FACTORS INFLUENCING FOOD SECURITY PROJECTS IN KURIA DISTRICT: A CASE OF NJAA MARUFUKU KENYA (NMK) - KURIA

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DECLARATION

Declaration by the Student

I Robert, M. S. Muthoka declare that this research project is my original work and has not been submitted to this or any other university for the award of a masters degree or any other award.

Signature: ..... Date: 30-08-2010

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L50/71972/2008

Declaration by the Supervisor

This research project was done under my supervision and has been submitted to the University of Nairobi for examination with my permission as the candidate's supervisor.

Signature..... Date: 04/09/2010

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DEDICATION

This research project is dedicated to my family: Esther Ndileve, Susan Kathure, Rees Ndoto, Hildah Ngina, and Esther Ndanu.

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LIST OF ABBREVIATIONS AND ACRONYMS

CDFSIP:	Community Driven Food Security Improvement Projects
FAO:	Food and Agriculture Organization
GOK:	Government of Kenya
MOA:	Ministry of Agriculture
NMK:	Njaa Marufuku Kenya
IDP	Internally Displaced Persons
SSA	Sub – Saharan Africa
LIFDC	Low Income Food Deficit Countries
SES	Socio-Economic Status
KFSSG	Kenya Food Security Steering Group

ABSTRACT

Kenya is one of the four countries in Africa selected by United Nations to pilot the fulfillment of the Millennium Development Goals. Kenya has fertile soils and good rainfall making her one of the world's leading exporters of tea, coffee and vegetables. However, despite its high-production capacity, 17 million of Kenya's estimated 40 million people live on less than 1 US dollar per day and suffer poverty and malnourishment, with about one-third being chronically undernourished. In Kuria District, 25% of the population suffered starvation in 2009 and it is still projected that there is food insecurity, yet the goal of NMK is to fight food insecurity. The purpose of this study was to establish the factors influencing food security among small-scale farmers in Kuria District with specific focus on the culture, environmental factors and socioeconomic factors of the people of Kuria District. A cross-sectional research design was used for this study. A sample of 240 respondents was selected from 638 members of all the 30 NMK farmer groups. Data for the study was collected using questionnaires, interviews (Key Informants) and Focused Group Discussions. The study established that culture of the local community; environmental factors and socio-economic factors affect food security among NMK farmer groups in Kuria District. Based on these findings, it was concluded that socioeconomic factors are the one most significant factor that influence food security among NMK farmer groups in Kuria District. Culture, and its associated practices and beliefs, are determinants of the way in which natural resources are accessed and used in Kuria district. The beliefs people and individuals hold about food and how that food is produced influences food security. Environmental factors also influence food security since food production requires land and favourable weather conditions. The study recommends that the government makes concerted effort to mobilize the community to improve literacy by taking advantage of free primary and secondary education and other informal trainings; that the Ministry of Agriculture introduce savings and credit organizations and soft loan schemes at the village level to enable farmers to purchase farm inputs such as certified seeds, fertilizers, farm implements and agro-chemicals. Extension services should be intensified to educate the farmers on modern land management and agriculture production techniques. The study also recommends that the Ministry of Agriculture uses the local administration and introduce programmes to take advantage of the positive culture to influence agricultural production in the area such as introducing new crop varieties that are drought resistant and with short maturity periods. Lastly, the study suggests that a study be conducted to quantify the actual effect or contribution of culture, environmental factors and socioeconomic status on the food security among NMK farmer groups in Kuria District.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Food security is a critical global development issue that is related to health, sustainable economic development, environment, and trade (Birhaeuser & Feder, 1991; Maxwell & Smith, 1992). It is concerned mainly with availability of sufficient quantities of food, its distribution within households and its nutritional levels (Maxwell & Smith, 1992; Maxwell, 1996; ODI, 1997). According to the Food and Agriculture Organization (FAO, 1996), food security involves both physical and economic access to food that meets people's dietary needs and food preferences. It is based on consistent availability of sufficient quantities of food, access to food and food use (or appropriate use based on knowledge of basic nutrition and care) and adequate water and sanitation (The World Bank, 1995).

The world annual food production stands at 538,000,000 metric tons against a total requirement of 821,258,963 metric tons (FAO, 2008). World food requirements are projected to double by 2015 and to meet this demand food production must involve doubling existing farmlands to meet food needs (FAO, 2008; Kinyua, 2004; World Bank, 1995). According to the World Bank (1991), FAO (2008) and Museveni (1996), the need for food security is more pronounced in Africa because its manufacturing sector is not yet fully developed. In addition, Africa's reliance on traditional practices and inadequate use of inputs such as fertilizers, improved seeds and irrigation result in low agricultural productivity. Thus, most African states are net importers of staple foods (Muthoka, 2006). The deficit and looming food shortage call for measures to increase food production, storage and distribution. This can be achieved through

provision of agricultural extension services, incentives, use of local knowledge, and community organizing to the local people (Feder, Willet & Willem, 1999).

Agriculture is an important socio-economic activity in Sub-Saharan Africa accounting for between 20 to 30 percent of Gross Domestic Product (GDP) and 50 percent of exports. In Sub-Saharan Africa, about 60 to 90 percent of the labour force is employed in Agriculture (FAO, 2008). The main cash crops grown in the region include cotton, coffee, tea, cocoa, sugarcane and tobacco; and the staple food crops are maize, beans, wheat, sorghum, peas, millet, rice, yams, and oil palm (Kinyua, 2004). The cash crops are grown on both large scale plantations and small holdings. Animals reared include cattle, sheep, goats, camels, donkeys and poultry (FAO, 2008). Most agricultural activities in Sub-Saharan Africa are based on subsistence farming which is vulnerable to climate change and global warming (UN, 1997). Biotechnology is now being advocated as a way of creating high yield, pest and environmentally resistant crops in the hands of small-scale farmers, but this has not yielded much result because it is has not been backed by clear economic policy support and guidance (Muthoka, 2006).

Food security is a critical national issue in Kenya (FAO, 2002; GOK, 2008). About 17 million people, majority of who reside in rural areas, live on less than 1 USD a day, and are unable to meet their basic needs including food and nutrition (GOK, 2008). Kenya's economy is predominantly agricultural and the agricultural sector contributes directly about 24 percent and indirectly 27 percent of the GDP. It supplies the manufacturing sector with raw materials and generates tax revenue and foreign exchange that support the rest of the economy (GOK, 2006). In Kenya the main cash crops are tea, pyrethrum, tobacco, coffee and horticultural produce. The staple foods crops grown in the country are maize , beans, millet, sorghum, cassava, sweet

potatoes and wheat. The main livestock reared include cattle, goats, donkeys and poultry (GOK, 2006).

Efforts to increase food production have been going on in Kenya since independence, but many households still suffer hunger mainly due to bad weather and poverty among other factors (GOK, 2005). In 2004, the Government of Kenya requested FAO's assistance to develop a national programme for food security to help improve access to food. The Njaa Marufuku Kenya (NMK) programme - translated as eradication of hunger from Kenya or ban hunger from Kenya - was inaugurated in late 2004, to fight food insecurity through supporting the up-scaling private sector food security innovations through public-private partnerships. NMK is a nationwide government-led programme that spearheads the fulfillment of Millennium Development Goal number 1 on eradicating extreme poverty and hunger (GOK, 2005; NMK, 2006; UN, 2000). The aim of NMK was to facilitate effective and sustainable Kenyan public-private partnership to address the challenges of hunger and poverty as a national concern through up-scaling on-going innovative private sector-led food security initiatives, encouraging adoption of new technologies, facilitating communities' empowerment, and enhancing devolution of government resources to grassroots level through separate individual NMK's projects. These individual activities are together intended to ensure food security in the whole of Kenya, and particularly in the districts or regions where the programme is implemented (GOK, 2005, 2006; NMK, 2006).

Njaa Marufuku Kenya programme has three Components. First, it supports Community-Driven Food Security Improvement Projects (CDFSIP); and second, it creates community nutrition awareness and support school meals programmes. The third component is to support and up-scale participation of CBOs, NGOs, private sector organizations and other independent food security innovations (NMK, 2006; 2007ab; GOK, 2006, 2008). NMK provides a framework

for a 10-year action plan (2005-2015) for hunger eradication in Kenya through its three strategic components (NMK, 2006, 2008). The CDFSIP component of NMK focuses on empowering communities through capacity building of group members (NMK, 2007ab; GOK, 2006, 2008), and providing grants to small-scale farmers to enable them up-scale such activities (NMK, 2007b). CDFSIP supports group projects which include small-scale micro-irrigation and water harvesting technologies; high value horticulture; cooperatives, marketing and value addition initiatives; environmental conservation; draft animal technology, livestock projects, artificial insemination and Dip services (NMK, 2007b).

Njaa Marufuku Kenya has supported the ministry of agriculture to work with private sector organizations including 15 CBOs, 9 Faith-Based Organizations, 7 NGOs, 2 Cooperative societies and 1 research institute since 2005 (NMK, 2008; GOK, 2008). It has also supported small-scale irrigation projects, production of high value and drought tolerant crops, animal production, agricultural produce value addition and marketing (NMK, 2007b; GOK, 2008). It has also supported water harvesting and environmental conservation, bee keeping, and HIV/AIDS management projects in several districts all over Kenya including Kuria District (GOK, 2008; NMK, 2007b; 2008), at a cost of over 150 million Kenya shillings annually (NMK, 2008).

Njaa Marufuku Kenya was launched in Kuria District in 2006. About Ksh 3,660,000 has been spent on different NMK projects in Kuria District. Despite the heavy expenditure, Kuria District, like most other districts in Kenya, is still food insecure. About 66,828 people or 31 percent of the population face starvation each year with 25 percent faced with hunger in 2009 alone. This indicates NMK has not met its targets.

The population of Kuria District is currently 536.841. The annual food production in Kuria District is about 383 tones against a total food requirement of 721 tones (GOK, 2010). Out of the projected 53 bags of maize per hectare, only a meager 36.8 tones were realized in 2009 leaving a deficit of 46.81 percent food need. Thus, about 25% of the population faced starvation in 2009. Food security index of the District is only 2.36 which is far below the average national value of 6.21 (FAO, 2008) and below the minimum value of 8.02 set by FAO (2008).

In Kuria District tobacco is grown mainly by farmers contracted by large-scale firms such as British-American Tobacco (BAT) and Mastermind Tobacco Kenya (MTK). The cash crop covers an area of 4500 hectares, and has reduced the area under food crops during the short-rains season (GOK, 2006).

Despite the importance of agriculture to the economy, unreliable rainfall, inadequate water supply, poor infrastructure and shortage of arable land among other factors have constrained efforts to expand agricultural production (IFAD, 2007). The study took the view that the prevalence of food insecurity in Kuria District was an indication that food security projects and initiatives such as Njaa Marufuku Kenya projects were facing challenges that render them ineffective in mitigating food insecurity, but the specific obstacles have not been investigated. Several factors have been indicated as determinants of food security in the global arena, but the relevance of these factors to Kuria District has not been established. For example, The European Commission (1996) and OECD (2002) advance personal factors such as attitude towards farming, and political influences as some of the factors causing food insecurity in Africa.

FAO (1999) attributes the prevalence of food insecurity in Africa largely to unpredicted market forces such as low prices and high cost of agricultural inputs, while Valdés and McCalla (1999) attribute the main cause of food insecurity to bad weather like unreliable rains and very

short rainy seasons and inadequate capacity of the local people to do irrigation. According to The World Bank (2002) the major causes of food insecurity in Africa are mainly cultural. But these factors are global in nature and are not specific to Kenya and Kuria in particular. Their efficacy and relevance to Kenya and particularly to Kuria District needed to be established in view of the high food insecurity in the region.

1.2 Statement of the Problem

Food security is a critical national issue in Kenya (FAO, 2002; GOK, 2008). A majority of Kenyans still experience hunger and poverty due to slow national economic growth and decreasing investments in agriculture. This leads to low food production which compromise food security. The minimum value of food security index is 8.02 (FAO, 2008; World Bank, 2008). The food security index in Africa is below minimum acceptable value at 6.21, out of which, Sub-Saharan Africa accounts for 4.83 which is very low indeed. The food security index in Kenya is 5.21 and of Kuria district is 2.36. This indicates that food security index in Kuria is lower than the average national food security index. The annual food production in Kuria District is about 383 tones against a total food requirement of 721 tones (GOK, 2010). The deficit in food production in Kuria District was 46.81 percent in 2009. Food production in Kenya is affected by culture, environmental factors, and socio-economic factors among others. In an effort to deal with these factors, the Government of Kenya has developed programmes like Njaa Marufuku Kenya to enhance food production to ensure food security. However, despite the an investment of over Ksh.3,660,000 in Kuria District, Njaa Marufuku Kenya has not achieved the desired objectives and many households faced starvation in 2009. Despite continued support from government aided projects such as Njaa Marufuku Kenya, food insecurity in Kuria District had

persisted, but the causes of food insecurity in the district have not been investigated. Thus, it is difficult for the government and the management of Njaa Marufuku Kenya to identify viable strategies to deal with food insecurity in Kuria District. Therefore, this study seeks to examine the factors that influence food security in Kuria district in order to develop strategies for achieving enhanced food production in order to ensure food security in Kuria District.

1.3 Purpose of the Study

The purpose of this study was to identify the factors that influence food security in Kuria District.

1.4 Objectives of the Study

The objectives of this study were to:

1. Assess the influence of culture on food security among Njaa Marufuku Kenya farmer groups in Kuria District.
2. Establish the influence of environmental factors on food security among Njaa Marufuku Kenya farmer groups in Kuria District.
3. Determine the influence of socioeconomic factors on food security among Njaa Marufuku Kenya farmer groups in Kuria District.

1.5 Research Questions

The study was guided by the following research questions:

1. How does culture influence food security among Njaa Marufuku Kenya farmer groups in Kuria District?
2. How do environmental factors influence food security among Njaa Marufuku Kenya farmer groups in Kuria District?

3. How does socioeconomic factors influence food security among Njaa Marufuku Kenya farmer groups in Kuria District?

1.6 Research Hypotheses

The study was guided by the following research hypotheses:

1. Culture significantly influences food security among Njaa Marufuku Kenya farmer groups in Kuria District.
2. Environmental factors significantly influence food security among Njaa Marufuku Kenya farmer groups in Kuria District.
3. Socioeconomic status significantly influences food security among Njaa Marufuku Kenya farmer groups in Kuria District.

1.7 Significance of the Study

Agriculture is the backbone of Kenya's economy (GOK, 2008). Food security is intricately linked to agriculture. It is important for the households and society in terms of food provision, nutrition and health of the labour force. A household or society that cannot feed itself remains hostage of whoever feeds it (Maxwell, 1996). The findings of this study will inform the management of Njaa Marufuku Kenya in Kuria District, and the concerned government agencies to develop better strategies to reduce food insecurity in Kuria District.

The study made significant contributions to food security particularly through examining the actual factors that influence food security in Kuria District. The recommendations could be replicated in other areas where the Njaa Marufuku Kenya programme is being implemented. This

study provides information to donors and to the government useful in formulating food security policies for the country in general and Kuria District in particular.

1.8 Basic Assumptions of the Study

There were other factors such as politics, government policies and market forces that could lead to food insecurity, if not controlled. This study assumed that the impact of these factors were fairly the same for all farmers. The farmers from whom information was obtained for this study were members of the same community and live in the same district. The effects of these factors on food production are therefore likely to be evenly distributed in the population. It was assumed that politics, government policies and market forces, did not contribute significantly to food insecurity in this study.

