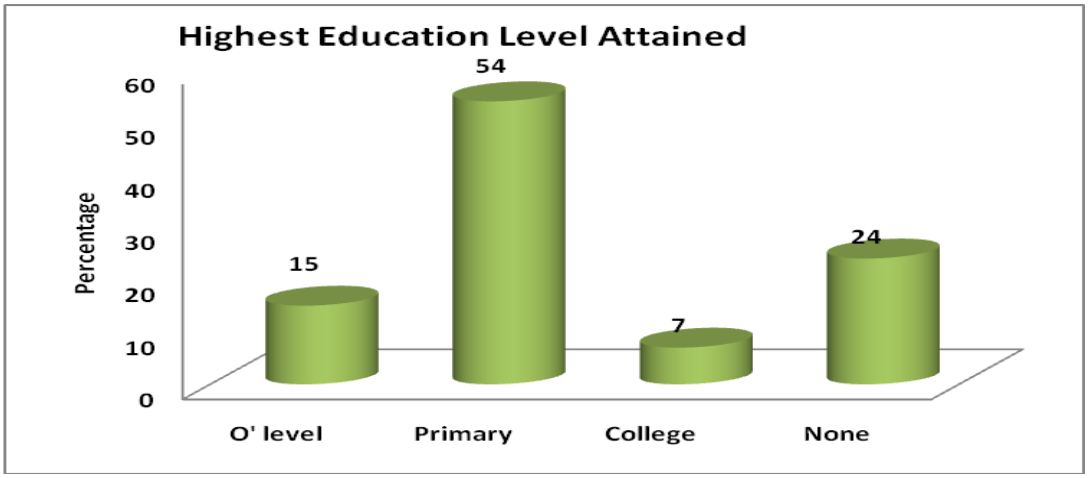
	Frequency (n)	**Percentage (%)**
Returned questionnaires	98	93.3
Unreturned questionnaires	7	6.7
Total	**105**	**100**
Returned interview schedules	5	55.5
Unreturned interview schedules	4	44.4
Total	**9**	**100**

4.3 Socio – Demographic characteristics of Responders

4.3.1 Educational Attainment

Most of the respondents (54%) had either primary school education or had not attained any formal education at all (24%). The number of respondent decreased as the level education rise. This is evidence that illiteracy is relatively high in this area and this has contributed very much to underdevelopment.

Figure 4.1: Education Level



4.3.2 Household Size

Most of the households (55.1%) had more than five members. The least had one member and the highest had 20 members with mean as 6.25 (±3.052). Traditional beliefs and practices were discovered to have also influenced food sufficiency in the study area is in relation to desired family sizes. Analysis of the obtained data indicates that family planning may not be widely practiced by the local households as indicated by the medium to large household sizes in the study area. This is due to a prevailing belief and desirability for large families. This is indicative that the local households could be overburdened with food and other household requirements to meet the demand of large families. Household size exerts more pressure on consumption than it contributes to production [Shiferaw et al (2003)].

In addition, raising young children and managing the large households was overwhelming reducing engagement in farming activities. It also puts up various other demands to households including time and money for health care needs, food, among others.

Field observations revealed that cases of malnutrition among children, the old and pregnant women could be high and are indicative of limited access to adequate food in the study area. Some men and women were observed to have weak bodies perhaps due to starvation or overworking themselves including in NGOs 'food for work' programmes. Weak bodies or ill health limited peoples' capacity to work productively.

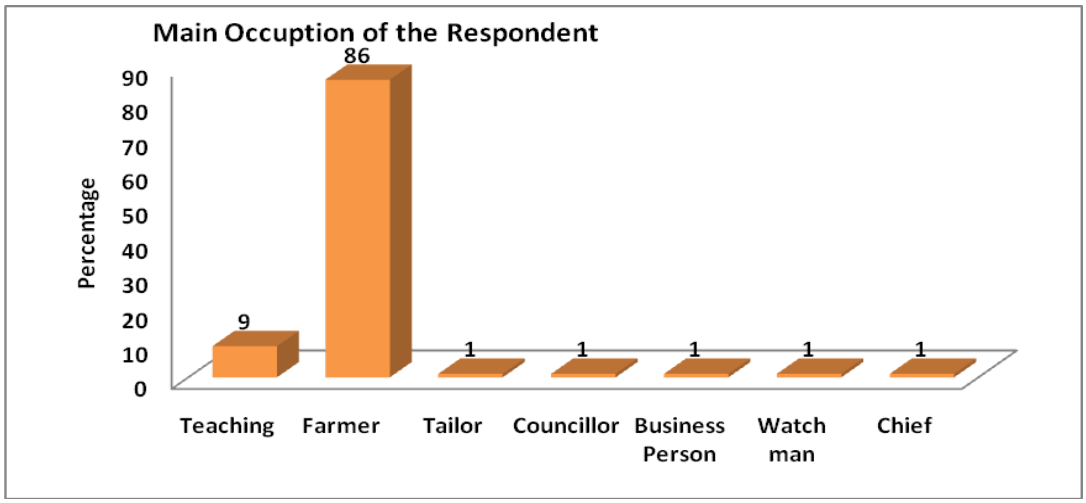
Table 4.2: Household size

Number of household members	Frequency(n)	Percentage (%)
1 – 2	9	9.2
3 – 5	35	35.7
6 – 7	21	21.4
8 – 9	18	18.4
10 and above	15	15.3
Total	**98**	**100.0**

4.3.3 Types of Occupation

Most of the residents in Madogo ward solemnly depend on farming and livestock keeping as the main source of their income. 86% of the respondents were dependant on farming. They depend on crop and livestock to get money which on the other hand are bought at very low prices. In order to supplement this, these inhabitants have turned to small scale ballast production, bricks making, burning of charcoal and illicit brewing.

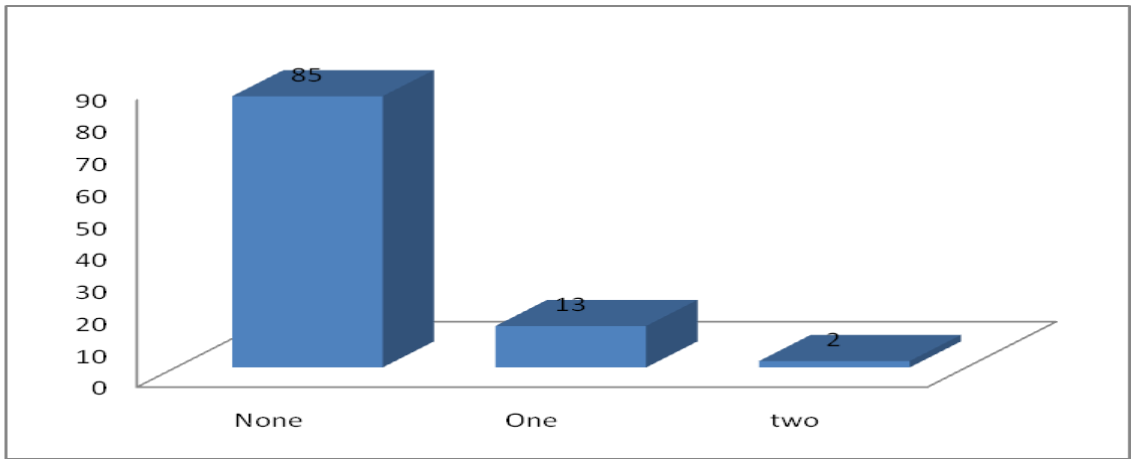
Figure 4.2: Main occupation of the respondents



4.3.4 Employment Status

Majority of the households (85%) in this study had none of their members permanently employed. This depicts that there were very few households engaging in alternative livelihood to supplement the farming income. In addition those with permanent jobs experienced high dependency syndrome from other household members and the immediate relative especially during famines.

Figure 4.3.: Permanent employment distribution among the households



4.3.5 Sources of Household Income

Much of the household income in the study area is generated through selling of farm produce (37.5%) and sell of livestock (27.6%). However due to hardships in the area associated to food insecurity, households have adopted other income earning activities such as; small scale ballast production, brick making, household labour and charcoal burning to supplement their meagre income from selling of food and livestock.