1.9 Scope of the Study

The study was delimited to Kuria District - one of the 36 Districts in Nyanza province. The study was also delimited to Njaa Marufuku Kenya farmer group members in Kuria District. This study was carried out in Kuria (Kuria East and Kuria West districts) District. It focused mainly on the factors influencing food security among Njaa Marufuku Kenya group members in Kuria District. The study used quota, purposive and snowball sampling techniques to select the respondents. Data was collected using questionnaire and interviews from 240 farmers in June 2010 and analyzed using percentages and ANOVA technique.

1.10 Limitations of the Study

Farmers cannot be found in a particular place at a specific time of the day. Their presence anywhere at any time is therefore very unpredictable. In terms of data collection, the use of quota sampling technique may not guarantee a very representative sample. However, it was the most suitable technique under the circumstances. The findings of the study should at best be restricted to the study sample and only generalized to other populations with caution.

1.11 Definition of Significant Terms used in the Study

The following terms were used in the study as follows:

Food security:	A condition where all people in a community at all times have access to sufficient, safe, nutritious food to maintain healthy and active lives.
Factors:	Referred to circumstances, conditions, issues or any personal, environmental, policy or organizational situations that influence food security. It was characterized by culture, environmental factors and socio-economic characteristics.
Culture:	Referred to a people's way of life i.e. beliefs of people about food, beliefs about rain, and beliefs about farming.
Environmental Factors:	Referred to security of the respondent, land use, weather patterns and rainfall patterns.
Socioeconomic Status	Referred to size of land owned by farmer, education of the respondent, occupation, income, and type of shelter.
Insecurity	Referred to insecurity caused by cattle rusting and inter-clan conflicts

1.12 Organization of the study

This report was divided into five chapters. Chapter one was the introduction and dealt with the background and the problem of the study, the objectives, questions and hypotheses of the study. It also described the significance, limitations and definition of significant terms used in the study. Chapter two dealt with literature review and it was organized in terms of concept of food security, approaches to food security and determinants of food security i.e. culture, socioeconomic status and environmental factors and their effect on food security. Chapter three described the study methodology along research design, target population, validity of the study and sampling. Chapter four dealt with the data analysis and interpretation and it was divided into the sections corresponding to the objectives of the study. Chapter five was conclusions and recommendations of the study. There was also a section of references and appendices of the study.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provided literature relevant to the study. It examined the concept of food security and techniques curbing food insecurity, and determinants of food security with specific reference to culture, environmental factors and socioeconomic status. It also discussed the theoretical and conceptual frameworks for the study.

2.2 The Concept of Food Security

Food security is a multi-faceted concept, variously defined and interpreted in terms of the availability of adequate supplies at a global and national level and concern with adequate nutrition and well-being (Lobell et al, 2008). The Committee on World Food Security, set up in 1975 by the UN World Food Conference to oversee developments in food security, adopted in the early 1980s the recognition of food security as a tripartite concept, reflecting the criteria of availability, access and stability. Similarly, the OECD suggests that food security has three dimensions: availability, access and utilization, although this source indicates that there is a tendency to characterize it in terms of availability (Lobell, Burke, Tebaldi, Mastrandrea, Falcon & Naylor, 2008).

Trends that reflect food security can be broadly categorized into two interrelated sets: those that directly measure shortfalls in consumption requirements, and those that concern the potential to meet such shortfalls (Mak, Jahn & Mot, 2001; von Braun, Swami Nathan & Rosegrant, 2004). The United States Department of Agriculture (USDA) evaluates two aspects of food security, availability and distribution, both of which capture the extent of the shortfall,

and analyze predicted trends through to 2009 (Brown & Funk, 2008). The most recent study covers 67 countries that have been, or are, potential food aid recipients. Two key indicators are used: first, the Status Quo gap, which measures the difference between projected food supplies (calculated as domestic production plus commercial imports minus non-food uses) and a base period (1995-97) per capita consumption (Brown & Funk, 2008; Cox et al., 2001) and second, the Nutrition gap, which is the difference between projected food supplies and the amount of food needed to support minimum per capita nutritional standards.

The *Status Quo* indicator provides a safety net criterion, whilst the Nutrition gap indicator gives a comparison of relative well-being (Omamo & Von Grebmer, 2005). At a more aggregate level, the FAO Committee on Food Security reviews a set of six indicators derived from observations of the global cereals market. Although the indicators are confined to cereals, the contention is that they shed light on the global food situation due to the weight of cereals in the overall food basket and thus overcome the difficulty of aggregating over food commodities in calculations of the total food supply and of food imports. FAO's food security indicators are ratio of world cereal stock to world cereal utilization; a ratio of 17-18 percent is estimated to be the minimum necessary to safeguard world food security; ratio of supplies to requirements in the 5 main exporters; ratio of closing stock in the 5 main exporters to their domestic consumption plus exports; cereal production in the 3 main importers (China, India and CIS); and cereal production in Low Income Food Deficit Countries (FAO, 1999).

The second set of food security indicators relates to indicators of changes in world markets, which in turn indicate the potential to meet food shortfalls such as world food price stability and world food price levels. These influence both the ability to finance imports via export earnings and changes in the food import bill, themselves potential indicators of changes in

the food security situation. The European Commission, for example, suggests that the instability of world markets is mainly transferred to each country via the import price of cereals (Cox et al., 2001). The aggregate impact on a country therefore depends on cereal imports as a share of total imports, the price elasticity of imports and the capacity to finance imports via export earnings.

The World Food Summit of 1996 defined food security as a condition where all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life (FAO, 2008). Commonly, the concept of food security is defined as including both physical and economic access to food that meets people's dietary needs as well as their food preferences (Brown & Funk, 2008). In many countries, health problems related to dietary excesses are an ever increasing threat. In fact, malnutrition and food borne diarrhoea have become double burden (Maxwell, 1996). According to Lobell, et al. (2008) food security is built on three pillars: food availability (sufficient quantities of food available on a consistent basis); food access (having sufficient resources to obtain appropriate foods for a nutritious diet) and food use (appropriate use based on knowledge of basic nutrition and care, as well as adequate water and sanitation). It is clear from these views that food security is a complex sustainable development issue, linked to health through malnutrition, but also to sustainable economic development, environment, and trade.

There is a global is debate on issues around food security. Some scholars argue that there is enough food in the world to feed everyone adequately - the problem is distribution (Omamo & von Grebmer, 2005) while other scholars take the view that, future food needs can or cannot be met by current levels of production (Brown & Funk, 2008). It has been argued that National food security is paramount or no longer necessary because of global trade (von Braun et al., 2004) and some have the view that globalization may or may not lead to the persistence of food

insecurity and poverty in rural communities (Singer, 1997; von Braun et al., 2004). Issues such as whether households get enough food, how it is distributed within the household and whether that food fulfils the nutrition needs of all members of the household, show that food security is clearly linked to health. In this study, food security is regarded as a condition when all people at all times have access to sufficient, safe, nutritious food to maintain healthy and active lives. It is characterized by the capacity to obtain food, sufficient quantities of food, knowledge of basic nutrition and availability of water and sanitation.

From the above, it can be argued that food security is the availability of food and one's access to it. A household is considered food secure when its occupants do not live in hunger or fear of starvation. There are six basic principles of community food security, as defined by the community food security coalition. These are low income food needs; self-reliance/empowerment; local agriculture; and systems-oriented projects typically are inter-disciplinary, crossing many boundaries and incorporating collaborations with multiple agencies. Food insecurity is a condition in which people lack basic food intake to provide them with the energy and nutrients for full productive lives.

2.3 Approaches to Food Security

The ability to ensure adequate food security hinges on the ability to identify vulnerable households. According to Omamo and von Grebmer (2005) vulnerability refers to the full range of factors that place people at risk of becoming food insecure. The degree of vulnerability of an individual, household or group of persons is determined by their exposure to the risk factors and their ability to cope with or withstand stressful situations. Singer (1997) indicates that vulnerable households constitute three categories of small scale farmers: those which would be

vulnerable under any circumstances such as where the adults are unable to provide an adequate livelihood for the household for reasons of disability, illness, age or some other characteristic; and those whose resource endowment is inadequate to provide sufficient income from any available source; and those whose characteristics and resources render them potentially vulnerable in the context of social and economic shocks (e.g. those who find it hard to adapt to sudden changes in economic activity brought about by economic policy) (Cox et al., 2001; von Braun et al., Rosegrant, 2004).

Although no definition of 'vulnerable' is complete, a useful starting point is estimates of income is to assume that the first two categories will be relatively poor both in terms of income and assets (Brown & Funk, 2008) and also that the third category will have a fragile resource base and other characteristics which make its income sources uncertain (Omamo & von Grebmer, 2005; Singer, 1997). An appropriate proxy for identifying vulnerable households, is how poor is a particular household measured against some established criterion or 'poverty-line' (Lobell, et al., 2008; FAO, 2008). Having defined who the poor are, the second step is to identify their household characteristics such as location, composition, and sources of income. FAO (2008) observes that a frequent problem in delineating those sections of the population most vulnerable, or at risk from changes in policy direction, is the lack of baseline data regarding household income and consumption patterns.

The notion of household entitlement to food, derived from the work of Amartya Sen (Lobell et al., 2008) is now widely used to investigate issues related to both food security and nutrition. Entitlement are the various means through which households avail themselves of food, whether through household production, or through other income-generating activities such as the sale of labour or participation in trading (von Braun et al., 2004). A number of these activities

may be pursued by the same member of each household, or by different members. In addition, transfers from sources external to the household such as from the state or friends and relatives, also add to household entitlement (Brown & Funk, 2008; FAO. 1999).

Entitlement can also be perceived as the household's ability to express effective demand for food (FAO, 2008; Singer, 1997). It presupposes the availability of food, since for demand to be effective it must be capable of being transformed into consumption. This applies as much to food grown for household consumption as to that purchased with income generated through other activities or from transfers. The former entails a decision to retain part or the whole of the output of productive activity, as opposed to selling it and purchasing food or non-food commodities. However as Brown and Funk (2008) and Singer (1997) observes, household activity or transfers do not directly result in access to food, as there are a number of intervening stages that mediate the process. Both governments and agencies concerned to augment household food security intervene in order to mediate between potential and reality (Cox et al., 2001). Resource endowment of the household will determine its capacity to produce or to trade, and events such as civil unrest or climatic disasters can seriously deplete households' resource potential, and increase the likelihood of structural food insecurity. If what might have appeared as a transitory problem is not to become chronic, the replenishment of productive capability should be a necessary part of programmes aimed at reversing this process. Physical resources by themselves, however, may be inadequate, and the upgrading or changing of the range of skills possessed by household members may be a necessary component of any programme. Consequently, training in new agricultural techniques, or in the necessary skills required by local industries or trades, can form an integral component of food security interventions (Lobell, et al., 2008).

The strategy employed to improve food security status is one of the key factors in understanding the relationship between water harvesting and food security. Two broad options have generally been followed by countries attempting to achieve adequate levels of food security: food self-sufficiency and food self-reliance (Omamo & von Grebmer, 2005; Singer, 1997; von Braun et al., 2004). Food self-sufficiency or the provision of a level of food supplies from national resources above that implied by free trade, represents a strategy followed by a wide range of countries (Omamo & von Grebmer, 2005). While this approach implies the provision of sufficient domestic production to meet a substantial part of consumption requirements, it does not necessarily imply that all households in the country have access to all the food they require.

In a number of countries which are net importers, substantial numbers of households are suffering from malnutrition (Singer, 1997). A strategy of food self-reliance, on the other hand, reflects a set of policies where the sources of food are determined by international trade patterns and the benefits and risks associated with it (Cox et al., 2001; FAO. 1999). This strategy has become more common as global trade has become more liberal. FAO (1999) has even argued that improved food security, as well as efficiency gains, may be achieved more satisfactorily, even in countries where agriculture remains a major contributor to GDP, by shifting resources into the production of non - food export crops and importing staple food requirements. However, as Cox et al., (2001) points out the success of these broad options will depend, inter alia, on the ability of producers to react to price incentives (particularly important), or of countries to use income gains for improved efficiency of resource allocation in order to procure food on the international market. This distinction can also be used at the household level to motivate an understanding of individuals' entitlements to food (von Braun et al., 2004).

2.4 Determinants of Food Security

The Committee on World Food Security recognizes food security as a tripartite concept, reflecting the criteria of availability, access and stability (European Commission, 1996). The OECD (2002) on the other hand recognizes food security has having three dimensions: availability, access and utilization, although that there is a tendency to characterize it in terms of availability. Variables that reflect food security can be broadly categorized into two interrelated sets: those that directly measure shortfalls in consumption requirements, and those that concern the potential to meet such shortfalls (FAO, 1999). Two commonly used indicators are the *Status Quo gap* and the nutrition gap (FAO, 1999). The status quo gap measures the difference between projected food supplies (calculated as domestic production plus commercial imports minus non-food uses) and a base period (1995-97) per capita consumption. The Nutrition gap measures the difference between projected food supplies and the amount of food needed to support minimum per capita nutritional standards (European Commission, 1996).

The *Status Quo* indicator actually provides a safety net criterion, whilst the Nutrition gap indicator gives a comparison of relative well-being. In some regions, the size of food gaps is quite small relative to commercial imports, meaning that if imports grew at a slightly higher rate the projected gaps could close such as in North Africa and in Latin America and the Caribbean). In Asia however, the ratio of the nutrition gap to commercial imports is about 20 percent and in SSA it is projected to be 229 percent. According to (USDA, 2002), it is highly unlikely that the gap can be filled. Food imports would need to grow by 10 percent per year in SSA and 4.7 percent in Asia to fill this gap by 2009.

The FAO Committee on Food Security has developed a set of six indicators derived from observations of the global cereals market. Although these indicators are confined to cereals, they

shed light on the global food situation due to the weight of cereals in the overall food basket and thus overcome the difficulty of aggregating over food commodities in determination of the total food supply and of food imports. The FAO's food security indicators are ratio of world cereal stock to world cereal utilization; ratio of supplies to requirements in the 5 main exporters; ratio of closing stock in the 5 main exporters to their domestic consumption plus exports, and cereal production in the 3 main importers. Others are cereal production in Low Income Food Deficit Countries (LIFDC) and production in LIFDC (FAO, 1999).

The difficulty in interpreting these indicators is that they make no reference to the ability of a country to meet increased import requirements. The second set of food security indicators relates to indicators of changes in world markets, which in turn indicate the potential to meet food shortfalls. Two key primary indicators are world food price stability and world food price levels (OECD, 2002). These influence both the ability to finance imports via export earnings and changes in the food import bill, themselves potential indicators of changes in the food security situation. The European Commission (1996), for example, suggests that the instability of world markets is mainly transferred to each country via the import price of cereals. The aggregate impact on a country therefore depends on cereal imports as a share of total imports, the price elasticity of imports and the capacity to finance imports via export earnings. Vanzetti (1998) concludes that the linking of domestic and world markets that would occur under a free trade regime with no government stocks would reduce the variability of the world price of grain by one-third. However, he cautions that any analysis of the instability of food consumption needs to distinguish between instability due to fluctuations in national production and instability of unit import costs, i.e. world prices.

Valdés and McCalla (1999) calculate an indicator of Food Import Capacity as the ratio of the food import value to the total export value (excluding services). This indicator however is relatively large for small Island Developing Countries (0.70), and for a number of sub-Saharan African countries including Gambia (1.99), Lesotho (0.85) and Mozambique (0.94). However, the ratio is much smaller for larger economies such as India (0.05) and Argentina (0.04). In contrast Paarlberg (1999) argues against using primary indicators of changes in international grain markets as indicators of food security, because most food insecure countries still depend only lightly on imports of grain from the world market. Paarlberg (1999) asserts that importing countries often do better overall when world grain prices are high, because prices often rise under conditions of rapid international growth. Evidence for this claim is that during the "world food crisis" of 1973/74, when the real export price of wheat increased by 103 percent and of maize by 58 percent, and when food reserves dropped to the equivalent of 33 days of global consumption requirements, there was no decline in overall consumption levels. Indeed, in most countries per capita cereal consumption was steady or even expanded (OECD, 2002). The increased prices in 1995/96 also failed to produce any notable decline in consumption. Paarlberg observes that between 1994/95 and 1995/96 wheat export prices increased from US$ 157 to US$ 216 per ton and global stock levels fell by 14.1 percent, but import levels were sustained. By contrast, the 1980s that were characterized by low world market prices and severe food crises were also marked by global recession (The World Bank, 2002).

Markets enhance food availability by enabling producers purchase inputs used for food production, and facilitating trade between surplus and deficit areas (KFSSG, 2008). They also determine the price of food and the incomes households receive from the sale of own products and labour. In Africa, markets and trade are important in promoting food availability, access,

stability and calorific consumption. Nearly all African countries are net importers of cereal (Braun, 2007).

In Kenya, markets and trade are critical in bridging the consumption gap caused by structural deficiency in production of major cereals and pulses by enabling food distribution from surplus to deficit areas (Beekhuis, 2007). In particular, regional cross-border trade is crucial in meeting the consumption gap for cereals, pulses and livestock in the country. The importance of markets is more pronounced at the livelihoods' level where households purchase a large proportion of their food. Rising demand for cereals to produce bio-diesel causing increase in global food prices has curtailed access to food for various households in different livelihoods. This has led to reduced food consumption or increased consumption of undesirable alternatives, sometimes of lower nutritive value (KFSSG, 2008).

Mittendorf (1993) observes that in many Sub-Saharan Africa countries policy changes eliminating market distortions and promoting competitive market systems have had a positive impact in promoting private business initiatives. In Kenya, however, marketing and institutional arrangements have mainly acted as disincentives to the private sector. Nyangito (1997) observes that the main constraint to development of private trade in cereals in Kenya is lack of supportive programmes. This implies inadequate provision of trading information and development of roads and marketing infrastructure (material, institutional and personal facilities and arrangements that allow production and movement of goods and services). Lack of information to market participants and poor access to markets remain a problem. The NCPB has not achieved the objective of stabilizing market prices, and sometimes it has induced price instability. The board is not adequately funded and runs out of funds whenever it attempts to intervene in the market.

Kenya must increase its farm productivity and income (Karanja, 1996). The Kenya Agricultural Research Institute (KARI) has an uphill task of generating and adapting better food crops technologies to local conditions. The extension programme of the Ministry of Agriculture should seek a more cost-effective means of using its extensive network of extension agents to supply farmers with basic and sound agricultural advice, for increased food production. The government must continue provision of enabling environment through clear policy goals and commensurate investments in infrastructure, education and information technology which are pre-requisites for agricultural and economic productivity growth.

2.5 Culture and Food Security

Culture in its broad sense is the way of life of a particular society (Bowbrick, 1986; Chapman, 2002; Kindall & Pimentel, 1994; Ponting, 2007). Culture includes the roles, uses, position, and symbolism of individuals, ideas, tools and food, in all aspects of a society. It incorporates beliefs, values, norms, taboos, institutions, language, rituals and art (Kindall & Pimentel, 1994). Some cultural practices can directly or indirectly influence the food security of a given society as culture prescribes the interactions between people, between people and land, and between people and food (Chapman, 2002). Food is regarded first and foremost as a necessity to support physical activity and survival, and the nutrition and health of the people. However, food also plays a major secondary role in socio-cultural activities and to a certain extent defines ethnic identity (Kindall & Pimentel, 1994; Ponting, 2007). Different ethnic groups, different foods have particular meanings and symbolism attached to them. For example, within the ethnic groups in the central and western parts of Kenya, insects such as grasshoppers

and white ants are eaten as a delicacy and can be preserved for use until the next season, thus contributing to the food and nutritional security of such communities.

Among the pastoral communities like the Maasai and Turkana in Kenya or the Banyankole, Teso and Karamojong, milk, meat, blood and milk products are central to their food culture. All ethnic groups hold particular foods in high regard. Although there are differences in food habits between ethnic groups, such habits have changed over time as people migrate, intermarry and interact (Bowbrick, 1986; Kindall & Pimentel, 1994). This has resulted in the adoption of new cultures and the modification of existing ones. For example, with the advent of the early traders and colonialists new foods such as spices, non-indigenous fruits, wheat, rice and maize were introduced (Kindall & Pimentel, 1994). By the 1960, leavened bread had become popular because its ingredients were familiar and readily available in Africa. Maize and rice are other examples of introduced foods, which in various forms have increasingly contributed a major proportion of peoples' diets (Ponting, 2007); these foods have been adopted and acculturated within the Kenyan cultural setting to the extent that they are likewise subjected to indigenous traditional cultural food preparation practices such as malting, fermentation and brewing.

Kenya has a wide range of ethnic groups, with diverse cultures that impact directly or indirectly on food and nutritional security through their dictates on land use, land access and food preparation and consumption. The patriarchal nature of Kenya's ethnic groups, diseases like HIV/AIDS and processes like urbanization and commercialization contribute to the effect of culture on food and nutritional security (Bowbrick, 1986; Chapman, 2002). Some cultural practices may have a negative impact on food security e.g. in a polygamous household where other housewives cannot harvest their produce before the first wife to the husband has not

harvested her produce. Some cultural practices may provide opportunities for improving food and nutrition e.g. that hindering the sale of all produce without storing some within the household stores. The present-day food culture has organically developed over time through people's interaction with others and with the environment. Ponting (2007) and Kindall and Pimentel (1994) point out that the environment is where people live and their ancestral origins influence food culture and practices. This is passed on from one generation to another. Thus, the food culture in Kenya has its roots in the diversity of its people, their cultures, and the environment.

Culture is a crucial determinant of food security because the beliefs people and communities hold about food, how that food is produced and prepared is a critical factor in food security. It has been argued that most families and communities and even countries are food insecure because they treat food crops like ordinary plants instead of as a vital commodity for the world's poor (Abby, Haile, & Waters-Bayer, 2000).

2.6 Environmental Factors and Food Security

The environment is a crucial factor in food production and determines food security. Rain or water and soil are the major elements of the environment that affect food security. Even with irrigation, Kenya is developing a grain deficit.

Food production requires massive amounts of water. Producing sufficient food is directly related to having sufficient water. Irrigation can ensure adequate and reliable supply of water which increases yields of most crops by 100 percent to 400 percent. Although 17 percent of global cropland is irrigated, it produces only 40 percent of the world's food. Increasing irrigation efficiency and limiting environment damage through salinisation or reduced soil fertility are

important for ongoing food availability. Where water is scarce and the environment fragile, achieving food security may depend on what has been called 'virtual water', that is, importing food from countries with an abundance of water. This may be a more efficient use of a scarce resource (Brown & Funk, 2008; Diaz-Bonilla, & Reca, 2000; FAO, 1999, 2008).

Intensive farming also leads to a vicious cycle of exhaustion of soil fertility and decline of agricultural yields. Approximately 40% of the world's agricultural land is seriously degraded. In Africa, if current trends of soil degradation continue the continent might be able to feed just 25% of its population by 2025. Rich governments and corporations are buying up the rights to millions of hectares of agricultural land in developing countries in an effort to secure their own long-term food supplies. FAO (2002) has warned that the controversial rise in land deals could create a form of "neocolonialism", with poor states producing food for the rich at the expense of their own hungry people.

According to a UN climate report, the glaciers that are the principal dry-season water sources of biggest rivers could disappear by 2035 as temperatures rise. In other parts of the world a big influence will be low yields of grain according to the World Food Trade Model, specifically in the low latitude regions where much of the developing world is located. From this the price of grain will rise, along with the developing nations trying to grow the grain. Due to this, every 2-2.5% price hike will increase the number of hungry people by 1%. And low crop yields are just one of the problem facing farmers in the low latitudes and tropical regions. The timing and length of the growing seasons, when farmers plant their crops, are going to be changing dramatically, as per the USDA, due to unknown changes in soil temperature and moisture conditions (Nissen-Petersen, 1982; Paarlberg, 1999; UNEP, 1982).

According to Esipisu (2010) combining traditional methods of weather predictions with meteorological forecasting is the best way of obtaining more accurate forecast data. While modern science provides reasonably accurate seasonal climate forecasts, many local communities still rely on indigenous knowledge to guide their planting, harvesting and other agricultural activities, to minimize climate risk. Climate change, however, seriously affect indigenous knowledge indicators since indigenous plant species used by the traditional forecasters are already disappearing due to unfavourable climatic conditions (Ouma, 2010).

The other issue of the environment that affects food security is disaster such as droughts, floods, cyclones and pests that can quickly wipe out large quantities of food as it grows or when it is in storage for later use. Likewise, seeds can be destroyed by such environmental dangers. Conflict can also reduce or destroy food in production or storage as farmers flee to safety or become involved in the fighting. Previously productive land may be contaminated with explosive debris and need to be cleared before it can again be used for food production. Stored food, seeds and breeding livestock may be eaten or destroyed by soldiers, leading to long-term food shortages. Government spending needs to prioritize food security in the aftermath of conflict (GOK, 2006a; Gould, & Nissen-Peterson, 1999; Gould, 1992).

Human factor is also an environmental factor that is related to food security. Population growth increases the demand for food (UNEP, 1982). With most productive land already in use, there is pressure for this land to become more productive. Poor harvests and higher costs lead many poor farmers to migrate to cities to look for job. Expanding cities spread out across productive land, pushing food production further and further away from consumers. This increases the cost of all the activities associated with producing and transporting food, and decreases the food security of the poor in cities (Ludwig, 1994; Nissen-Petersen, 1982).

The need for food during emergencies such as drought, disaster, population displacement and conflict is addressed by the distribution of basic food supplies and fuel. Early warning systems can predict problem areas, allowing action to be taken to keep people in their homes and help them back to food self-sufficiency as quickly as possible. Food sourced locally rather than internationally minimizes the costs and disruption to local markets. In severe situations feeding may be necessary but often food aid is linked with work, health or education to avoid dependency and address the long-term causes of food insecurity (Abbay et al., 2000; Brown & Funk, 2008).

Poor rains in the southeastern and coastal marginal agricultural lowlands, in combination with an early end to the short rains season, and after a succession of three poor seasons, have resulted in widespread crop failure, and precipitated a likely humanitarian and livelihood crisis. Some northeastern and southeastern pastoral districts have benefited from improved livestock conditions, but the early cessation of the short rains could cause a rapid deterioration in pasture and water availability, resulting in a quick decline in food security. Pastoral areas in the north and south receive poor short rains and require immediate assistance. The GOK (2005) indicated that 10 million persons are highly food insecure. The number includes a provisional estimate of 3.2 million drought-affected marginal farmers, agro pastoralists, and pastoralists; about 150,000 IDPs; 850,000 school children; 3.5 million urban dwellers and about 2.2 million persons affected by HIV and AIDS, including orphans.

2.7 Socioeconomic Status and Food Security

Socioeconomic status (SES) is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position relative to others, based on education, occupation and income. When analyzing a family's SES, the household income earners' education and occupation are examined, as well as combined income, versus that of an individual, when their own attributes are assessed. Socioeconomic status is typically broken into three categories, high SES, middle SES, and low SES to describe the three areas a family or an individual may fall into. When placing a family or individual into one of these categories any or all of the three variables (income, education, and occupation) can be assessed. A fourth variable, wealth, may also be examined when determining socioeconomic status (Paarlberg, 1999; UNEP, 1982).

Income refers to wages, salaries, profits, rents, and any flow of earnings received. It can also come in the form of unemployment or workers compensation, social security, pensions, interests or dividends, royalties, trusts, alimony, or other governmental, public, or family financial assistance. Income is viewed as either relative or absolute (Abbay et al., 2000). Absolute income, as theorized by economist John Maynard Keynes, is the relationship in which as income increases, so will consumption, but not at the same rate. Relative income dictates a person or family's savings and consumption based on the family's income in relation to others. Income inequality is most commonly measured around the world by the Gini coefficient, where 0 corresponds to perfect equality and 1 means perfect inequality. Economic inequality in Kenya has been on the rise, leaving low income families struggling in society (GOK, 2006a; Gould, & Nissen-Peterson, 1999). Low income families focus on meeting immediate needs and do not accumulate wealth that could be passed on to future generations, thus increasing inequality.

Families with higher and expendable income can accumulate wealth and focus on meeting immediate needs while being able to consume and enjoy luxuries and weather crises (UNEP, 1982).

Educational attainment is the highest level (grade or degree) of education somebody has completed. Median earnings are known to increase with each level of education. Higher levels of education are associated with better economic and psychological outcomes (i.e.: more income, more control, and greater social support and networking. Education plays a major role in skill acquisition for both white collar jobs and self employment in agriculture, as well as specific qualities that stratify people with higher SES from lower SES. Annette Lareau speaks on the idea of concerted cultivation, where middle class parents take an active role in their children's education and development by using controlled organized activities and fostering a sense of entitlement through encouraged discussion. A division in education attainment is thus born out of these two differences in child rearing. In theory, lower income families have children who do not succeed to the levels of the middle income children, who feel entitled, are argumentative, and better prepared for adult life (Nissen-Petersen, 1982; Paarlberg, 1999).

Wealth are a set of economic reserves or assets which presents a source of security and provides a measure of a household's ability to meet emergencies, absorb economic shocks, or provide the means to live comfortably. Wealth reflects intergenerational transition as well as accumulation of income and savings. Income, age, marital status, family size, religion, occupation, and education are all predictors for wealth attainment. The wealth gap, like income inequality, is very large in Kenya (GOK, 2008). There exists a racial wealth gap due in part to income disparities and differences in achievement. Differences in savings (due to different rates of incomes), inheritance factors, and discrimination in the housing market all lead to the racial

wealth gap. Savings increase with increasing income, but some families cannot participate in this, because they make significantly less than others. Further, inheritance patterns differ in Africa. The amount a person inherits, either during a lifetime or after death, can create different starting points between two different individuals or families, and these different starting points also factor into housing, education, and employment discrimination (Gould, & Nissen-Peterson, 1999; Gould, 1992; Ludwig, 1994).

The most crucial element within personal characteristics includes health (Paarlberg, 1999; UNEP, 19820. Without sufficient calories and nutrients, the body slows down, making it difficult to undertake the work needed to produce food. Without good health, the body is also less able to make use of the food that is available. A hungry mother will give birth to an underweight baby, who then faces a future of stunted growth, frequent illness, and learning disabilities and reduced resistance to disease. Contaminated food and water can cause illness, nutrient loss and often death in children (Abbay et al., 2000). The HIV/AIDS pandemic has reduced food production in many affected countries as productive adults become ill or die. Lacking the labour, resources and know-how to grow staples and commercial crops, many households have shifted to cultivating survival foods or even leaving their fields, further reducing the food supply. Addressing health issues will improve utilization and availability of food (UNEP, 1982).

Gender is another element of personal characteristics that is critical to food production. Women play a vital role in providing food and nutrition for their families through their roles as food producers, processors, traders and income earners (; Gould, & Nissen-Peterson, 1999). Yet women's lower social and economic status limits their access to education, training, land ownership, decision making and credit and consequently their ability to improve their access to

and use of food. Food utilization can be enhanced by improving women's knowledge of nutrition and food safety and the prevention of illnesses (Nissen-Petersen, 1982). Increasing women's involvement in decision making and their access to land and credit will in turn improve food security as women invest in fertilizers and better seeds, labour-saving tools, irrigation and land care. Gender equality is a prerequisite for the eradication of poverty and hunger. Many programs recognize the need for changes in access to food, land, credit, education, health and nutrition training and decision making in order to make effective use of women's roles in agricultural production and food preparation (Diaz-Bonilla, & Reca, 2000).