Household income was also reported to be inappropriately used to buy unnecessary items. Division agricultural officer and other officers interviewed on this issue argued that some people changed their lifestyles drastically upon harvesting and selling their farm produce such as buying of expensive diets, holding social activities and moving to town centres to spend their income

Table 4.3: Main sources of household income

Source of income	Frequency(n)	Percentage (%)
Selling of livestock	27	27.6
Farm produce	35	35.7
Household labour	11	11.2
Charcoal burning	5	5.1
Employment / salary	5	5.1
Small businesses	7	7.1
Illicit brew	4	4.1
Making ballast and bricks	4	4.1

Due to lack of sustainable income sources, the average household income per capita in the study area was found to be very low as shown in the figure below.

4.3.6 Household Income Levels

Figure 4.4: Household income levels

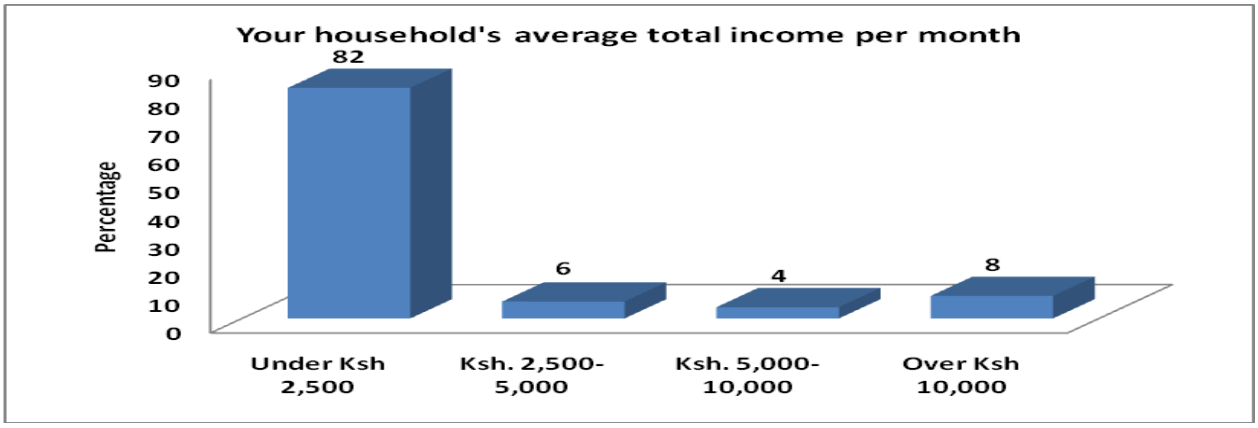


Figure 4.4 shows that 82% of households involved in the study earned less than Kshs. 2,500 per month which translates to Kshs. 30,000 per annum. This household income is low, far below the national average and is indicative of high incidence of poverty in the area. It also implies that the purchasing power for most of the households in the study is weak. The study findings have reviewed that, dependency of farming as the main source of income and low prices of farm products and livestock in the local markets are the main contribution to this scenario.

Allocation of household income expenditures is prioritized, with food purchases (53.1%), school expenditures (24.5%) and health care (9%) being given the largest proportions. Purchase of agricultural inputs such as improved seeds and fertilizers (1%) was an expenditure item for only a few households in the study area. This indicates that farmers invest less on improving food productivity by either buying of artificial fertilizers or improved seeds. The table below elaborates the main household expenditures in the study area.

Table 4.4: Major household expenditure items

Household expenditure item	Frequency(n)	Percentage (%)
School fees	24	24.5%
Health care bills	9	9.2%
Purchase of food	52	53.1%
Purchase of agricultural inputs	1	1.0%
Other home expenses	12	12.2%

It is evident from the above data that much of the income is used in buying food. Mostly the residents have to buy food from market, because after harvests they sell much of their farm outputs and livestock to fulfil the household needs. Buying of food and school fees are the main responsibilities which preoccupy most the residents in this area.

This was explained by Khalif Rajab one of the respondents from Pamba sub-location who said:

> *Food insecurity is a real 'headache'. We have many problems but we have to endure……. For example we are poor; having no any other source of income other than the food we harvest and livestock which has also reduced in numbers. After harvesting we sell almost everything to pay school fees which are a problem to every family with a learner. Then after a few months we begin purchasing food from market which is usually expensive to afford.*

The above explanation underscores the fact that high level of poverty in the dry lands creates this cycle of buying and selling of food which mostly affects the farmers who are over exploited by the traders hence aggravating food insecurity.

The households' sizes were also found to be ranging from one to 20 members with the average being 6 members. This indicates a relatively medium to large household size in the study area. It was evident that such a household size was hardly sustained with food especially during food shortage periods. Due to this, different households have adopted some more coping strategies which include; adoption of short term dietary changes which include avoiding lunch meals and taking only supper and light breakfast which had been adopted by 70% of the interviewed households, reducing or rationing household consumption to severe dietary changes such as

going for an entire day without eating which was reported by 80% of the respondent and 60% of the respondents practised altering intra-household distribution of food through consideration of the young and denial to the grown-ups. Short term labour migration to more food secure area such as Madogo town and selling of assets especially land and livestock's was also reported by 35% of the interviewed households.

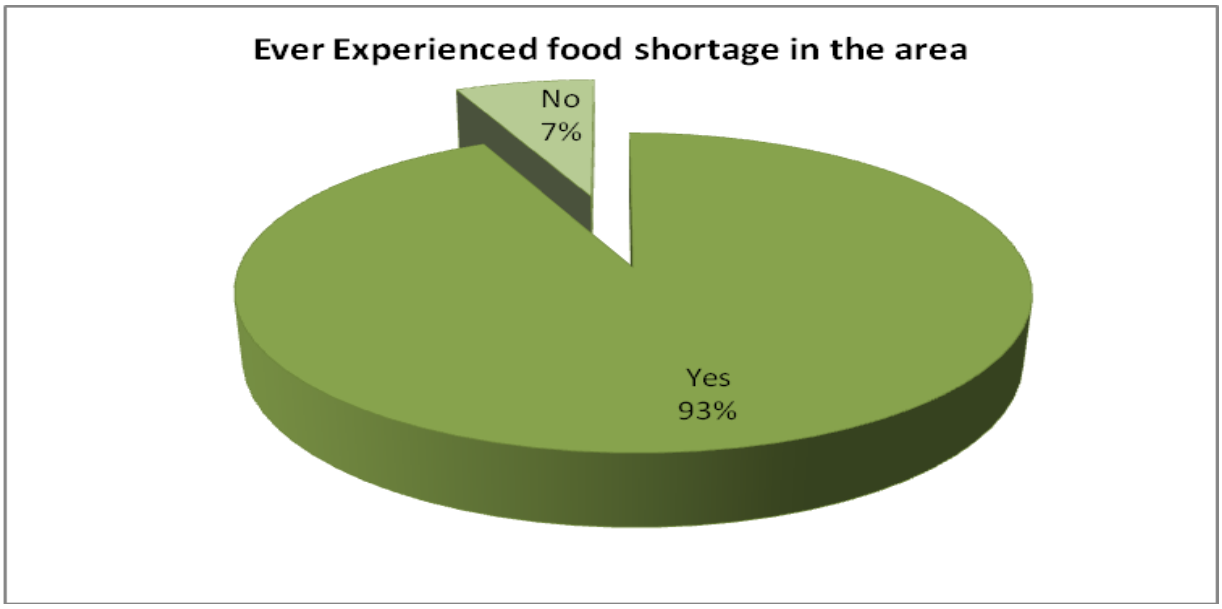
As it was mentioned earlier purchasing food from the market to supplement own production is the other coping strategy reported to have been practised by 80% of the households involved in the study. Whilst the study found out that the inhabitants depends much on market products since their own produce is mostly not sufficient to sustain their family demands, they are at the same time incapacity to purchase the amount they need due to low incomes, high prices and sometimes unavailability of required food items.

The main food stuff regularly bought in the market was identified as maize and pulses such as beans. These are rarely produced in Madogo. Seventy nine percent of the respondents mentioned that they buy maize and pulses from market while 20% rely on market for all food stuffs. Only (3%) mentioned reliance on relief foods, while wild foods such as tarmarindus indica locally known as "Ukwaju" and seeds from baobab trees locally known as "mbuyu" were relied upon by only (2%) to supplement the little available food because as reported by 70% of the respondents, wild fruits have deteriorated due to desertification effects in this area. Clearly, the market is a main source of food for most households in the study area.

4.4 Food Security Situation in Madogo Ward

Food security situation in the study area was investigated by obtaining data on the experiences of local households. The vast majority of the 98 households covered in the study (93%) indicated that they had experienced food shortage in the past as residents of Madogo division. Only 7% of the total households involved in the study did not mention ever facing food shortage.

Figure 4.5: Households' experience of food shortage



Of the 93% households who reported the experience of food shortages, about 66% were completely food insecure because they experienced food shortage for most of the year. Slightly over half (54%) of these vulnerable households were female headed.

4.4.1 Causes of Food shortage

Frequent food shortages in Madogo division were revealed to be contributed by mainly three factors. Low food production was identified by 53.1% of study participants as the main cause of food insecurity. This essentially means that most households were not producing enough of what they needed to last the entire year. This was reviewed to have been influenced by less crop diversity, poor soil management, planting of wrong seeds and rainfall inadequacy among others.

Inability to afford food from the market was noted as the second cause reported by (33.7%) of all the study respondents. This essentially means that when households fell short of producing enough of their food requirements, they were not being able to afford food in the market to cover up their food gaps. Low income per capita and the fact that food stuffs were very expensive when most needed (times of food gaps) were contributing to this problem.

In most cases, food stuff was available in the market but not affordable as put across by Amina Chako one of the respondents from Konoromadha who said;

> *We are suffering very much because when we harvest we sell a lot of food at very low prices to fulfil other household needs. We have no bargaining power; the buyers determine the prices for our food. Even if a seller is unwilling to sell their food, they are forced to sell at the poor prices because others have accepted and nobody controls the prices in the market. Eventually when famine /food shortage strike this food is sold to us at very high prices.*

This suggests some direct association between the local marketing system (food prices) and food shortage in the study area. Thus, the market appeared to play a significant role in food security situation in the area. Indeed, food inaccessibility in the area, as noted below, is not so much about scarcity but affordability in the market as shown in the table below.

Table 4.5: Main causes of food shortage

Causes of food shortage	**Frequency (n)**	**Percentage (%)**
Low food production	52	53.1
Inaccessibility due to food scarcity	2	2.04
Incapability to afford from the market	33	33.7
Rainfall inadequacy	10	10.2
Less crop diversity	1	1.02%

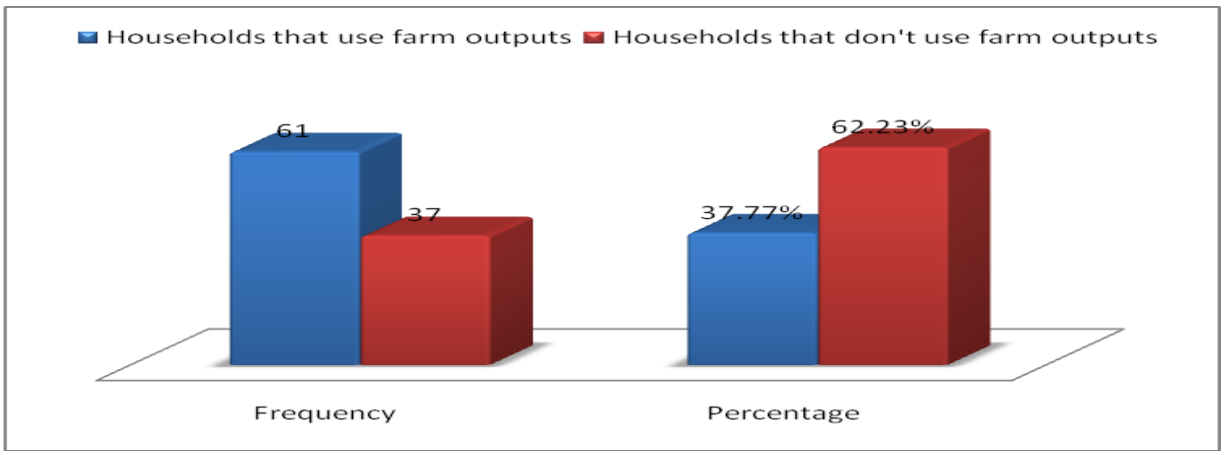
The study findings also reviewed that a lot of the food brought to market from Thika, Garissa, and other areas, is usually expensive. The problem is more about the potential of the households to purchase enough from the market to meet their needs because food prices escalate very much during famines and food shortage periods. The study established that the same food bought at very low exploitative prices from the farmers is latter sold very expensively during food shortages.

The locally produced foods; millet, sorghum, green gram and cow peas, were revealed to be sold by famers at very low prices during harvests. For instance these were the prices in market during this survey which was carried out during harvests was; Millet- ksh.10.00/kg, Green gram- ksh.20.00/kg, Sorghum- ksh.8.00/kg, and Cowpeas- ksh.20.00/kg. This is as compared to food coming from other areas which is sold at relatively high prices. The average selling prices for such foods was noted to be as follows: Maize- Ksh.35.00/kg, Beans- ksh. 70.00/kg, Pigeon peas- Ksh45.00/kg. Vegetables, potatoes, tomatoes and fruits prices varied with the quantity of purchases but were relatively high. Nevertheless in order to sustain household food requirements these residents spent their little income in buying these foods hence exhausting much of their income and eventually leading to food shortages.

All the above information indicates that majority of interviewed households faced food shortages is a proof that the study area is food insecure and there is a need to address some of human related causes in order to alleviate this problem. This finding is supported by available Government records on the study area. According to the Madogo Division strategic Development Plan (2005-2010), the division has high prevalence of poverty, estimated at 60 per cent with the poor residing in the driest divisions of Madogo, Mulanjo, Konoromadha, Korati, Buwa, Asako and Pamba respectively have the least poverty prevalence. Food insecurity in Madogo Division in particular is perennial as can be said of other divisions of Tana North and semi - arid areas of Kenya more generally.

4.5.1 Agricultural practices on food security

Figure 4.6: Use of farm produce



Livestock breeds kept in the area are traditional types, like the case of the crops; there was no evidence that new breeds are being introduced in the area in recent years. Pests and diseases were identified as common factors limiting the productivity of crops and animals being kept in the area. Some of the respondents, especially the institutional officers, viewed this as local farmers neglecting to uphold new technology hence having not been able to improve their crop and livestock production levels. From administrational point of view this has been influenced by ignorance, lack of exposure, and cultural conservativeness of the local population which was said to have complicated or minimized the impact of efforts by agencies (mainly NGOs and Government) to promote food security Madogo division. However there are a few who have begun practising new farming methods such as soil conservation introduced by NGOs who have improved farm out puts.

Farmers in Madogo division rarely use animal manure or industrial fertilizers on their farms. Among 98 households interviewed, only (37.77%) were found to be using these farm inputs, albeit in small quantities. The vast majority (62.23%) of the households interviewed did not. Livestock manure was found to be readily available in the local area with field observations revealing that a lot of livestock manure from goats, sheep, cattle and chicken lay un-utilized in many homesteads.

The few farms that had experienced fertilizer or manure application were revealed to be registering high production compared to farms without manure or fertilizer application. A quite interesting finding is that none of the households who mentioned application of manure or fertilizers on their farms were among the 66 households who were revealed to be food insecure. Additionally these 39 household heads representing the manure/fertiliser applying households had formal education at either primary, secondary or college level.

Farmers also believe that the best seeds are those obtained direct after harvest from their own locality. Introduction of new seeds by agricultural agencies is not much welcomed. This has led to less crop diversity. Again due to low education level and influence, many farmers have been buying wrong seeds from markets. When planted and coincidentally having poor production, most farmers neglect new seeds and stick to their own varieties. Use of pesticides is not widespread among the farmers. They depend on old methods of smoking the green millet especially when invaded by caterpillars and spreading ashes on cowpeas to kill insects. Sticking to such practices has caused great losses of food whenever there are pests or disease outbreaks.