Agriculture tasks have been found to be partly or wholly gender specific (Opio, 2003). In most parts of Africa women have traditionally been responsible for producing food crops for the family on land which they gain access upon marriage but do not necessarily control. Cleveland (2008) observes that gender inequity and its impact on resource management is shaped by many factors including unequal access to basic facilities such as education and income.

2.8 The Theoretical Framework

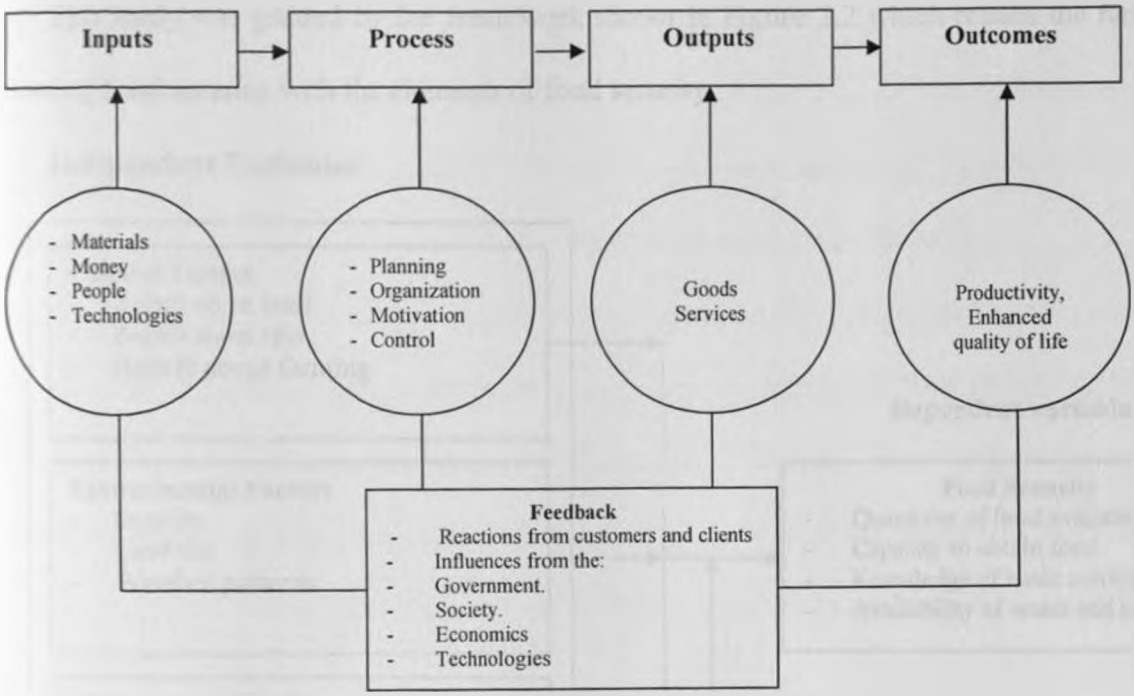
The concern with food security has been debated for many decades and several theories have been advanced to explain it. This study was guided by the systems theory of management which can explain food security as the culmination of a series of events and activities that are related and interdependent and which together produce a performance in food production. The status of food security is the result of the interactions between the activities of various individuals and institutions in a system and can be interpreted as a region or country.

The systems theory was originally proposed by Ludwig von Bertalanffy in 1928. It is an interdisciplinary theory about the nature of complex systems in nature, society, and science, and

is a framework for investigating and or describing groups of objects that work together to produce some result (Laszlo, 1974). The foundation of the systems theory is that all components of an organization or society are interrelated such that changing one impact on many others. Systems theory has closed and the open approaches. The closed approach view organizations as closed entities separate and independent of environmental influence and subject only to internal influences (Walonic, 2007) without any contact with the external environment. The open systems approach on the other hand views organizations as continually interacting with their environments: they are in a state of dynamic equilibrium as they adapt to environmental changes (Senge, 1990).

This study was guided by the open systems approach which postulates that all organizations and sections of society require inputs such as raw materials, funds, technology and people which are processed into and released as outputs, products or services to the market (Luhmann, 1995). Outcomes include enhanced quality of life or productivity for customers or clients. Inputs, process, products, and outcomes are connected through a feedback which according to Pool (1991), feedback is information from human resources carrying out the process, customers or clients using the products, or from the larger environment of the organization such as influences from government, society, economics, and technologies (Luhmann, 1995).

Figure 2.1: **The elements of a social system**



Source: Social systems (p.93) by N.Luhmann (1995), CA; USA: Stanford University Press

In this study, the systems theory holds that the whole society is a system and the factors that influence food security are sub systems within the society. In this study, culture, environmental factors and socioeconomic factors, are presumed to influence the availability of adequate safe foods, access to acquire safe food in socially and culturally acceptable ways; food use (or knowledge of basic nutrition care). The way the factors are manipulated in the society, either at the governmental or at the household level, will dictate the degree of food security.

2.9 The Conceptual Framework

This study was guided by the framework shown in Figure 2.2 which relates the factors influencing food security with the elements of food security.

Independent Variables

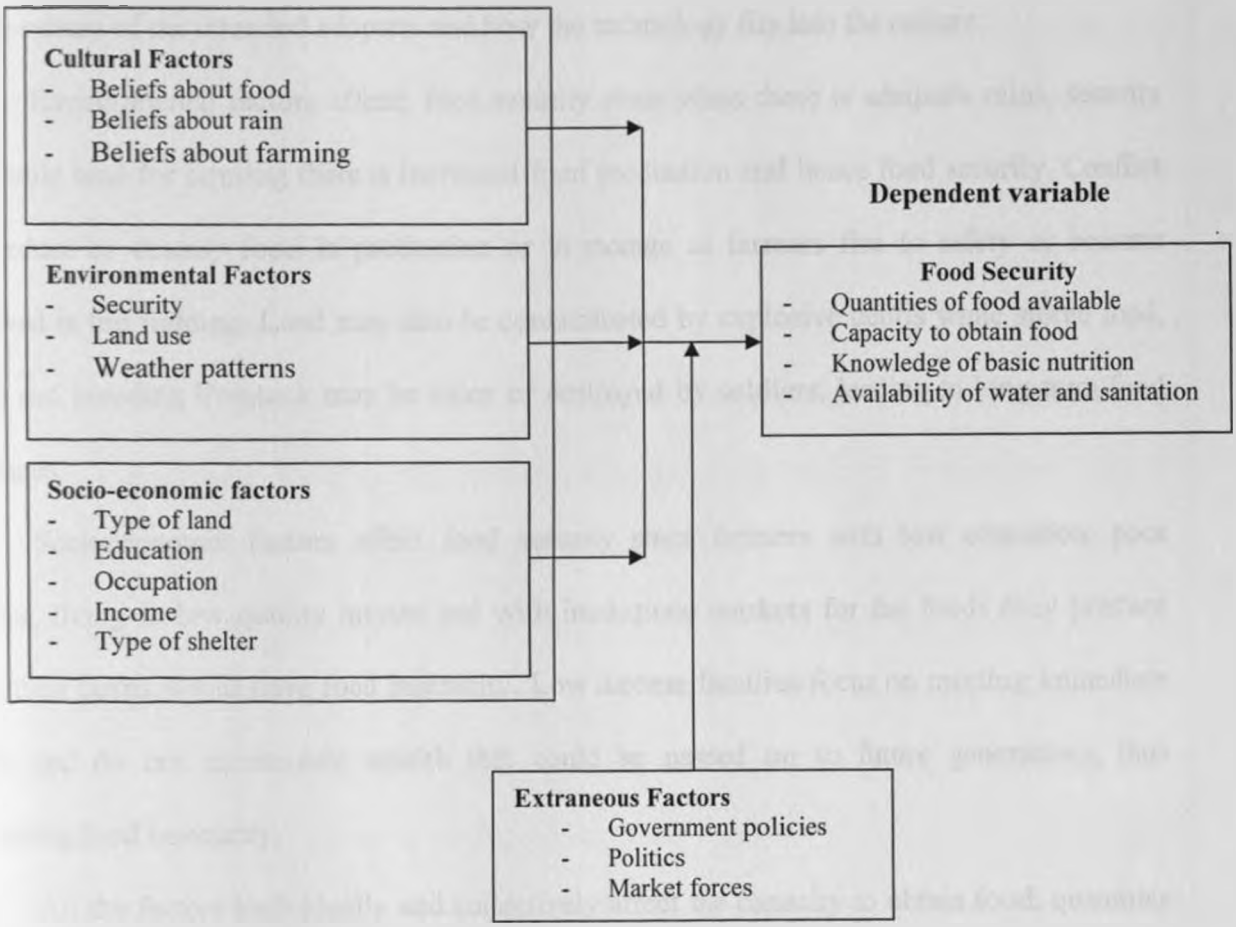


Figure 2.2. Factors influencing food security

This conceptual framework postulates that culture, environmental factors, and socioeconomic factors influence food security. Cultural Factors includes beliefs about food, rain, and farming and storage of food. Environmental factors broadly cover security, land use, and

weather patterns. Socio-economic factors include size of land, education, occupation, income, and type of shelter.

Culture affects food security because the culture of the local people influences their adoption of modern agricultural practices. Whether or not a new technology is adopted depends on the culture of the intended adopters and how the technology fits into the culture.

Environmental factors affects food security since when there is adequate rains, security and fertile land for farming there is increased food production and hence food security. Conflict can reduce or destroy food in production or in storage as farmers flee to safety or become involved in the fighting. Land may also be contaminated by explosive debris while stored food, seeds and breeding livestock may be eaten or destroyed by soldiers, leading to long-term food shortages.

Socioeconomic factors affect food security since farmers with low education, poor income, living in low quality houses and with inadequate markets for the foods they produce from their farms would have food insecurity. Low income families focus on meeting immediate needs and do not accumulate wealth that could be passed on to future generations, thus increasing food insecurity.

All the factors individually and collectively affect the capacity to obtain food, quantities of food available, knowledge of basic nutrition, and availability of water and sanitation. It is therefore envisaged that if the factors are favorable, in other words, if there are favorable personal and environmental factors, if the members have sufficient wealth and culture which is not repugnant to agriculture, then there should be high capacity by the households to obtain food, sufficient quantities of food available, good knowledge of basic nutrition and adequate water and sanitation. In other words, there would be food security.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design, target population, sampling techniques, data collection instruments, methods of data collection, validity and reliability of instruments as well as data analysis techniques which were used in the study. The chapter ends with the operationalization table.

3.2 Research Design

This study employed a cross-sectional research design which is a methodology that investigates populations by selecting samples to analyze and discover occurrences, and to provide quantitative descriptions of some part of a population. A survey is suitable when a researcher wants to just describe events or opinions without manipulating variables (Oso & Onen, 2008). The variables under investigation in this study: culture, environmental factors and socioeconomic variables are variables that the study did not have the capacity to change or alter at will. It was therefore necessary to describe them as they were. It is this intention to describe "events as they are" that make the survey the ideal design for this study. Data was collected at one point in time.

3.3 Target Population

The target population for this study was all the 638 members from the 30 NMK small-scale farmer groups in Kuria district.

3.4 Sample Size and Sample Selection

This section describes the strategies that were used to identify the main categories of respondents for this study.

The sample comprised 255 small-scale farmers from the 638 members of the 30 Njaa Marufuku Kenya groups in Kuria District. The choice of this size has been guided by Kathuri and Palls (1993), Amin (2005) and Yamane (1967) Table of samples which recommends a sample size of 255 for a population of 638.

The Yamane (1967) formula used was:

$$n = \frac{N}{1 + N(e)^2}$$

Where; n - Sample size, N – Population size, e – Level of Precision (0.5)

At 95% confidence level and 0.05 level of significance

3.5 Sampling Techniques

This study employed quota sampling, by way of snowball and purposive sampling techniques, to select the individual members of the sample.

Quota sampling is a selection technique that assigns sizes to subgroup in the population and then selects members (but not at random) to form the sample (Amin, 2005; Kothari, 1990; Oso & Onen, 2009). There was no guarantee that the farmers selected through a simple random procedure would accept to participate in the study and this would lead to high non response rates (Kothari, 1990). The study assigned two quotas: Fifteen Njaa Marufuku Kenya groups each with less than 20 members and fifteen Njaa Marufuku Kenya groups each with more than 20 members. There are 30 Njaa Marufuku Kenya groups in Kuria District. To achieve a sample of

255 respondents, 9 farmers were selected from the first 15 Njaa Marufuku Kenya groups with majority of members to form 135. Then 8 farmers were selected from each of the 15 Njaa Marufuku Kenya groups with a membership of less than twenty members to form 120. Snowball and purposive techniques were then used to select the individual farmers to the sample. The quota technique simplified the selection procedure while at the same time enabled the researcher to account for the differences in the subgroup characteristics (Oso & Onen, 2009).

The study selected individual members of the farmer groups through snowball technique. A sample of farmers picked at random would have been difficult to trace since the researcher could not trace them outside their groups. Snowball technique is usually employed to locate individuals who are difficult or impossible to locate by other means (Kathuri & Pals, 1993; Oso & Onen, 2008). This strategy takes advantage of social networks and the fact that people with similar characteristics tend to know one another. Farmers who are in groups were assumed to be in a position to know others like them who are also in groups. The researcher identified few farmers who belonged to Njaa Marufuku Kenya groups. Once such individual(s) were identified, the researcher engaged them in locating other farmers like them. Opinion leaders were used to assist in locating other respondents in cases where farmers did not cooperate to lead the researcher to other farmers. This process was continued until the desired sample of 240 farmers was attained.

Purposive sampling is a sampling technique in which the researcher decides, basing on his or her knowledge of the population, who to include in the sample (Oso & Onen, 2009). Purposive sampling was used to select the Key informants. The first eight (8) longest serving office holders of the 30 Njaa Marufuku Kenya groups were selected as key informants. The group leaders were farmers and managers at the same time. They were in a better position to

provide special information since they are accountable for the performance of their groups. Other key informants were 2 District Agricultural Officers (DAO), 2 Njaa Marufuku Kenya Desk Officers and 5 Divisional Agricultural Extension Officers (DAEO).

3.6 Data Collection Instruments

Both qualitative and quantitative data were collected to achieve objectives of this study. The data was collected using questionnaires, interviews and focus group discussions.

3.6.1 Interview Methods

Interviews are person to person verbal communication in which one person (or group of persons) asks the other person (or group of persons) questions intended to elicit responses for the purposes of gathering information (Oso & Onen, 2008). It is a conversation with a purpose.

Key informants interviews refer to an interview technique where data is collected from individuals who by their position have the requisite information on a one-on-one basis. Key informants' (or in-depth interviews) interview guides were the tools (Appendix C) was used to collect information from these categories of respondents. The first eight (8) longest serving office holders of the 30 Njaa Marufuku Kenya groups were selected as key informants. Some respondents like the chairpersons, the secretaries and other office holders within the groups may hold information that other farmers do not have by virtue of their positions.

3.6.2 Survey Interview Method

The survey interview method was used on farmers who could not read and write. The researcher was aware that not all Njaa Marufuku Kenya farmer group members were literate. As

such some respondents may encounter difficulties responding to questionnaires or may require translation or even interpretation. The use of interviews in the local language was a necessity in this study. Three local Research Assistants were selected and trained to facilitate in data collection. In this case, questionnaires were the data collection tool and used as interview guide (Appendix B).