Nonetheless there is effort to change these habits, through implementation of water and soil conservation projects in this area by Ministry of Agriculture and Kenya Red Cross who have been operating in the area. KRCS has supported farmers in the area through grants from donors to improve agricultural practises in the area. Farms implementing soil conservation measures were noted to have improved fertility and food productivity. This serves as evidence that these soil erosion prevention measures will improve food availability in this area. Despite the fact that such activities will help to improve soil fertility and eventually farm productivity, the practice is not widespread and only few farmers appear to have taken the issue of soil conservation seriously.

The Kenya Red Cross has also introduced irrigation farming in the area where water is pumped from river tana using irrigation pumps to farms. This has improved access of water and less dependability of rainfall .in addition household water supply has been improved through construction of shallow wells requiring households to trek less distances in search of water.

Poor food storage was found to be another factor aggravating food security situation in Madogo. Field observation indicated that after harvesting food, notably millet, sorghum, cow peas and green grams, the local farmers do not thresh it at once in large quantities. Instead they keep it in their small granaries and pick bit by bit threshing for sale or household consumption. This was noted as one mechanism of avoiding using up the harvest fast to the extent of encountering household food gaps just a few months after harvest. But the consequence of keeping food without any preservatives is that a lot of it is destroyed by weevils.

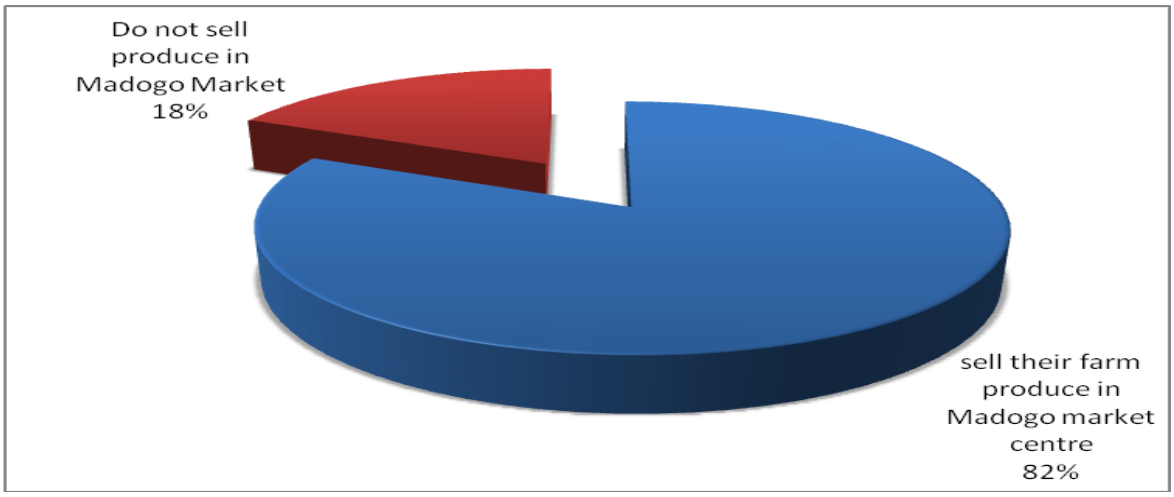
It was evident from field observations that 54% of the local households interviewed have no food stores, which is indicative of serious food storage problems. Whenever such households had good harvests, they are forced to process their food stuff fast and sell it at low prices to retain only small quantities which they are able to maintain. Such food management practices were observed to be contributing to food insecurity in the area.

4.4.2 Marketing system on food security

Almost all respondents indicated that marketing system in Madogo division is not well organized or controlled for the benefit of all. The local farmers and average inhabitants of the division do not appear to get a good deal from the market, particularly due to poor pricing of their produce. For the average household, the marketing system in Madogo division remains a main cause of food insecurity in their community.

There are several reasons discovered in this study to have created this situation. Firstly, most farmers sell a lot of their food during harvests at mostly low prices due to the markets being flooded with the same produce. Secondly, the same farmers buy foods from outside their area (those they do not grow e.g. beans and maize) at high prices. Thirdly, during the times of widespread food shortage, local households have to purchase food stuffs at exorbitant prices. Fourthly, a large part of the food sold by the local farmers in local markets is transported out of the ward which affects the aggregate food stocks available to remedy short term food shortages and thereby keeping food prices at affordable level. The effect of all this is that the local farmers, and indeed the average households in the study area engage with the local markets and their main operators (middle men) from a disadvantaged position.

Figure 4.7: Sell of produce in Madogo Market



The findings indicated that (82%) of the interviewed respondents usually sell their farm produce in Madogo market centre which is the main market for all the locations comprising the ward. The main traders come from Garissa, Thika and Madogo town. Information obtained from the traders involved in the study revealed that traders from these areas do not carry out the actual food buying transactions but give money to local brokers who buy food stuff from local farmers at low prices and in the process earn huge commissions.

The study also noted that the food sellers (local farmers) have little or no bargaining power for the prices of their produce. Prices are usually determined by the food market brokers. After selling of the food, some of it is transported and sold at twice or triple the buying price in the big urban centres either in Nairobi or other areas in the country. The remaining food which has been sold to the local traders is stored and later sold to the same farmers at very high prices. Due to lack of better sources of income, the local inhabitants have to sell a lot of their foods at throw away price to meet their other needs. This has devastated Madogo residents who appear bound to the production-market-expenditure cycle that is weighed on heavily by unfair market practices.

4.4.3 Availability of essential services

Poor road infrastructure and unfair marketing practises in Madogo division were noted to have been contributing a lot to the un-affordability of food stuff in the local markets. There are no tarmac roads in Madogo division, but only one murram road linking to Madogo Township. Due

to insufficiency of other services such as health facilities, water in good quality and quantity, and electricity this has greatly contributed to underdevelopment in the study area.

For instance in Madogo ward transportation of food to the market is a daunting task for many farmers who have to depend on donkeys as the main means of transportation. Poor transportation inhibits local farmers' ability to move their goods and services to places where prices could be better. Consequently respondents claimed that they are forced to sell their produce at low prices to avoid carrying it back home whenever there are unfavourable prices in the market.

Unavailability of functional health facilities in Madogo division was noted to be another problem hindering development. Madogo Division Hospital is clearly the main source of health care for the inhabitants yet it is far. Major sicknesses among the inhabitants are taken to Garrisa meaning that some illnesses are kept pending until when there is food or livestock to be sold. Some common illnesses such as Malaria causes farmers to incur heavy losses as they are forced to sell the little available food or livestock to cater for the medical expenses. Health bills take 9% of household income which in turn reduces the household's ability to purchase food in the Market to offset household food gaps. This scenario is very unsettling for the poor households or those without regular sources of income.

Water availability in sufficient amount and in good quality was noted to be affecting food security in Madogo. The researcher through field observation found out that much time is spent by inhabitants in collecting water. At most people in this Division travel for about 3-6 kilometres to fetch water with donkeys, a distance which on average takes about 3 hours. In other instances, fetching of water from river tana has resulted in crocodile attacks hence households seeking alternatives to access water. This is one factor which consume a lot of farmers' time especially the women who have other household chores responsibilities. While children are at school, birds and wild animals destroy crops, especially millet and sorghum (main crops grown in the area) as the farmers search for water. The overall effect is low on food production as enough time is not devoted to crop and livestock production and part of the potential food produce is destroyed while still in the fields.

Madogo ward has also very few schools, both secondary and primary schools. For instance there are only four secondary schools in the whole Tana North Sub County, indicating that parents spend a lot of their income to cover transportation cost for students travelling to school located in other areas. Primary schools in this area are also few and sparingly distributed causing the pupils to walk long distances to access education facilities.

This study found out as indicated earlier that 24.5% of the household income goes to school expenditures. Of all households interviewed that had a student either in primary or secondary school, payment of school fees was noted to be the most worrying and heaviest household burden. During the harvests parents have to sell a lot of food at very low prices to obtain school fees. As stated above, food prices in the area are usually low during harvest time hence farmers sell almost all the harvest they have and after a while they begin the struggle for food.

4.4. Traditional cultural beliefs and practices

There is much inclination to traditions and cultural values in Madogo division which has been contributed by low formal education attainment among the inhabitants. Various cultural beliefs and practices appear to exert considerable influence on food security and education status in the area. These include beliefs and practices around property ownership rights, desirability of the local crop and animal varieties, food habits, drinking of illicit brews, pests and disease control, and approach to reproductive health.

4.5 Role of Institutional Bodies

These lifestyles funded from sale of farm produce were reported to not only have aggravated the food insecurity situation of local households but also contributed to the spread of anti-social activities such as drinking of illicit beer, prostitution and spread of HIV/Aids especially in the trading centres within the study area.

4.5.1 The role of Governmental agencies

Kenyan Government was reportedly involved in promoting agriculture in the study area, although to a limited extent. Main Government agencies or officials' operative involved in such activities included agricultural extension officers, provincial administration, Division agricultural officers who were reported by 40% of the respondents to have been issuing seeds to local

farmers thereby enabling those without enough seeds to plant early. The main seeds distributed are sorghum and maize varieties suitable to the area.

Two percent of the respondents mentioned also that Government officers assist the livestock keepers in animal vaccination and disease treatment. However, it was reported by 10% of the respondents that these Government officials often required local farmers requiring services to fuel the vehicles transporting the officials to the affected homesteads. The farmers were also required to provide additional incentives in form of money for them to be attended. Essentially, this means that local farmers sometimes co-support the delivery of Government services through unaccounted for monetary contribution. Farmers who are unable to afford such incentives are either neglected or receive untimely services from the Government extensional officers.

Besides offering direct service to local farmers, the Government was mentioned to be assisting NGOs operation in the area to establish various development projects such as promotion of irrigation projects. The Government and world food programme also provides relief food to the inhabitant which is very helpful during severe famines. According to 81% of the respondents, relief food supplied by the Government enables them to work on their farms rather than moving to other places (temporal migration) in search of food. They also desist from engaging in environmentally destructive food shortage coping strategies such as charcoal burning.

Government agencies were involved in promoting improved agricultural practices such as crop rotation, better food storage, soil conservation, pests and disease control, and use of manure but mainly through facilitation from NGOs operating in the area. There was no evidence also those Government agencies have been actively involved in intervening to streamline the local marketing system that was reported to be unfavourable to the local farmers.

4.5.2 The role of Non-governmental organisations

There were three NGOs operating in Madogo division however most of the projects had come to an end. These were: German Agro Action (GAA), Kenya Red Cross and Action against hunger. Their main activities involved promoting food security (providing farm inputs, water conservation, soil conservation, and tree budding).

German Agro Action was reported to be involved in the conservation and harvesting of water for domestic and livestock use in the study area. This is through the construction of earth dams and sand pans. The harvested water is also used by the local people for small scale vegetable farming. The NGO is also involved in teaching the local people how to conserve soil and prevent severe soil erosion which has destroyed massive land in the study area. Many farmers have dug benches to conserve water and prevent soil erosion on their farms thereby improving land productivity.

The Kenya Red Cross was reported to support farmers in establishing irrigation in their farms through supply of pumps and digging of canals. They also supported farmers with inputs and training on modern agronomical .In addition they conducted maternal child and health services in the area to increase demand for the services and worked with the ministry of health to equip a level 3 maternity facility located in Mulanjo.

Action against hunger worked in promoting access to water sanitation and improvement of hygiene practises and also integrating the same with livelihood support in Madogo.

4.5.3 The role of Community based organisations (CBOs)

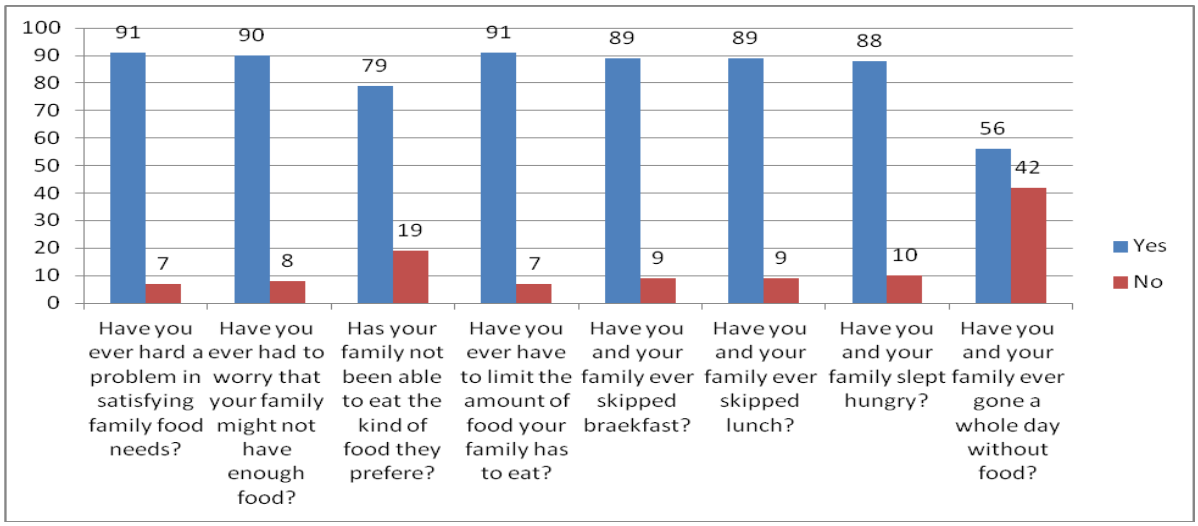
There are numerous grassroots organisations which have been established in the study area. These include women self-help groups, youth groups, men groups, among others. Many of these community based groups work closely with the three NGOs operating in this area. They play various roles such as distributing food and other assets such as farm inputs provided by the NGOs. For instance, Madogo CBO, in collaboration with World Vision and Action Aid has managed to support many HIV/Aids patients in the study area. The CBO's registered members who are affected by the disease receive food and financial assistance through the "Food for Assets" programme run by the CBO. The programme is focused on improving food security in the Division through soil and water conservation activities organized by Action Aid group.

Other CBO based activities in the study area include tree grafting, digging of toilets for institutions such as primary schools and practicing small scale vegetable farming using water conserved in earth dams. Many of the CBO activities are focused on improving food security in the Division and there is hope that their noble work will help change the food security situation in the area.

4.6 Food Insecurity in Tana River.

4.6.1 Occurrence

Figure 4.8: Occurrences of food insecurity



Sum of HFIAS Scores in the sample

Number of households in the sample

673/98 = 6.9

According to Bickel et al's (2000) Household Food Insecurity Access Score (HFIAS) score and categorization households are classified into food secure, food insecure without hunger, moderately food insecure with hunger, and severely food insecure with hunger as indicated below.

<table>
<tr><td>Up to 2.32</td><td>Up to 4.56</td><td>Up to 6.53</td><td>Up to 10</td></tr>
<tr><td rowspan="3">Food Secure</td><td colspan="3">Food Insecure</td></tr>
<tr><td rowspan="2">Food Insecure Without Hunger</td><td colspan="2">Food Insecure With Hunger</td></tr>
<tr><td>(Less Severe) "Moderate"</td><td>(More Severe) "Severe"</td></tr>
</table>

In these scores and categorization, households with a score of up to 2.32 are categorized as food secure, those with a score of up to 4.56 are classified as food insecure without hunger, a score of up to 6.53 are categorized as moderately food insecure with hunger and a score of 6.54 and above are classified as severely food insecure with hunger. An average HFIAS of 6.9 therefore, means that on average the households in Tana River have a score of 6.9X10/8 =8.63 and falling in the class of severely food insecure with hunger.

4.7 Food Insecurity Mitigation Measures and Their Effect on Local Environment

Madogo division has historically faced frequent severe food shortages. As a result, the inhabitants have adopted various coping strategies which have apparently enabled them to move on even in times of hardships when it is hard to find any help from the government or other organisations. Some of these strategies are less harmful to the environment, while others though boosting the household income have negative effects on the environment. They have contributed to land dereliction and desertification in Madogo division due to severe soil erosion.

Sixty five percent of the respondents confirmed that charcoal burning has adversely affected Madogo environment especially in Buwa sub-location where there is widespread charcoal burning. Much deforestation is taking place and deterioration of crop productivity is now evident. Due to removal of the vegetation cover during charcoal burning process, much land has been left bare hence being exposed to severe soil erosion.