A questionnaire is a carefully designed instrument consisting of a set of items to which the respondents are expected to react, usually in writing. It is a self-report instrument used for gathering information about variables of interest in an investigation (Amin, 2005; Oso & Onen, 2009). Questionnaires were used because the study was concerned mainly with the views, perceptions and feelings of the farmers and such variables cannot be directly observed. Secondly, the sample size of 255 that was used in this study was also quite large and given the time constraints, questionnaire was the ideal tool for collecting data. The study used self constructed semi-structured questionnaires, with a mixture of focused and free-response items in a single instrument (Kothari, 1990). This enabled the researcher to collect both quantitative data from the closed-ended sections, and qualitative data from the open-ended sections. This balance was necessary for a detailed explanation of the factors that influence food security, with special reference to Njaa Marufuku Kenya's farmer groups. The questionnaires were divided into four sections: a section on the biographic information, a section on culture, on socioeconomic status and a section on environmental factors. Lastly there was also .a section on food security.

3.6.3 Focus Group Discussions

Another method of data collection used to collect data from NMK group members was focus group discussion. The aim of this was to obtain information on their knowledge of the

factors influencing food security. A total of two Focus Group Discussions were conducted: one from Kuria East District and the other from Kuria West District. A focus discussion guide was the tool used.

The focus group included two (2) longest serving male members, two (2) longest serving female members, two (2) most recently recruited male members and two (2) most recently recruited females members of the groups. The group also included two most influential opinion leaders belonging to the Njaa Marufuku Kenya groups. Hence ten (10) respondents were interviewed in each focus group discussion.

3.7 Methods of Data Collection

The researcher developed a proposal under the guidance of the supervisors. The proposal was then defended at the university to enable the researcher to proceed to the field to collect data. The proposal was defended and accepted, and the researcher was permitted by the University to proceed to the field to collect data. The researcher sought research permit and research authorization from the National Council for Science and Technology from the Ministry of Higher Education and was granted. The researcher requested and was granted permission by the district and division officers in charge of Njaa Marufuku Kenya groups. The researcher then proceeded to the field to collect data from 255 farmers in 30 Njaa Marufuku Kenya farmer groups in Kuria District in June 2010 using questionnaires and interview guides and discussion guides.

The questionnaires were administered by the researcher and trained research assistants. The researcher and the research assistants went to the farmers as the farmers were working and requested members who were willing to fill the questionnaires to respond as they waited. It was

not possible to use drop and pick method because the researcher did not know the residences of the respondents. It would be very difficult to trace them once they were out of their farms. For those who could not read and write the researcher and research assistants read out the questions for them and recorded their answers in a form of interview.

The focus group and key informants' interviews were conducted by the researcher on appointment with the concerned parties. Most of the group leaders were traced from their homes and interviews conducted there while the officials of Njaa Marufuku Kenya were interviewed from their offices. Focus group discussions were conducted at the chiefs' offices.

3.8 Validity of Instruments

Validity was ensured through use of experts. The questionnaires and interview guides were given to three experts on project management to evaluate the relevance of each item in the instruments to the objectives. Validity index was determined from the assessors agreement scale and the instruments modified until a validity index of at least .70 was attained. Content validity index was calculated as $n_{3/4}/N$, where $n_{3/4}$ is the number of items marked very good or good by all experts and N was the total number of items assessed. An index of .70 is the "least accepted value of validity in research" (Amin, 2005, p. 288; Oso & Onen, 2009, p. 90). This means that out of any ten time items in the instruments, at least seven items must accurately measure what they are supposed to measure. They were rated as 1 for not relevant, 2 for somewhat relevant, 3 for relevant and 4 for very relevant. Those rated 1 or 2 were regarded as not relevant while those rated 3 or 4 were regarded as relevant. From the assessments, the validities of the instruments were determined by calculating the Content Validity Index from the total number of items rated as relevant by both judges. The ratings of the assessors are summarized in Table 3.1.

Table 3.1: Judges Ratings of the Items in the Questionnaire

		Judge I				
		1	2	3	4	Total
	1	1	2	0	0	3
	2	2	0	0	0	2
Judge II	3	1	1	21	5	28
	4	1	0	15	7	23
	Total	5	3	36	12	56

The total number of items rated as good by both judges were 48. The content validity index was 48/56 = 0.862. Hence a validity index of 86.2% was reported showing that 86.2% of the items measured the objectives correctly.

3.9 Reliability of Instruments

Reliability was ensured by the use of internal consistency method through split half reliability technique. The instruments were administered to a convenient sample of 30 respondents. The responses were scored on a scale of 1 to 5 for every response provided and the total score for each respondent on the questionnaire was determined. The responses were then divided into odd and even numbers, and the scores indicated below were obtained.

Respondent	Even Scores	Odd Scores
1	124	98
2	98	99
3	96	112
4	103	100

5	99	89
6	104	97
7	111	112
8	103	98
9	97	86
10	98	76
11	110	94
12	121	92
13	116	87
14	94	102
15	92	98

The two separate halves correlated using Spearman-Brown Prophecy correlation formula. The reliability of the entire instrument was obtained through $\Gamma^{1}_{xx} = 2\Gamma_{xx} / (1 + \Gamma_{xx})$, where Γ_{xx} is the correlation between the two halves. A reliability index of 0.726 (72.6%) was obtained. indicating that that there was 72.6% chances of getting consistent responses when the same question was posed to the same respondent more than once.

3.10 Data Analysis Techniques

This study collected and analyzed both qualitative and quantitative data. Quantitative data was analyzed using descriptive statistics such as percentages and averages, and analysis of variance (ANOVA) technique. This process was achieved through use of SPSS computer package. The results were presented in tables and figures. Descriptive statistics and ANOVA were used to show the face values of the effects Njaa Marufuku Kenya activities particularly with regard to availability of food, the capacity to access food, knowledge of basic nutrition and availability of water and sanitation among small scale farmers in Kuria District. Data was coded

5 for strongly agree, 4 agree, 3 for no Comment, 2 for disagree and 1 for strongly disagree. The scores were coded and interpreted as indicated in Table 3.2.

Table 3.2: Interpretation of Codes used to analyze responses from Questionnaires

Variable	Good = 1	Moderate = 2	Poor = 3
Culture	30 - 40	20 – 29	10 -19
Environmental Factors	47 - 64	30 – 46	13 - 29
Socio Economic Factors	10 -13	6 – 9	3 - 5

Data was measured on ordinal scale and coded 1, 2, 3 for good, moderate and poor respectively as indicated in Table 3.2. Data was analyzed at 0.05 level of significance, and degrees of freedom 45 and 195 between and within groups respectively. The 0.05 level of significance was chosen because the sample size has been determined from tables of samples based on this value of significance. This meant that the study was 95% sure of the results and only 5% of the results could occur by chance.

The content analysis method was used to analyze qualitative data. Data processing and analysis, was undertaken as an activity simultaneous with data collection. Data was processed and analyzed following three steps. In the first step, the data was organized following key thematic areas summarizing it into daily briefs and field notes. The second step involved description of the responses to produce interim reports with areas that require additional information being identified and the requisite data sourced. The third step involved systematic analysis and interpretation of the interim report which was then integrated with quantitative data in the main report. Constant memo writing and comparisons of the data was continuously

performed to document any ideas or insights emerging from the data. The emerging constructs were used to organize data into meaningful clusters or broader patterns.

Table 3.3 Operationalization Table

OBJECTIVE	TYPE OF VARIABLE	INDICATOR	MEASURE	LEVEL OF SCALE	APPROACH OF ANALYSIS	TYPE OF ANALYSIS	LEVEL OF ANALYSIS
Assess the influence of culture on food security among Njaa Marufuku Kenya farmer groups in Kuria District.	IV (CULTURE) is categorical i.e. poor, moderate or good.	Beliefs about rain. Beliefs about food. Beliefs about farming	10-19 = poor = 1; 20-29 = fair = 2; 30-40 = good = 3.	Ordinal	Quantitative and Qualitative	Descriptive and Description	Percentages and Narrative
	DV (FOOD SECURITY) is continuous i.e. expressed as fractions.	Capacity to obtain food. Quantities of food available. Knowledge of basic nutrition. Availability of water and sanitation.	0-100%	Ordinal	Quantitative and Qualitative	Descriptive and Description	Percentages, ANOVA and Narrative
Establish the influence of environmental factors on food security	IV (environmental factors) is categorical i.e. poor, fair or good.	-Type of land. -Market forces. -Rainfall. -Security.	13-29 = poor = 1; 30-46 = fair = 2; 47-64 = good = 3.	Ordinal	Quantitative and Qualitative	Descriptive and Description	Percentages and Narrative

among Njaa Marufuku Kenya farmer groups in Kuria District.	DV (FOOD SECURITY) is continuous i.e. expressed as fractions.	Capacity to obtain food. Quantities of food available. Knowledge of basic nutrition. Availability of water and sanitation.	0 - 100%	Ordinal	Quantitative and Qualitative	Inferential	Percentages, ANOVA and Narrative
Determine the influence of socio-economic characteristics on food security among Njaa Marufuku Kenya farmer groups in Kuria District.	IV (socio economic status) is categorical i.e. poor, moderate or good.	- Income. - Education. - Occupation.	3-5 = poor = 1; 6-9 = fair = 2; 10-13 = good = 3.	Interval	Quantitative and Qualitative	Descriptive	Percentages and Narrative
	DV (FOOD SECURITY) is continuous i.e. expressed as fractions.	Capacity to obtain food. Quantities of food available. Knowledge of basic nutrition. Availability of water and sanitation.	0 - 100%	Ratio	Quantitative and Qualitative	Inferential	Percentages, ANOVA and Narrative

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This section presents findings of the study under five themes namely: socio demographic attributes of respondents, culture, environmental factors and socio-economic status and their relationship to food security among Njaa Marufuku Kenya farmer groups in Kuria District. The study targeted 255 respondents and data was collected from 240 respondents indicating 94% response rates.

4.2 Response Rate

There was 100 percent response rate as all the targeted 240 respondents were reached. The snowball technique meant that there was no chancing in selecting the respondents and the researcher therefore went to only those who should have been in the sample. They were persuaded to fill the questionnaires or to respond to the interviews there and then, and this reduced cases of non responses.

4.3 Demographic Characteristics of Respondents

The demographic characteristics were collected on the gender of respondents, size of the family, and size of land owned by respondents, the level of education, income, and type of shelter. The demographic characteristics are always proxy determinants of a person's capacity to acquire food and hence crude measure of food security. They were therefore sought in order to determine and describe their relationship to food security among farmers in Kuria District.

4.3.1 Distribution of Respondents by Gender

The respondents were asked to state their gender. It was important that there is gender balance among the respondents and the views reflected were as balanced as possible between the two sexes. The responses obtained are summarized in Table 4.1.

Table 4.1 Gender of Respondents

Gender	Frequency	Percent
Males	112	46.6
Females	120	50.0
No Comment	8	3.4
Total	240	100.0

The results in Table 4.1 shows that the majority of respondents 120 (50.0%) were females and 112 (46.6%) were males. Eight respondents (3.4%) did not indicate their gender. The results indicate a fair distribution in terms of the respondents in terms of gender. So should any difference be found in food security among households dominated by males or females, then it could only be due to random fluctuations, but not the design the study. Such a difference can only be attributed to chance but it could not occur because of the way the sample was selected.

4.3.2 Distribution of Respondents by Size of Families

The respondents were asked to indicate the number of people in their households. The number of people in a household is a significant variable when dealing with food security because the more people there are in a household the more food is required. If there are more

people than the amount of food available to feed them, then such a scenario would depict food insecurity. The responses obtained are summarized in Table 4.2.

Table 4.2: Size of Households of Respondents

Size of Household	Frequency	Percent
1-3	0	0.0
4-6	48	20.0
7-9	104	58.3
10 or more	88	36.6
Total	240	100.0

Table 4.2 shows that majority of households 104 (58.3%) have between 7 and 9 people while 88 (36.6%) of the households have over 10 people. Another 48 (20.0%) of the households have between 4 and 6 people. There is no household with less than three people. The average family is generally large with 192 (80.0%) having at least 7 people per household. This means that each family has at least five children. These are high figures and are likely to make most families food insecure no matter how productive the land could be. Large families with large lands still need to work harder and use the land more effectively to be food insecure. But as shown in section 4.2.3, most families have relatively small parcels of land, yet they have large families. This is a recipe for food insecurity.

4.3.3 Distribution of Respondents by Size of Land

The respondents were asked to indicate the size of land or farms they own. Land is an important factor of production without which food cannot be produced. It was therefore important to determine the amount of land available for each household to assess how much food they can produce from their lands. The responses are summarized in Table 4.3.

Table 4.3: Size of Land of Respondents

Size of Land (acres)	Frequency	Percent
Less than 1	32	13.3
2-4	80	33.4
5-7	40	16.7
8-10	32	13.3
Over 10	32	13.3
No Comment	24	10.0
Total	240	100.0

The results in Table 4.3 indicates that most households 80 (33.4%) have between 2 – 4 acres while 40 (16.7%) of households have between 5 – 7 acres. However, quite a good proportion of respondents 32 (13.3%) have less than one acre of land. On the average, it can be seen that most households 104 (43.3%) have over five acres of land which makes agriculture a promising venture for fighting food insecurity. Therefore, food insecurity in Kuria district cannot be attributed to size of land *per se*; may be to its productivity. This information compared to

information in Table 4.2, shows that the productivity of the land more than its size is called to question here or, the use of the available land. Where over 58.3% have at least 7 acres of land, the quality and use of land becomes an issue more than its availability. Hence food insecurity in Kuria should be attributed to the quality and type or use of land rather than to the availability of land per se.

When the respondents were asked to indicate the source of the land, the responses reported in Table 4.4 were obtained.

Table 4.4: Source of Land of Respondents

Source of Land	Leased	Purchased
Leased	16	6.7
Purchased	16	6.7
Inherited	196	81.6
No comment	12	5.0
Total	240	100.0

Table 4.4 reveals that most respondents 196 (81.6%) inherited their land. Another 16 (6.7%) purchased land while an equal number of 16 (6.7%) have leased. Some 12 (5.0%) did not indicate the source of land. These results tally with those indicated in Table 4.4 and indicate people can still inherit land from their parents in Kuria district. Those who purchased or leased were mostly outsiders who had settled in the area. But most indigenous people had inherited land. This supports the views expressed above that land *per se* is not the cause of food insecurity in Kuria district because it is available.

4.3.4 Distribution of Respondents by Level of Education

The respondents were asked to indicate their level of education. Education is key to understanding basic agricultural concepts and principles and is a key factor to food security. It was therefore necessary to determine the level of education in order to relate to food insecurity in the area. Should most people be less educated, this is expected to be reflected in the levels of food insecurity. The results are presented in Table 4.5.

Table 4.5: Education Level of Respondents

Level of Education	Frequency	Percent
Primary	96	40.0
Secondary	32	13.3
Tertiary	16	6.7
Other	88	36.7
No Comment	8	3.3
Total	240	100.0

Table 4.5 indicates that most respondents 96 (40.0%) have only primary level of education with only 32 (13.3%) having secondary education and 16 (6.6) having tertiary education. Some respondents 88 (36.6%) went through other channels of schooling but most of these were non-formal. In total, only 48 (20%) of respondents have secondary education and beyond. This is rather low literacy levels and it could interfere with capacity of the people in the community to understand basic agricultural principles for modern methods of farming. This could impact negatively on food security.

4.3.5 Distribution of Respondents by Income

Food insecurity is fought mainly through effective food production methods and techniques and these require inputs. These inputs have cost implications. It was therefore necessary to determine the capacity of the respondents to afford these inputs. Hence, they were asked to indicate the income. The responses are summarized in Table 4.6.