Another coping strategy noted to have effect on the environment was bricks making which is much practiced Madogo market. These bricks are commercially made for use in the construction of commercial buildings within the market. This activity has caused much land dereliction with many holes dug and left. This environment encourages mosquitoes breeding which also affect the surrounding population through spread of malaria disease which was affirmed by 25% of the respondents interviewed near the market centre within Madogo sub-location.

People engage also in sand harvesting from Tana River which is just a few meters from Madogo market to sell to constructors. This activity which has been taking place over a long period of time since respondents reported that all buildings in this market have been built using sand from this seasonal river.

During food shortage a lot of sand is harvested which is bought at very low price and kept for future usage. The researcher observed that the river bed has lost a lot of sand, having large out cropping bed rocks which initially were not seen. This has had great impact by lowering the water table of this river consequently causing water scarcity especially during drought seasons. Another problem observed during this study caused by sand harvesting activity is much surface run off which carry a lot of soil from nearby farms to the river. Farms near this river have been severely eroded with much of this soil getting to the river.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the findings, conclusions, recommendations and suggestions for further studies.

5.2 Summary of the Findings

Food security situation in the study area:

One of the major objectives of the study was to investigate the food security situation in Madogo division and establish causes of vulnerability. The study established that the area is a perennially food insecure zone that is characterized by frequent drought, food shortage and famine. Many of the inhabitants believe that the food shortage problem cannot be solved unless there is enough rainfall in the area. Little attention is given to the influence of human factors on food security situation in the area. Whilst relief food provided by government and other organisations has been helpful especially during famines, it has, on the other hand, reportedly caused a dependency syndrome among the local households on relief food. The immediate consequences of this include laziness, idling and a sense of hopelessness especially for the poorest households.

Food insecurity problem is not only experienced in Madogo Division of Tana North sub County. Frequent famines experienced in the division have resulted in high influx of people to towns and migration to areas perceived to have enough food, such as Madogo, Konoromadha, Korati ,Buwa, Asako and Pamba. For instance, it was found that most of the members of households involved in the study were reputedly in Tana North sub County at the time of the field work. Such movements increase food shortages because instead of returning home to produce their own food during rain seasons, the temporal migrants do return immediately after famines. Instead they stay away from study area only to come later and consume the little food produced by the few who remained during famine spell.

Impact of socio-economic factors on food security situation:

The study investigated several socio-economic factors perceived to be influencing food security situation in the study area. The main social variables investigated were education status, gender, and cultural beliefs and practices. The economic variables examined were the local marketing

system, agricultural practices, availability of essential services, and household income and expenditure patterns). The impact of work of institutional bodies (Government agencies, NGOs and CBOs) in promoting food security in the study area was also investigated.

These factors were found to exert considerable influence in either improving or undermining the food status of the local households. Poor farming practices were found to be widespread and contributed to low farm productivity and ultimately to the problem of food insecurity in the study area. It was established that many of the local households were not producing enough food to last them throughout the year. Low application of manure, shifting cultivation, limited soil conservation, and low crop diversity were some of the common farming practices observed in the study division which contributed to this. Poor storage methods and facilities also caused considerable food loss. It was found that most of the local households had only small grass thatched granaries which contributed to food being destroyed by rain and pests.

The study established that the local marketing system and practices were skewed against the local households in as far as selling of their produce and purchasing of food from the market is concerned. The local marketing system is characterized by low prices for farmers' produce during or a few weeks after harvest and very high prices for the same food stuff during times of food shortages. This resulted in local households selling extra more food in order to obtain the money they required to meet their needs. Exorbitant food stuff prices during times of shortage coupled with low household income per capita resulted in many households not being able to afford all the food they needed from the market. Most people in the study area have low purchasing power as only few of the residents in permanent formal employment and hence with regular income.

Poor road infrastructure in the division is also causing the inhabitants to incur heavy losses as they are unable to access markets with better prices for their produce. All people in the study area depend on Madogo market centre and have to endure the unfavourable food pricing that is common in the market. Local producers have no bargaining power in the market leading to over exploitation by middle men. The prevailing marketing arrangements have multiple faceted negative effects on the local food security situation. Limited availability and accessibility to essential services, especially schools and health facilities leads many local households to spend

large proportion of their produce and meagre incomes to secure required services. It also limits the amount of income available to local households to purchase food needed from the market.

In other instances, people spend a lot of valuable agricultural time in searching for water. During dry seasons, residents have to move over a long distance in search of water for domestic and livestock use. There are few health facilities in the entire Division which results in huge amount of household resources, especially money and time being spent on transportation and health care costs. These expenses are financed through the selling of food stuff as farming is the main source of income for majority of households in Madogo division.

Average household incomes have been found to be low with a considerable number of local households and individuals being classified as poor. Their ability to ensure household food sufficiency through own production and purchase from the market is therefore low. That a considerable portion of household expenditures goes to financing essential services requirements (school fees, health services, transportation, etc.) also affects the ability of the local households to invest in improved agricultural practices or to buy enough food that they need from the market.

A variety of social variables, including low level of formal education attainment, traditional beliefs and cultural practices (such as around property rights) have been found to negatively affect the food security situation in Madogo division. In particular, the high level of illiteracy and cultural conservatism was found to be hindering agricultural innovation and acceptability and adoption of improved farming practices promoted by the Government and NGOs operating in the area.

Impact of institutional bodies' work on food security situation:

Institutional bodies (Government, NGOs, and CBOs) are involved in addressing the problem of frequent food shortages in the study area. NGOs have initiated various food security related programmes such as drilling of boreholes, promotion of irrigation and training farmers on soil conservation practices. They have also supported the digging of benches, construction of terraces on farms, water harvesting and capacity building activities. All these are aimed at boosting the local people's ability to produce adequate food for household consumption and sale.

It is evident that NGO initiatives are improving agricultural production in the study area to a great extent. CBOs are equally playing an important role in boosting food security in the area, mainly by working closely with NGOs operating in the area. However, there are no NGOs currently operating in the area with most of projects closed and the capacity of CBOs is low hence minimising the potential impact of these development actors in terms of improving food security in the study area.

The Government and its officers, especially those under the Ministries of Agriculture and Livestock Development are assisting to some extent in addressing the problem of food shortages in Madogo division. However, their impact on the food security situation in the study appears minimal, compared to that of the NGOs' work. The problem appears to be limited availability and accessibility of Government personnel services to the local people, especially the poor. It was reported that government officials often demanded incentives in order to provide services requested by the local people. This included fuelling of the government vehicles yet this is particularly hard for the poor households. This practice discouraged residents from seeking help from government officials in most of food production matters.

Effects of food insecurity mitigation measures on the local environment:

Residents of Madogo have devised various strategies to cope with food insecurity problem. However, some of these strategies appear to have negatively affected the local food security situation due to environmental degradation. Charcoal burning is a good example of locally practiced coping mechanisms that have implications for the environment and ultimately the area's future food security status. The activity is widespread in most sub-locations of Madogo division to the extent that Madogo, Konoromadha, Korati, Buwa, Asako and Pamba sub-locations are apparently threatened with desertification.

Other commonly applied coping strategies include bricks and small scale ballast production, fetching water and sand harvesting. These activities contribute to destruction of the land surface which in turn reduces land productivity. Moreover, illicit brewing has stagnated endeavours of improving food security in the area as it leads to unnecessary selling of household food stuff and also encourages idling.

The above summary of the findings indicate that human variables (socio-economic and institutional factors) investigated in the study area enhance vulnerability to the food security situation in the study area. The study findings also confirm the validity of the conceptual model developed by the researcher to predict factors that affect food security situation..

5.3 Conclusions

The study has established that Madogo division is a perennially food insecure area as is typical of other dry land environments in Kenya. Frequent drought, food shortage and famines are a common defining characteristic of the area. They lead to widespread suffering and loss of savings, investments and livestock. The inhabitants of Madogo division appear to have accepted this as the norm and mainly attribute food insecurity to inadequate rainfall in the area. This is indicative that natural factors (rainfall) still occupy a prominent part in people's mind set in as far as the cause of food shortages in the area is concerned. There appears to be limited appreciation by the local population that human factors such as poor agricultural practices and unfavourable marketing arrangements also play an increasingly crucial role in determining their food security situation. Targeted community dialogue on the causes of food shortages in the area is therefore necessary so that people are able to understand the link and therefore try to address all factors contributing to food insecurity in the Division.

There is much dependence on government and other well-wishers for relief food and monetary support during food shortages in the area. Other mitigation measures such as charcoal burning and bricks making have negative impact on the local environment and will aggravate the food insecurity situation in the area in the long run. Such activities therefore need to be checked and more sustainable food mitigation measures introduced else they ended up worsening the food security situation in the area.

While the prevailing food insecurity situation of the study area may be hard to change in the short term, it should not be accepted or dismissed as a problem of the ASALs. There are many resources in the area which can be harnessed to tackle the food problem. Also, if the residents change their perception on causes of food insecurity and get adequate support from the Government and other development actors, a resolution can indeed be found.

The research has established that the work of institutional bodies, notably that of NGOs and CBOs have had a positive impact on food security in the study area. Government agencies are also promoting food security in the area but with limited impact. Water and soil conservation initiatives underway by some of the local people through NGOs and CBOs support have the potential to improve land productivity and improve food security in Madogo but all this depends on the continuation of NGO support and the uptake of these activities by more local people. More Government support and work in poverty reduction and agricultural development in the study area will also be needed to address the food insecurity challenge in the study area and other Kenyan dry lands.

5.4 Recommendations

This ward has valuable resources which can be harnessed to reduce poverty and food insecurity problem. For instance the Tana River basin from Buwa, Asako and Pamba sub-location is very ideal for irrigation and can be explored by the Government for possible exploitation. An Irrigation scheme started in this area will have tremendous benefit to the local people and the positive effects of such an initiative are likely to be felt beyond Madogo division. Meanwhile people around this area can also be encouraged and supported to initiate small scale vegetable farming for own consumption and for sale of the surplus.

Most residents of Madogo division are not only poor but also lack access to credit facilities. The government should create financial systems capable of lending to micro enterprises and low-income households in this division. This will help in developing private sector and reducing poverty level through reduction of unemployment and over reliance on farming that threatens the survival of the poor in the study area.

The government need to prohibit irregular exploitative practises in the marketing systems. This is a great problem which is influencing food insecurity in the dry lands. Governmental intervention will be very helpful to the farmers by ensuring better prices for their produce. This may be implemented through the local county council or establishment of cereals boards and farmers' cooperatives. Another alternative include decentralized business development efforts such as community driven development (CDD) trading activities which offer the potential for increased community participation in micro enterprises.

Provision and improvement of the social services and physical infrastructures will be fundamental in reducing underdevelopment in this Division. The Government, through the Ministry of Planning and National Development, Ministry of Health and Ministry of Education, Science and Technology should come in and ensure they work closely with the local people in improving these services. NGOs and CBOs and other development actors operating in the area should also be involved in this effort. Vision 2030 and the new national constitution offers a motivation and framework for the Government and other development partners to immediately intervene in the area as well as in other dry land areas facing similar problems.

The study reviews that poor farming practises (shifting cultivation, less use of farm inputs and poor water and soil conservation) and some food mitigation measures have greatly caused environmental degradation in the study area. This calls for government and non-governmental organizations intervention to embark on massive institutional agricultural information and demonstration activities in public congregations. This will help the farmers to know the effects of their activities to the environment and help in reducing environmental degradation especially in the ASALS.

Government officials and community leaders need to become more active and firm in dealing with retrogressive cultural practices such as illicit brewing and also enforce the environmental law in order to curb environmentally destructive food shortage coping strategies, especially charcoal burning. NGOs, CBOs, religious leaders, and local Government officials in the area should join hands in addressing these issues.

While the findings and recommendations of this research can be generalized to other dry land environments in Kenya, local contexts and circumstances such as traditions and culture clearly influence the gravity of the impact of the investigated socio-economic and institutional factors on the food security in these areas. Therefore, context specific research is recommended as the most appropriate approach for identifying and determining local level interventions for addressing food insecurity problem in different dry land locations in Kenya.

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APPENDICES

APPENDIX 1: INTERVIEW SCHEDULE FOR HOUSEHOLD

Introduction

Greetings. You have been selected randomly from among the households in Tana North Sub County and would very much appreciate your cooperation as the results of this study will contribute to on-going efforts to tackle food shortages in areas such as this one. I would like to assure you that all the information you will give will be treated with strict confidentiality. Thank you.

Background Information

1. Respondent's details

Name (optional)	Age	sex	Highest education level attained	Main occupation	Religious affiliation

2. Household details:

Number of household members	Number of children in household	Number of household members with permanent employment (regular income)	Number of months/years household has resided

3. Has your household ever experienced food shortage while residing in this area?

   Yes [ ] No [ ]

   (If No, please go to Q3)

4. If Yes, how often has your household experienced food shortage within a span of one year?

   Always/every month in a year [ ]

Most of the year (6 months or above) [ ]

A few months in the year (less than 6 months) [ ]

Rarely/food shortage not a major problem [ ]

5. Were you/household member not able to eat the kinds of foods you preferred because of a lack of resources?

Yes [ ] No [ ]

6. How often did this happen?

Rarely (1-2 times) [ ]

Sometimes (3-10 times) [ ]

Often (more than 10) [ ]

7. Did you/ household member have to eat a limited variety of foods due to a lack of resources?

Yes [ ] No [ ]

8. How often did this happen?

Rarely (1-2 times) [ ]

Sometimes (3-10 times) [ ]

Often (more than 10) [ ]

9. Did you/ household member have to eat some foods that you really did not want to eat because of lack of resources to obtain other types of foods?

Yes [ ] No [ ]

10. How often did this happen?

Rarely (1-2 times) [ ]

Sometimes (3-10 times) [ ]

Often (more than 10) [ ]

11. Did you/ household member have to eat a smaller meal than felt you needed because there was not enough foods?

Yes [ ] No [ ]

12. How often did this happen?

Rarely (1-2 times) [ ]

Sometimes (3-10 times) [ ]

Often (more than 10) [ ]

13. Did you/ household member have to eat fewer meals in a day because there was not enough foods?

Yes [ ] No [ ]

14. How often did this happen?

Rarely (1-2 times) [ ]

Sometimes (3-10 times) [ ]

Often (more than 10) [ ]

15. Were there ever no foods to eat of any kind in your household because of lack of resources to get foods?

Yes [ ] No [ ]

16. How often did this happen?

Rarely (1-2 times) [ ]

Sometimes (3-10 times) [ ]

Often (more than 10) [ ]

17. Did you/ household member go to sleep at night hungry because there was not enough foods?

Yes [ ] No [ ]

18. How often did this happen?

Rarely (1-2 times) [ ]

Sometimes (3-10 times) [ ]

Often (more than 10) [ ]

19. Did you/ household member go a whole day and night without eating anything because there was not enough foods?

Yes [ ] No [ ]

20. How often did this happen?

Rarely (1-2 times) [ ]

Sometimes (3-10 times) [ ]

Often (more than 10) [ ]

21. What normally causes the food shortages experienced by households in this area?

---

22. Based on your experience, how would you describe a typical food insecure household in this area?

---

23. In your view, what proportion of households in this Division fits your description of a food insecure household?

All households/100% :----------

Vast majority of households/ over 75% :----------

About half of households/50% :----------

Less than half of households/25 – 50% :----------

Very few households/ less than 25% :----------

22. What does your household normally do when faced with a food shortage?

---

23. Do other households in this area take similar or different measures to those taken by your household? Please explain ----------

24. What are your household's main sources of food? ----------

25. What proportion of your household food requirements comes from the following sources in any given year?

i. From own production: ----------

ii. Purchase from the market: ----------

iii. Wild foods: ----------

iv. Relief food: ----------

v. Other sources: ----------

26. What food types does your household normally purchase from the local markets?

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27. Are there times when your household is unable to purchase its food requirements from the local markets?

Yes [ ]

No [ ]

28. If yes, when is this and what are the common barriers? ----------

29. What are the common wild foods consumed by households in this area particularly during times of food shortage? ----------

30. In your view, are wild foods available and used now as much as in the past?

Yes [ ] No [ ]

31. If No, what has caused the increase or reduction in the availability and use of wild foods today?

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32. Do you practice both crop farming and livestock keeping?