Table 4.6: Monthly Income of Respondents

Monthly Income (Ksh)	Frequency	Percent
Less than 200	24	10.0
501-1000	90	37.5
1001-3000	30	12.5
3001-5000	40	16.7
5001-1000	32	13.3
Over 10000	24	10.0
Total	240	100.0

Table 4.6 shows that most respondents 90 (37.5%) earn between 501-1000 per month, and about 40 (16.7%) earn between 3,001 – 5,000 per month. It shows that about 24 (10.0%) of respondents earn over 10,000 per month. The table shows that on average most respondents 216 (90.0%) earn below 10,000 per month. It can be deduced that the average income of most respondents in Kuria district is low and negatively influence their capacity to buy the required inputs for modern farming. This could lead to food insecurity.

4.3.6 Distribution of Respondents by Shelter

The type of shelter is an indicator of social and economic status of the individual. The type of houses in an area can be used as a proxy or indicator of the level of poverty and food security. It was therefore necessary to determine the type of shelter of respondents to enable the study make an impression on the economic status and the possible influence of this on food security. The responses are summarized in Table 4.7.

Table 4.7: Type of Shelter of Respondents

Type of Shelter	Frequency	Percent
Permanent-Stone House iron-roofed	0	0.0
Permanent- Brick house iron-roofed	8	3.3
Semi Permanent iron-roof house	208	86.7
Semi-permanent Grass Thatched	24	10.0
Total	240	100.0

Table 4.7 shows that majority of respondents 208 (86.7%) live in semi permanent houses and 24 (10.0%) live in grass thatched houses. Eight (about 3.3%) live in permanent – brick house and there no respondents living in permanent – stone houses. This shows that most respondents are below average persons who cannot afford good quality houses. This is an indication that they are low income earners. The implication is that, if the individuals cannot afford good quality shelter, they may not afford the inputs required for modern farming. This could lead to food insecurity in the area.

4.4 Determinants of Food Security

The aim of this study was to determine the factors that cause food insecurity in Kuria District. The study had hypothesized that culture, environmental factors and socioeconomic status of the people could cause food insecurity. This section presents the data and findings under these major themes which follow research objectives.

The data analyzed through themes for all determinants of food security i.e. culture, environmental factors and socio-economic status was subjected to ANOVA analysis to test the hypotheses whether they do significantly influence food security among Njaa Marufuku Kenya farmer groups in Kuria district, at 95% confidence level, 0.5 precision and at 0.05 level of significance.

4.4.1 Culture and Food Security

The first objective of this study was culture of the local people in influencing food security in the region. The influence of culture was determined through the respondents' beliefs on rain, rituals and beliefs about food. The respondents were asked to indicate their beliefs about rain and food rituals by selecting alternative responses on a Likert scale. Those who responded *strongly agree* and *agree* were pooled together as *agree* and were rated as having positive culture. Those who responded *disagree* and *strongly disagree* were regarded as *disagree* and rated as having negative measure of the variable. Those who responded *no comment* were rated as having moderate measure of the variable. The results are summarized in Table 4.8.

Table 4.8: Views of Respondents on Rain, Food Rituals and Culture

Elements of Culture	Positive	Moderate	Negative	Total
Beliefs about Rain	80	160	0	240
	33.3%	66.7%	0.0%	100.0%
Food Rituals	176	40	24	240
	73.3%	16.7%	10%	100.0%
Beliefs about Food	200	40	0	240
	83.3%	16.7%	0.0%	100.0%
Culture (Total)	63.3%	33.4%	3.3%	100.0%

Table 4.8 shows the views of respondents on each element of culture. On the beliefs about rain 160 (66.7%) respondents have moderate beliefs about rain while 80 (33.3%) had positive beliefs about rain. There were no respondents with bad beliefs about rain. On the elements of food rituals, 176 (73.3%) had positive food rituals while 40 (16.7%) had moderate rituals. Only 24 (10%) had bad rituals about food. But on the element of beliefs about food, it was noted that 200 (83.3%) had positive beliefs about food while 40 (16.7%) had moderate beliefs about food. There were no respondents with negative rituals about food.

The total responses on all three elements of culture were used to examine the status of culture on farming of the respondents. In the overall analysis, Table 4.8 indicates that 63.3% of the respondents had positive culture while 33.4% had moderate culture. Only 3.3% of the respondents had negative culture. The table shows that there were more respondents with positive attitudes towards farming as compared to respondents with negative attitudes and

practices. It can be concluded from these results that culture of local people does not cause food insecurity since it does not contradict modern agricultural practices.

The responses on culture were later coded on a 1 - 5 scale as described in 3.10 and rated such that those who scored between 10 - 19 were rated as negative on culture and coded 3, those who score 20 - 29 were rated as moderate on culture and were coded 2, and those who scored 30 - 40 were rated as having positive culture and were coded 1. The food security of responses with positive, moderate and negative culture was compared and the results shown in Table 4.9 were obtained.

Table 4.9: Relationship between Food Security and Culture

Status of Culture	Average Food Security	Number of Respondents	Percent
Positive	69.39	79	32.9
Moderate	61.97	87	36.3
Negative	59.21	74	30.8
Total	63.56	240	100.0

Table 4.9 indicates that respondents with positive attitudes towards farming have higher food security (69.39) than respondents who have moderate culture (61.97) and those with negative attitudes and practices (59.21). The average food security of all respondents based on culture is 63.56. These results indicate that there is a relationship between culture and food security such that positive culture is associated with high food security and negative culture with low food security. This implies that culture influences food security. However, an ANOVA test was done to attempt to confirm whether culture indeed influences food security.

Hypothesis 1: H_{01}: Culture does not significantly influence food security among Njaa Marufuku Kenya farmer groups in Kuria District.

The data was subjected to ANOVA analysis to test the hypothesis that culture does not significantly influence food security among Njaa Marufuku Kenya farmer groups in Kuria district. The results of the analysis are summarized in Table 4.10.

Table 4.10: Summary of ANOVA of the Means of Food Security Based on Culture

Source of Difference	Sums of Squares	df	Mean Square	F	A
Between groups	38.69	45	0.860	$F_c = 1.320$	$\alpha_c = 0.050$
Within Groups	114.19	194	0.589	$F_o = 1.460$	$\alpha_o = 0.042$
Total	152.89	239			

The results in Table 4.10 confirm the results suggested by the results in Table 4.9 that culture influences food security. This was confirmed since $F_o = 1.460 > F_c = 1.320$ and $\alpha_c = 0.05 > \alpha_o = 0.042$. The hypothesis that culture does not influence food security among Njaa Marufuku Kenya farmer groups in Kuria district was therefore rejected. This means that people with positive beliefs on seasonality and about how rain is formed and those with positive attitude towards food as well those with positive rituals about food are likely to have higher food security.

This finding supports the views expressed by Abbey et al. (2000) that the beliefs people and individuals hold about food and how that food is produced is a critical factor in food security. This is also in line with the observation of FAO (2008) that families and communities

and even countries are food insecure because they treat food crops like ordinary plants instead of as a vital commodity for the world's poor. The study agrees with FAO (2008) in criticizing decades of policymaking by the world Bank, the International Monetary Fund and others, encouraged by the U.S, which pressured Africans in particular into dropping government subsidies for fertilizer, improved seed and other farm inputs as a requirement to get aid. The views of UNEP (1982) that attitudes towards risky innovations depend on how close to bare survival production lies are also affected by culture. Whether or not a new technology is adopted depends on the culture of the intended adopters and how the technology fits into the culture.

4.4.2 Environmental Factors and Food Security

This study also attempted to establish the influence of environmental factors on food security among Njaa Marufuku Kenya farmer groups in Kuria District. The important environmental factors included security, rainfall patterns and type of land. The respondents were asked to indicate whether they feel secure to work on their farms, whether or not the rains are reliable and sufficient and whether or not they have adequate productive land for farming by selecting alternative responses on a Likert scale. Those who responded *strongly agree* and *agree* were pooled together as *agree* and were rated as having good environmental factors. Those who responded *disagree* and *strongly disagree* were regarded as *disagree* and rated as poor environmental factors. Those who responded *no comment* were rated as having moderate views on environmental factors. The results are summarized in Table 4.11.

Table 4.11: Views of Respondents on Security, Rainfall Patterns and Land

Elements of Environmental Factors	Good	Moderate	Poor	Total
Security	104	120	16	240
	43.3%	50%	6.7%	100.0%
Rainfall Patterns	72	144	24	240
	30%	60%	10%	100.0%
Land	56	168	16	240
	23.3%	70%	6.7%	100.0%
Environmental factors (Total)	32.2%	60%	7.8%	100.0%

Table 4.11 shows the views of respondents on each element of environmental factors. On security, 120 (50%) respondents indicate that they have moderate security while 104 (43.3%) responded that they have good security. Only 16 (6.7%) responded that they have poor security. This shows that insecurity is not contributing to food insecurity. On the element of rainfall patterns, 144 (60.0%) respondents responded that there is moderate rainfall while 72 (30%) responded that they receive good rainfall. Only 24 (10%) indicated that they receive poor rains. It can be said from this observation that there are adequate rains since most respondent indicated that they receive adequate rainfalls as compared to those who said they receive poor rains. On the element of land, 168 (70%) indicated that they have moderate land while 56 (23.3%) indicated that they have good land. Those who indicated that they have poor land were only 16 (6.7%). It can be deduced that residents of Kuria district have adequate land since there were more people who indicated that they have good land as compared to those who indicated that

they have poor land in terms of both size and fertility. Hence land cannot be the cause of food insecurity in the District.

The total responses on all three elements of environmental factors were used to determine the status of environmental factors of the respondents. In the overall analysis, Table 4.14 indicates that 32.2% of the respondents experience good environmental factors while 60% experience moderate environmental factors. Only 7.8% of the respondents experience poor environmental factors. This shows that there were more respondents who experience good environmental factors as compared to respondents who experience poor environmental factors. It can be concluded from these results that environmental factors do not cause food insecurity since it is not hostile to agricultural practices. This means that the region receives adequate rains over the years, there is adequate security and there is adequate and fertile land for farming. Hence they are not among the factors causing food insecurity.

The responses on environmental factors were further coded on a 1 - 5 scale as described in 3.10 and rated such that those who scored between 13 - 29 were rated as poor on environmental factors and coded 3, those who score 30 - 26 were rated as moderate on environmental factors and were coded 2, and those who scored 47 - 64 were rated as having good environmental factors and were coded 1. The food security of responses with good, moderate and poor environmental factors was compared and the results shown in Table 4.12 were obtained.

Table 4.12: Relationship between Food Security and Environmental Factors

Status of Environmental Factors	Average Food Security	Number of Respondents	Percent
Good	74.67	65	27.08
Moderate	64.57	120	50.00
Poor	48.22	55	22.92
Total	62.49	240	100.0

Table 4.12 indicates that respondents with good environmental factors have higher food security (74.67) than respondents who have moderate environmental factors (64.57) and those with poor environmental factors (48.22). The average food security situation of all respondents based on environmental factors is 62.49. These results indicate that there is a relationship between environmental factors and food security such that conducive environmental factors are associated with high food security and poor environmental factors with low food security. This implies that environmental factors influence food security. This observation was subjected to confirmation by ANOVA test, as shown below:

Hypothesis 2: H_{o2}: Environmental factors do not significantly influence food security among Njaa Marufuku Kenya farmer groups in Kuria district.

Data on environmental factors was subjected to ANOVA analysis to test the hypothesis that environmental factors do not significantly influence food security among Njaa Marufuku Kenya farmer groups in Kuria district. The results of the analysis are summarized in Table 4.13.

Table 4.13: Summary of ANOVA of the Means of Food Security Based on Environmental Factors

Source of Difference	Sums of Squares	df	Mean Square	F	A
Between groups	61.22	45	1.361	$F_c = 1.320$	$\alpha_c = 0.05$
Within Groups	58.35	194	0.0301	$F_o = 4.523$	$\alpha_o = 0.00$
Total	152.89	239			

The results in Table 4.13 confirm the results obtained in Table 4.12 that environmental factors influence food security. This was confirmed since $F_o = 4.523 > F_c = 1.320$ and $\alpha_c = 0.05 > \alpha_o = 0.000$. The hypothesis that environmental factors do not influence food security among Njaa Marufuku Kenya farmer groups in Kuria district was therefore rejected. It was therefore established that the environmental factors influence food security among Njaa Marufuku Kenya farmer groups in Kuria District. This means that people with good security, in areas with reliable rainfall and which have enough parcel of fertile lands are likely to have higher food security than those in opposite conditions.

The finding that environmental factors influence food security has been held for a long time (GOK, 2006). The correlation between the environment and food security is reinforced by the fact that food itself is an environmental issue, since its production requires fertile land and reliable weather conditions. This finding therefore fits well into those that have already been expressed by other researchers. This finding agrees with that of Brown and Funk (2008) that environment is a crucial factor in food security since rain or water and soil influence food security. They point out that if water tables fall, this may eventually lead to water scarcity and cutbacks in grain harvest. Food production has always required optimum amounts of water and

this can only be guaranteed with adequate rains. It also supports the views of Diaz-Bonillab and Reca (2000) that producing sufficient food is directly related to having sufficient water.

Land is a significant factor in food security. Apart from the fact that land is required for any basic production in an appropriate size, the type of the land is also important. Although the findings of this study show that large hectarage of land in Kuria District is fertile, intensive farming can lead to a vicious cycle of exhaustion of fertility and decline of agricultural yields (GOK, 2005). This is already being experienced because as Nissen-Petersen (1982) had pointed out earlier, the timing and length of the growing seasons are already changing dramatically due to unknown changes in soil temperature and moisture conditions. The views of Gould (1992) have also been supported by this finding. Gould (1992) had pointed out that conflict can reduce or destroy food in production or storage as farmers flee to safety or become involved in the fighting. At the same time, productive land may be contaminated with explosive debris and would need to be cleared before it can again be used for food production, while stored food, seeds and breeding livestock may be eaten or destroyed by soldiers, leading to long-term food shortages. The fact that there is adequate security for farmers in Kuria District is therefore a very important finding in light of this observation.

4.4.3 Socio-economic Factors and Food Security

In respect to the influence of socio-economic factors on food security among Njaa Marufuku Kenya farmer groups in Kuria District, the focus was on the level of education, occupation, income, shelter and availability of market for farm produce. The respondents were asked to indicate their education level, occupation, income, the type of houses they live in and whether or not they have ready market for their farm produce by selecting alternative responses

on a Likert scale. Those who responded *strongly agree* and *agree* were pooled together as *agree* and were rated as having good socio-economic factors. Those who responded *disagree* and *strongly disagree* were regarded as *disagree* and rated as poor socio-economic factors. Those who responded *no comment* were rated as having moderate socio-economic factors. The results are summarized in Table 4.14.

Table 4.14: Views of Respondents on Income, Shelter, Market and Level of Education

Elements of Socio-economic Factors	Good	Moderate	Poor	Total
Level of Education	16	32	192	240
	6.7%	13.3%	80.0%	100%
Occupation	80	112	48	240
	33.3%	46.7%	20.0%	100.0%
Income	24	56	160	240
	10%	23.3%	66.7%	100.0%
Shelter	8	104	128	240
	3.3%	43.3%	53.3%	100.0%
Market	112	48	80	240
	46.7%	20%	33.3%	100.0%
Socio-economic factors (Total)	20%	29.3%	50.7%	100.0%

Table 4.14 shows the views of respondents on each element of socio-economic factors. On the highest level of education, 192 (80.0%) respondents had poor education while 32 (13.3%) had moderate level of education. Only 16 (6.7%) of the respondents had good level of education.