Yes [ ] No [ ]

33. Which crops do you grow on your farm? ……

34. Does your household currently grow new crops or keep new livestock types that you did not have five years ago?

Yes [ ] No [ ]

35. If Yes, what are these new varieties and who introduced them to you?

SN	New crops/animal	Source of crop/animal variety

36. Have you been applying manure or fertilizer on your farm? ----------

37. Which type of manure do you prefer and why? ----------

38. Which soil conservation methods do you apply on your farm? ……

39. Have you been harvesting rain water? If yes, how have you been using this water?

Domestic use only ----------

Irrigation of kitchen garden----------

Livestock consumption ----------

40. Please explain how livestock keeping supplement crop food to ensure food security in your house hold? ----------

41. Has livestock keeping have had any effects on the environment, and how has it affected crop production in this area? ----------

42. What are your household's major sources of income? ----------

43. What is your household's average total income per month from all sources?

Under Kshs. 2,500: ----------

Kshs. 2,500 – 5,000: ----------

Kshs. 5,000 – 10,000:----------

Over Kshs. 10,000: ----------

44. On average, what proportion of your household's annual income goes to the following expenditure items?

School fees ----------

Health care bills ----------

Purchase of food ----------

Repaying debts ----------

Purchase of agricultural inputs----------

Other ----------

45. When there happens to be a good year with great household income, how else do you spend your income other than satisfying the basic house hold needs? ----------

46. When famines strike this area which other activities do people adapt to earn their income and provide house hold food requirements? ----------

47. Have such activities have had any effects on the environment of this place? ……

48. Does your household sell part of its food produce in the local markets?

Yes [ ] No [ ]

49. If Yes, is this during times of surplus or even during bad harvest?

Sells only during good season when there is surplus food [ ]

Sells even during bad seasons [ ]

50. On what does your household usually spend the proceedings from sale of food produce?

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51. Which major challenges do you encounter when selling food produce in the local markets?

Please explain ----------

52. Does your household face challenges of similar nature when selling its livestock and livestock products in the local markets?

Yes [ ] No [ ]

Please explain ----------

53. How do such challenges affect food security status of this area? .....

54. Are you aware of any activities by the following institutions towards improving food security in this area?

Government	:	Yes	[ ]	No	[ ]
NGOs	:	Yes	[ ]	No	[ ]
CBOs	:	Yes	[ ]	No	[ ]
Religious organisations	:	Yes	[ ]	No	[ ]

55. If yes, what are these activities?

Government : ----------

NGOs : ----------

CBOs : ----------

Religious organisations : ----------

56. in your view how has your household and others in this area benefited from the activities of these agencies se in terms of boosting food security situation?

Benefits from Government activities----------

Benefits from NGOs activities ----------

Benefits from CBO activities----------

Benefits from religious organisations activities----------

57. Are there persons or other institutions and organisation you are aware of who have conducted activities that have brought benefits to your food security situation?

Yes [ ] No [ ]

If yes, please name them and what they have done or are doing ----------

58. Please feel free to make other suggestions you may towards improving food security situation in the Kenyan dry lands and this area in particular----------

Thank you very much for your cooperation and good day

APPENDIX II: INTERVIEW SCHEDULE FOR TRADERS

Introduction: Greetings. My name is Suada and I am a graduate student at the University of Nairobi. I am doing a study on Food Insecurity in Protracted Crisis; Case Study. I would like to discuss some questions with you for about 1 hour. The results of this study will contribute to ongoing efforts to tackle food shortages in areas such as this one. I would like to assure you that all the information you will give will be treated with strict confidentiality. Thank you.

1. What are the current average prices of food and livestock sold in local markets?

Food prices

Sorghum ----------

Millet----------

Beans----------

Cow peas----------

Pigeon peas----------

Maize----------

Others----------

Livestock prices

Cow----------

Goat----------

Sheep----------

Chicken----------

Other ----------

2. Do you consider these prices to be same, higher, or lower than in other areas in the county? Please explain
3. Who usually determines the pricing of food and livestock in the local markets and what factors are taken into consideration?
4. Are there times when the local markets experience huge volume of food and livestock supply? Please explain when and what happens to the prices.
5. What role do traders play during times of widespread food shortage in this area?

7. What role has institutional bodies played in improving livestock keeping and marketing in this area?
8. What are your opinions on the general marketing systems in this area?
9. Please feel free to make other suggestions you may towards improving food security situation in this area in particular.

Thank you very much for your cooperation and good day

APPENDIX III: INTERVIEW SCHEDULE FOR INSTITUTIONAL LEADERS

Introduction: Greetings. My name is Suada and I am a graduate student at the University of Nairobi. I am doing a study on Food Security in Protracted Crisis; Case Study of Tana River County. I would like to discuss some questions with you for about 1 hour. The results of this study will contribute to ongoing efforts to tackle food shortages in areas such as this one. I would like to assure you that all the information you will give will be treated with strict confidentiality. Thank you.

1. In your view, what causes food shortages in this area? Please explain

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2. What types of households are most affected by food shortages in this area and why?

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3. How significant are the following factors in influencing food security situation in this area?

S.N	Socio-economic variable	Level of influence				
		1. Very high influence	2. Medium influence	3. Low influence	4. No influence	5. Not sure/don't know
1	Agricultural practices of households					
2	Amount of household income					
3	How people spend their incomes					
4	Marketing / trading practices					
5	Transportation network					
6	Availability and state of social amenities					
7	Activities of government					
8	Activities of non-government org- NGOs					
9	Activities of CBOs					
10	Activities of religious organisations					
11	Traditional and cultural beliefs					
12	Other social factors (gender, education level, etc)					

4. Please explain how the above factors affect food security situation in this area

a) Agricultural practices applied by the local people:

---

b) Amount of household income

---

c) How people spend their incomes

---

d) Marketing / trading practices

---

e) Transportation network

---

f) Availability and state of social amenities ----------

g) Activities of government agencies ……

Activities of NGOs ----------

h) Activities of CBOs ----------

j) Activities of religious organisations ……

k) Traditional and cultural beliefs----------

l) Other social factors (gender, education level, etc) ----------

5. In your view, what factors cause or aggravate food shortages in this area? Please explain

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6. What are your major activities in this area? ----------

7. What impact, if any, has your organisation made towards improving food security in this area?

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8. What constraints or challenges have you faced if any in dealing with the issue of food security in this area?

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9. How do households in this area usually cope with food shortages?

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10. In your opinion, are these coping strategies adequate and environmentally friendly? Please explain

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11. What local resources are available that can be harnessed to improve food security in this area?

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12. Please feel free to make other suggestions you may towards improving food security situation in the area in particular.

Thank you very much for your cooperation and good day

APPENDIX IV: OBSERVATION CHEK LIST

Note to the observer: This tool aims to collect complementary information to that obtained through interviews and other methods. Please record as full as possible in the "Observations Note Book" all relevant information observed during the field work. Key issues to be observed:

1. Crop varieties grown ----------
2. Size of farms ----------
3. Crops grown in kitchen gardens---------- ---------- ---
4. Size of kitchen gardens ----------
5. Type of animals kept ----------
6. Size of animal stocks kept ----------
7. Physical condition of local people especially children----------
8. Physical condition of animals kept ----------
9. Major type of animals and food traded in local markets ---------- ----------
10. Food and animal prices during market days ----------
11. Food storage practices----------
12. Common food consumed within households – breakfast, lunch, dinner ----------
13. Diets sold in hotels, restaurant and eating places ----------
14. On farm agricultural practices [Yes] [No]
    (a) Farm preparation [ ] [ ]
    (b) Utilization of crop residues [ ] [ ]
    (c) Application of manures [ ] [ ]
    (d) Soil conservation activities [ ] [ ]
    (e) Major trees in farms [ ] [ ]
    (f) General vegetation cover in farms [ ] [ ]
    (g) Irrigation activities [ ] [ ]
15. Condition and utilization of available rivers----------
13. Water harvesting practices and uses----------
16. Transport network----------
17. Availability and state of social amenities:
    (a) Schools----------
    (b) Markets----------

(c) Health facilities----------

(d) Electricity----------

(e) Water supply----------

(f) Telephone ----------

18. Food security related activities of Government, NGOs, CBOs, and religious organisations