On the elements of occupation, it was noted that 112 (46.7%) of the respondents had moderate views on occupation while 80 (33.3%) of the respondents had good views about agriculture as an occupation. Only 48 (20.0%) of the respondents had poor views about agriculture. They regarded agriculture as a poor man's job. On the element of income, 160 (66.7%) respondents have poor income while 56 (23.3%) respondents had moderate income. Only 24 (10%) respondents were found to have good income: earned at least 10000 per month. This shows that the average response is poor and this is likely to have an influence on food security since food of all kinds have cost implication on them and those with weak capacities to afford it are likely to be food insecure. On the element of shelter, most respondents 128 (53.3%) were found to have poor shelter: they live in grass thatched houses while 104 (43.3%) respondents were found to have moderate shelter because they lived in semi permanent houses. Only 8 (3.3%) of respondents lived in permanent (stone or brick) houses. This indicates that on average, the respondents are poor people who cannot afford descent houses. This has implications for food security since those who cannot afford good housing may not afford enough food all the time. On the element of market, most respondents 112 (46.7%) indicated that they have good market for all produce from their farms while 48 (20%) indicated that they have moderate market for their farm produce. Another 80 (33.3%) of the respondents indicated that they have poor market for their farm produce. This implies that there is ready market for all farm produce and therefore the lack of adequate market is not one of the factors causing food insecurity in the District.

The total responses on all three elements of socio-economic factors were used to determine the status of socio-economic factors of the respondents. In the overall analysis, Table 4.14 indicates that 50.7% of the respondents have low socio-economic factors while 29.3% have moderate socio-economic status. Only 20% of the respondents have high socio-economic status.

This shows that there were more respondents with low socio-economic factors as compared to those with high or moderate socioeconomic factors. It can be concluded from these results that most respondents have poor socio-economic factors. This means that they have poor income, they live in low quality houses and they do not have adequate market for the foods they produce from their farms. They also have relatively low education and lowly rated occupations. Hence socioeconomic factors are contributing to food insecurity in Kuria District.

The responses on socio-economic factors were further coded on a 1 - 5 scale as described in 3.10 and rated such that those who scored between 3 - 5 were rated as poor on socio-economic factors and coded 3, those who score 6 - 9 were rated as moderate on socio-economic factors and were coded 2, and those who scored 10 - 13 were rated as having good socio-economic factors and were coded 1. The food securities of the respondents with good, moderate and poor socio-economic factors were compared and the results shown in Table 4.15 were obtained.

Table 4.15: Relationship between Food Security and Socio-economic Factors

Status of Socio-economic Factors	Average Food Security	Number of Respondents	Percent
High	70.40	68	29.33
Moderate	62.24	77	32.08
Low	57.66	95	39.58
Total	62.79	95	100.0

Table 4.15 indicates that respondents with high socio-economic status have higher food security (70.40) than respondents who have moderate socio-economic status (62.24) and those with poor

low socio-economic status (57.66). The average food security of all respondents based on socio-economic factors is 62.79. These results indicate that there is a link between socio-economic status and food security such that good socio-economic status tends to have high food security and poor socio-economic status with low food security. This implies that socio-economic factors influence food security. This observation was subjected to confirmation by ANOVA test.

Hypothesis 3: H_{o3}: Socio-economic factors do not significantly influence food security among Njaa Marufuku Kenya farmer groups in Kuria district.

The data was subjected to ANOVA analysis to test the hypothesis that socio-economic factors do not significantly influence food security among Njaa Marufuku Kenya farmer groups in Kuria district. The results of the analysis are summarized in Table 4.16.

Table 4.16: Summary of ANOVA of the Means of Food Security Based on Socio-economic Factors

Source of Difference	Sums of Squares	Df	Mean Square	F	A
Between groups	38.43	45	0.854	$F_c = 1.320$	$\alpha_c = 0.05$
Within Groups	106.22	194	0.548	$F_o = 1.560$	$\alpha_o = 0.021$
Total	144.66	239			

The results in Table 4.16 confirm the results suggested by the results in Table 4.15 that socio-economic factors influence food security. This was confirmed since $F_o = 1.560 > F_c = 1.320$ and $\alpha_c = 0.05 > \alpha_o = 0.021$. The hypothesis that socio-economic factors do not influence

food security among Njaa Marufuku Kenya farmer groups in Kuria district was therefore rejected. It was therefore established that the socio-economic factors influence food security among Njaa Marufuku Kenya farmer groups in Kuria District. This means that people with good houses, with high income and with good and ready market to their farms' produce will have higher food security than those in opposite conditions.

This finding confirms that socioeconomic status affects food security, but it has localized this finding in the context of Kuria District. It has been argued by Paarlberg (1999) and also by UNEP (1982) that SES is an economic and sociological combined total measure of a person's work experience and of an individual's or family's economic and social position relative to others, based on income, education and occupation. This means that a family's SES includes the household income earners' education and occupation, as well as combined income, versus with an individual, when their own attributes are assessed. These were the variables dealt with in this study and they reflect a correlation with food security.

This study also confirms the views of GOK (2006a) that income inequality in Kenya has been on the rise, leaving low income families struggling in society. This implies that income or more specifically SES influence food security. Low income families focus on meeting immediate needs and do not accumulate wealth that could be passed on to future generations, thus increasing food insecurity. Families with higher and expendable SES can accumulate wealth and focus on meeting immediate needs while being able to consume and enjoy luxuries and weather crises. This finding is in agreement with Annette Lareau's theory of concerted cultivation, where middle class parents take an active role in their children's education and development by using controlled organized activities and fostering a sense of entitlement through encouraged discussion. A division in education attainment is thus born out of these two differences in child

rearing. In theory, lower income families have children who do not succeed to the levels of the middle income children, who feel entitled, are argumentative, and better prepared for adult life. This will influence their capacity to acquire food and hence their food security.

The study also supports the views of Gould (1992), that wealth gap, like income inequality, is very large in Kenya and particularly in Kuria District. There exists a racial wealth gap due in part to income disparities and differences in achievement. Differences in savings (due to different rates of incomes), inheritance factors, and discrimination in the housing market all lead to the racial wealth gap. Savings increase with increasing income, but as pointed out earlier, most families in Kuria District cannot participate in this, because they make significantly less than they need. The amount a person inherits, either during a lifetime or after death, can create different starting points between two different individuals or families, and these different starting points also factor into housing, education, and employment discrimination.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of key findings, which are set out in line with the study objectives, the conclusion, and recommendations of the study.

5.2 Summary of Findings

This study investigated four main aspects that were hypothesized to influence food security among Njaa Marufuku Kenya farmer groups in Kuria District. Consequently, the study also made three major findings in line with the three objectives or themes. The first objective of this study was culture of the local people influences food security. Culture was determined through the respondents' beliefs on rain. the food rituals and their beliefs about food. Preliminary analyses showed that there were more respondents with positive culture as compared to respondents with negative culture and that respondents with positive culture have higher food security than respondents who have moderate culture and those with negative culture, indicating that there is a relationship between culture and food security. These views were upheld by ANOVA test. The study therefore established that culture affects food security among Njaa Marufuku Kenya farmer groups in Kuria district.

This study also determined the influence of environmental factors on food security among Njaa Marufuku Kenya farmer groups in Kuria District. Environmental factors were characterized by security, rainfall patterns and nature of land. Preliminary analyses indicated that there were more respondents who experience good environmental factors as compared to respondents who experience poor environmental factors, and that respondents with good

environmental factors had higher food security than respondents who have moderate environmental factors and those with poor environmental factors, suggesting that there is a relationship between environmental factors and food security. This view was supported by ANOVA analysis. The study therefore established that the environmental factors influence food security among Njaa Marufuku Kenya farmer groups in Kuria District.

Lastly, the study determined the influence of socio-economic factors on food security among Njaa Marufuku Kenya farmer groups in Kuria District. Socio-economic factors were characterized by income, shelter, availability of market for farm produce, level of one's education and occupation. It was observed that there were more respondents who experience good socio-economic factors. It was also observed that respondents with good socio-economic factors have higher food security than respondents who have moderate socio-economic factors and those with poor socio-economic factors which suggested that there is a relationship between socio-economic factors and food security. This assertion was upheld by ANOVA analysis. The study therefore found out that socio-economic factors influence food security among Njaa Marufuku Kenya farmer groups in Kuria District.

5.3 Conclusion

The purpose of this study was to determine the factors affecting food security among Njaa Marufuku Kenya farmer groups in Kuria district, but with specific focus on the relationship between culture, environmental factors and socio-economic status and food security. The study found out that culture, environmental factors and socioeconomic factors all influence food security among Njaa Marufuku Kenya farmer groups in Kuria District.

Culture, and its associated practices and beliefs, are determinants of the way in which natural resources are accessed and used in Kuria district. Successful project outcomes are dependent on the extent to which these cultural factors are understood and incorporated into project design and implementation. The beliefs people and individuals hold about food and how that food is produced is a critical factor in food security. Traditional cultural practices and food systems are positively related and mutually supportive and both are fundamental for food security and well-being. Cultural issues are central to adequate nutrition given that the appropriateness of foodstuffs, food taboos and food distribution along age and gender lines are culturally determined.

Environmental factors affect food security. The environmental factors that increase food insecurity include poor soils, poor rainfall regime, and low crop diversity and low crop acrerages under cultivation. The correlation between the environment and food security is reinforced by the fact that food itself is an environmental issue since it requires land and favourable weather conditions for its production. Thus rain or water and soil affect food security. If water tables fall, water scarcity is experienced and this leads to cutbacks in grain harvest. Producing sufficient food is directly related to having sufficient water. The type of land is important for any basic food production. Most of the land in Kuria District is fertile but intensive farming leads to exhaustion of fertility and decline of agricultural yields. Conflict can reduce or destroy food in production or storage as farmers flee to safety or become involved in the fighting. However, there is adequate security for farmers in Kuria District.

Socioeconomic factors affect food security. Among the three objectives, it was socioeconomic factors that pooled highest on poor factors with 50.7% as compared to 7.8% on environmental factors or 3.3% on culture. On the basis of these findings, the study concludes that

socioeconomic factors are the ones that most significantly influence food security among Njaa Marufuku Kenya farmer groups in Kuria District. Apart from the fact that it pooled highest of all other factors, socioeconomic factors also subsumes all other elements' factors that could influence food security as a person's level of education, his or her occupation would influence his or her culture, and his or her capacity or ability to deal with environmental issues. SES is a total measure of a person's work experience and of an individual's or family's economic and social position relative to others based on education, occupation and income. Except for rich farmers, average and poor farmers spend very little cash for investment in crop and animal production. Low investment in crop production, especially for non-labour inputs has an impact on food production and thus affects food security. Farmers respond to market forces that in turn influence the crops and other enterprises farmers choose to work with, which in turn affect food security. Labour divisions are gendered. Women have distinctive roles to play in determining the acceptability of food basically because of their traditional roles as wives and mothers who cook for their families. Men are involved in clearing land, land preparation, provision of shelter and general resource management.

5.4 Recommendations

In respect to the findings summarized in 5.3 the study makes the following recommendations. First, the study recommends that the government makes a concerted effort to mobilize the community to go to school by taking advantage of free primary and secondary education as well as informal trainings. This will create literacy, awareness on matters of agriculture and promote attitude change of the local community towards agriculture as a profession and as a practice in order to promote food security.

The study established that the culture of the people of Kuria District has positive attributes compatible with modern agriculture. They have positive beliefs about food, and have positive rituals about food, as well as positive beliefs about food and positive beliefs about rain. The study recommends that the ministry of agriculture makes use of the local administration and introduce programs to take advantage of the positive culture to influence agricultural production in the area such introducing new food species that are drought resistant and with short maturity periods.

The study also found out that the environmental factors in Kuria District are generally conducive for agriculture and that most respondents have large parcels of fertile land. However, they lack the capacity to put the land to productive use. The study therefore recommends that extension services be intensified to educate the farmers on modern land management and agriculture production techniques.

The study also established that the socio economic statuses of the people are generally low and this has a negative influence on the capacity to produce or acquire food. People who cannot produce food because they are poor cannot be food secure. The study therefore recommends that the ministry of agriculture introduce soft loan schemes at the village levels to enable farmers get involved in modern agriculture and make money to improve their SES. Without improving the earning capacity of the people, it would be difficult to improve food security in the region.

5.5 Suggestions for Further Research

This study only examined the factors that influence food security among farmer groups, but it did not delve into its actual influence or value of the influence of these factors on food security. For example, it has been established that culture affects food security but to what extent has not been established. This study therefore recommends that another study be conducted to determine the actual influence or effect of culture, environmental factors and socioeconomic status on food security among Njaa Marufuku Kenya farmer groups in Kuria District. This will help planners to determine the right mix of control mechanisms or measures that can produce a desired level of food security not only in Kuria but in Kenya as a whole.

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APPENDICES

Appendix A: List of Njaa Marufuku Kenya Farmer Groups in Kuria District

Njaa Marufuku Kenya Group	Number of Group Members	Sample Size
1	16	8
2	18	8
3	16	8
4	28	9
5	14	8
6	12	8
7	12	8
8	31	9
9	16	8
10	19	8
11	25	9
12	26	9
13	22	9
14	18	8
15	8	8
16	23	9
17	24	9
18	14	8
19	6	8
20	14	8
21	11	8
22	10	8
23	27	9
24	31	9
25	22	9
26	29	9
27	36	9
28	33	9
29	42	9
30	35	9
Total	**638**	**255**

Appendix B: Questionnaire for Farmers in Njaa Marufuku Kenya Farmer Groups

Introduction

Dear Respondent.

I am Robert M. S Muthoka, a student at the University of Nairobi. I am conducting a study on the factors affecting the food security in Kuria District, for the award of a degree in Masters of Arts in Project Planning and Management. This study will examine the factors affecting food security among small scale farmers in Kuria District, by taking the case of CDSFIP component of Njaa Marufuku Kenya projects. It is hoped that the study will result into the institutionalization and implementation of structural changes for the enhancement of food security in Nyanza and in Kenya as a whole. Your views as a resident of Kuria district are crucial for the success of this study. Your cooperation will be highly appreciated and any information given shall be treated as strictly private and confidential.

PART A: BACKGROUND INFORMATION

Indicate the following information about yourself. Please, tick (✔) the appropriate choice or fill in the blanks accordingly).

(a) Name (Optional).....

(b) Sex Male ( ) Female ( )

(c) Sub location of origin.....

(d) How many are you in this household? .....

(e) What is the size of your family land? .....

(f) What types of crops do you produce from the land? .....

Does it support your food needs? YES.....NO.....

(g) If NO suggest two main reasons why it does not support your food needs.....

.....

PART B: FACTORS AFFECTING FOOD SECURITY

1. Respond to the issues raised below following the instructions given for each.

i) Education:

What is your highest level of education?	**Response**				
	Primary	Secondary	College	University	Other

ii) Occupation:

Statement	**Response**				
	SA	A	NC	DA	SDA
1. I prefer to be employed in an office rather than work in the field.					
2. Farming is a job for the lowly in the society.					
3. Farming is a job just like any other job.					

Key: SA= strongly Agree; A = Agree; NC = No Comment; DA = Disagree; SDA= Strongly Disagree

iii) What is your income?

Statement	Income in Ksh					
	Less than 500	501 -1000	1001-3000	3001-5000	5000-10000	Over 10000
1. Daily income.						
2. Weekly income.						
3. Monthly income.						

iv) Do you always get all kinds of food you need with your monthly income?

a) No……. b)Yes…….. c) Sometimes…… d) Not sure……. e) Other……

2. What type of shelter do you have?

What type of house do you live in?	Type of house				
	Permanent Stone house	Permanent Brick house	Mud wall house, iron roof	Mud wall house, Grass thatched	Other

3. Rainfall and food security:

Statement	Response				
	SA	A	NC	DA	SDA
1. The rainfall in my area is very reliable and predictable. Rains never fail.					
2. It always rains with hailstones					
3. My area is dry most of the year					
4. I get information on rainfall regime over the radio					
5. I get information on rainfall from neighbors					

Key: SA= strongly Agree; A = Agree; NC = No Comment; DA = Disagree; SDA= Strongly Disagree.

4. Land Size:

a) How much land do you own? .....acres/Hectares

b) How did you acquire the land:

i) Inheritance .....ii) Leasing .....iii) Purchased.....

5. Type of land and Food availability:

Statement	Response				
1. I have sufficient land for my agricultural needs.					
2. The type of land in this area is fertile. I always get good returns on land.					

3. Land in this area is sandy; it does not hold water for a long time.					
4. I use inorganic fertilizers to improve soil fertility					

Key: SA= strongly Agree; A = Agree; NC = No Comment; DA = Disagree; SDA= Strongly Disagree.

6. Rituals on Food:

Statement	**Response**				
	SA	**A**	**NC**	**DA**	**SDA**
1. There are rituals that I must always fulfill before I begin ploughing every season.					
2. There are rituals that I must always fulfill before I begin planting activity every season.					
3. There are rituals that I must always fulfill before I begin harvesting every season.					

Key: SA= strongly Agree; A = Agree; NC = No Comment; DA = Disagree; SDA= Strongly Disagree

7. Beliefs about Food:

Statement	**Response**				
	SA	**A**	**NC**	**DA**	**SDA**
1. There are certain foods which I do not eat because they bring bad luck.					

2. There are certain foods which I eat because they bring good luck.					
3. There are no foods with good or bad luck.					

Key: SA= strongly Agree; A = Agree; NC = No Comment; DA = Disagree; SDA= Strongly Disagree

8. Security and food availability:

Statement	**Response**				
	SA	**A**	**NC**	**DA**	**SDA**
1. I do not fear to attend to my farm due to insecurity.					
2. There are no fights among people over land in this area.					
3. I can wake up early and go to the farm without fear of being attacked.					
4. I have to stay in my farm for long hours to protect it from thieves.					

Key: SA= strongly Agree; A = Agree; NC = No Comment; DA = Disagree; SDA= Strongly Disagree.

9. Knowledge about farming terms:

Indicate whether or not you have heard of the following terms as a farmer. Provide the meaning and the applicability of the terms you are aware of.

Terms	Yes	No	Meaning	Applicability /use
1. Fertilizers				
2. Top dressing				
3. Terraces				
4. Soil erosion				
5. High value horticulture				
6. Artificial insemination				
7. Plant breeding				
8. Certified seeds				
9. Irrigation				

10. Market and Food availability:

Statement	Response				
	SA	A	NC	DA	SDA
1. I have ready market for the produce from my land.					
2. I always sell all my farm produce with ease.					
3. There is easy access to the nearest market.					

Key: SA= strongly Agree; A = Agree; NC = No Comment; DA = Disagree; SDA= Strongly Disagree

11. **What skills have you gained from Njaa Marufuku Kenya?**

Statement	SA	A	NC	DA	SDA
1. Growing horticultural crops which give me very good returns.					
2. Make my decisions and take care of myself from the produce of my farms.					
3. Planted trees on my farms and dug trenches and terraces to protect my land.					
4. Keeping improved livestock breeds.					

Key:

SA = Strongly Agree; A = Agree; NC = No Comment; DA = Disagree; SDA = Strongly Disagree

PART C: HOUSEHOLD FOOD SECURITY

1.a). How many meals are served in your house in a day? 1..... 2.....3..... Other.....

b). Why are you served this number of meals in a day? Explain briefly.

.....

.....

2.Do you always get these types of food whenever you want any of them? Yes .....No.....

Why do you say so? Please explain briefly.

.....

3.How do you get the food you want to cook for the day?

(i) Buy..... (ii) Harvest from farm/kitchen garden..... (iii) Beg..... (iv) Steal.....

(v) Visit a neighbor..... (vi) Other.....

4. How do you use the food you harvest from your farm?

(ii) Sell..... (ii) Eat.....(ii) Distribute..... (iv) Store..... (v) Other.....

5. Where do you store the harvested crop? How much do you store?

(i) Granary.....Quantity..... (ii)In your house.....Quantity.....

Other places (Specify).....

6.What can you say about food security in this area?

.....

.....

7.a) Have you heard of Njaa Marufuku Kenya ? YES.....NO.....

b) How do you rate Njaa Marufuku Kenya 's extension service delivery?

i) poor.....ii) Fair.....iii) Good.....iv) Very good.....v) Excellent.....

c) Are there specific skills you learnt from Njaa Marufuku Kenya ? YES.....NO.....

If yes list them down:

i).....

ii) .....

iii).....

c) What was the level of Njaa Marufuku Kenya's capacity building? Satisfied.....

Unsatisfied.....

Other (specify).....

d) In your opinion, how can the Njaa Marufuku Kenya programme be improved?

.....

.....

.....

.....

Appendix C: Interview Guide for Key Informants (Njaa Marufuku Kenya group Leaders) in Kuria District

Introduction

Dear Respondents,

I am Robert M. S Muthoka, a student at the University of Nairobi. I am conducting a study on the factors affecting the food security in Kuria District, for the award of a degree in Masters of Arts in Project Planning and Management. This study will examine the factors affecting food security among small scale farmers in Kuria District, by taking the case of CDSFIP component of Njaa Marufuku Kenya projects. It is hoped that the study will result into the institutionalization and implementation of structural changes for the enhancement of food security in Nyanza and in Kenya as a whole. Your views as a resident of Kuria district are crucial for the success of this study. Your cooperation will be highly appreciated and any information given shall be treated as strictly private and confidential.

Please react to the questions that follow.

1. Have you heard about Njaa Marufuku Kenya?
2. What is the status of food security in Kuria District?
3. What factors contribute to food insecurity in Kuria District?
4. How does the culture of the community relate to food security?
5. On average, how much land does each member of Njaa Marufuku Kenya groups own?
6. How productive is land in Kuria District?
7. What is the nature of rainfall patterns? How do they impact on food security?
8. What other environmental factors influence food production?
9. i) What is the nature of market for food crops/cash crops?

ii) What are the constraints to marketing of food crops/cash crops?

10. What skills have farmers learnt from Njaa Marufuku Kenya?
11. Can you say that Njaa Marufuku Kenya has improved the capacity of farmers to acquire food?
12. How does extension service delivery relate to food security?
13. What recommendations can you suggest for promoting food security in Kuria District?

Thank you.

Appendix D: Discussion Guide for Focus Group Discussions for Njaa Marufuku Kenya - Group members in Kuria District

Introduction

Dear Respondents,

I am Robert M. S Muthoka, a student at the University of Nairobi. I am conducting a study on the factors affecting the food security in Kuria District, for the award of a degree in Masters of Arts in Project Planning and Management. This study will examine the factors affecting food security among small scale farmers in Kuria District, by taking the case of CDSFIP component of Njaa Marufuku Kenya projects. It is hoped that the study will result into the institutionalization and implementation of structural changes for the enhancement of food security in Nyanza and in Kenya as a whole. Your views as a resident of Kuria district are crucial for the success of this study. Your cooperation will be highly appreciated and any information given shall be treated as strictly private and confidential.

Please react to the questions that follow.

1. What is the status of food security in Kuria District?
2. What factors contribute to food insecurity in Kuria District?
3. How does personal characteristics of farmers relate to food security?
4. How does socio-economic factors of farmers relate to food security?
5. How does the culture of the community relate to food security?
6. What is the nature of rainfall patterns? How do they impact on food security?
7. What other environmental factors influence food production?
8. On average, how much land does each member of Njaa Marufuku Kenya groups own?
9. What is the nature of market for food crops/cash crops?
10. What are the constraints to marketing of food crops/cash crops?
11. What skills have farmers learnt from Njaa Marufuku Kenya?
12. Can you say that Njaa Marufuku Kenya has improved the capacity of farmers to acquire food?
13. How does extension service delivery relate to food security?
14. What recommendations can you suggest for improving Njaa Marufuku Kenya's CDFSIP?
15. What recommendations can you suggest for promoting food security in Kuria District?

Thank you.

Appendix E: Interview Guide for managers of Njaa Marufuku Kenya - CDFSIP in Kuria District

Introduction

Dear Sir/Madam,

I am Robert M. S Muthoka, a student at the University of Nairobi. I am conducting a study on the factors affecting the food security in Kuria District, for the award of a degree in Masters of Arts in Project Planning and Management. This study will examine the factors affecting food security among small scale farmers in Kuria District, by taking the case of CDSFIP component of Njaa Marufuku Kenya projects. It is hoped that the study will result into the institutionalization and implementation of structural changes for the enhancement of food security in Nyanza and in Kenya as a whole. Your views as a resident of Kuria district are crucial for the success of this study. Your cooperation will be highly appreciated and any information given shall be treated as strictly private and confidential. Please react to the questions that follow.

1. What is the status of food security in Kuria District?
2. What factors contribute to food insecurity in Kuria District?
3. How does the culture of the community relate to food security?
4. What is the nature of rainfall patterns? How do they impact on food security?
5. What other environmental factors influence food production?
6. What is the nature of market for food crops/cash crops?
7. What are the constraints to marketing of food crops/cash crops?
8. What can you say are achievements of Njaa Marufuku Kenya?
9. What are the factors that have hindered Njaa Marufuku Kenya from achieving 100 percent results?
10. How can such factors be addressed?
11. What skills have farmers learnt from Njaa Marufuku Kenya?
12. Can you say that Njaa Marufuku Kenya has improved the capacity of farmers to acquire food?
13. How does extension service delivery relate to food security?
14. What recommendations can you suggest for improving Njaa Marufuku Kenya's CDFSIP?
15. What recommendations can you suggest for promoting food security in Kuria District?

APPENDIX F: SUMMARY OF RESEARCH DATA

Respondents	Cultural factors	Environmental factors	Socio-economic factors	FOOD SECURITY
1	1.00	1.00	1.00	70.50
2	2.00	2.00	2.00	61.10
3	1.00	1.00	1.00	85.00
4	3.00	1.00	3.00	32.60
5	3.00	1.00	3.00	29.40
6	3.00	2.00	3.00	28.20
7	3.00	2.00	3.00	42.30
8	3.00	2.00	3.00	32.60
9	1.00	1.00	1.00	85.00
10	2.00	2.00	2.00	51.70
11	2.00	1.00	2.00	75.00
12	3.00	3.00	3.00	29.40
13	3.00	2.00	3.00	32.60
14	3.00	3.00	3.00	29.40
15	3.00	1.00	3.00	28.20
16	3.00	3.00	3.00	42.30
17	3.00	2.00	3.00	32.60
18	3.00	3.00	3.00	29.40
19	2.00	3.00	2.00	51.70
20	2.00	3.00	2.00	56.40
21	1.00	2.00	1.00	65.80
22	2.00	2.00	3.00	94.60
23	1.00	1.00	1.00	84.60
24	1.00	2.00	1.00	65.80
25	1.00	1.00	1.00	70.50
26	2.00	1.00	1.00	65.80
27	2.00	1.00	2.00	75.20
28	2.00	2.00	1.00	75.20
29	2.00	3.00	3.00	51.70
30	2.00	2.00	1.00	56.40
31	3.00	2.00	3.00	56.40
32	3.00	2.00	3.00	65.80
33	1.00	3.00	2.00	94.60
34	1.00	1.00	2.00	84.60
35	2.00	2.00	3.00	65.80
36	2.00	1.00	1.00	70.50
37	1.00	1.00	2.00	98.00
38	2.00	1.00	1.00	75.20
39	2.00	3.00	1.00	65.80
40	2.00	2.00	1.00	51.70
41	2.00	2.00	3.00	56.40

42	2.00	1.00	2.00	56.40
43	3.00	1.00	2.00	65.80
44	1.00	3.00	1.00	94.60
45	1.00	3.00	1.00	84.60
46	2.00	3.00	3.00	65.80
47	1.00	2.00	3.00	94.60
48	1.00	2.00	2.00	84.60
49	2.00	3.00	2.00	65.80
50	1.00	1.00	3.00	70.50
51	2.00	2.00	1.00	65.80
52	2.00	1.00	2.00	75.20
53	2.00	1.00	1.00	65.80
54	2.00	1.00	1.00	51.70
55	2.00	3.00	1.00	56.40
56	2.00	2.00	3.00	56.40
57	2.00	2.00	2.00	65.80
58	1.00	1.00	2.00	94.60
59	2.00	1.00	1.00	84.60
60	2.00	3.00	1.00	65.80
61	2.00	1.00	1.00	70.50
62	2.00	1.00	1.00	65.80
63	2.00	3.00	1.00	56.00
64	1.00	2.00	3.00	65.80
65	1.00	2.00	2.00	65.00
66	3.00	1.00	2.00	56.40
67	2.00	1.00	1.00	78.00
68	2.00	3.00	2.00	65.80
69	3.00	1.00	1.00	94.60
70	2.00	1.00	1.00	85.00
71	2.00	3.00	1.00	84.60
72	2.00	2.00	3.00	65.80
73	1.00	2.00	2.00	70.50
74	2.00	1.00	2.00	65.80
75	2.00	1.00	1.00	75.20
76	2.00	3.00	2.00	65.80
77	2.00	3.00	1.00	51.70
78	3.00	3.00	2.00	56.40
79	1.00	2.00	1.00	56.40
80	2.00	2.00	3.00	65.80
81	2.00	1.00	1.00	69.00
82	2.00	2.00	1.00	63.00
83	1.00	1.00	1.00	69.00
84	2.00	1.00	1.00	67.00
85	2.00	1.00	2.00	72.00
86	2.00	1.00	1.00	71.00

87	2.00	3.00	3.00	65.80
88	1.00	2.00	1.00	83.00
89	3.00	2.00	3.00	65.80
90	2.00	2.00	2.00	29.40
91	2.00	3.00	2.00	32.60
92	2.00	1.00	3.00	57.00
93	2.00	2.00	1.00	65.00
94	1.00	1.00	2.00	85.00
95	3.00	1.00	1.00	32.60
96	1.00	1.00	1.00	89.00
97	2.00	3.00	1.00	65.00
98	3.00	1.00	2.00	75.00
99	3.00	3.00	3.00	84.60
100	2.00	2.00	2.00	65.80
101	2.00	3.00	3.00	70.50
102	2.00	1.00	3.00	65.80
103	3.00	3.00	2.00	75.20
104	3.00	2.00	2.00	51.70
105	2.00	3.00	2.00	65.80
106	2.00	3.00	1.00	79.00
107	3.00	3.00	2.00	56.40
108	1.00	2.00	1.00	75.00
109	2.00	2.00	3.00	61.10
110	1.00	1.00	1.00	71.00
111	3.00	2.00	2.00	61.10
112	2.00	3.00	2.00	51.70
113	2.00	3.00	1.00	51.70
114	2.00	3.00	2.00	65.80
115	2.00	3.00	1.00	47.00
116	3.00	3.00	2.00	56.40
117	1.00	2.00	1.00	98.00
118	2.00	2.00	3.00	61.10
119	2.00	1.00	1.00	61.10
120	2.00	2.00	2.00	61.10
121	2.00	1.00	2.00	64.00
122	3.00	1.00	3.00	66.00
123	2.00	1.00	3.00	69.00
124	2.00	2.00	2.00	65.80
125	3.00	3.00	2.00	47.00
126	1.00	2.00	3.00	82.60
127	3.00	2.00	1.00	56.40
128	3.00	2.00	2.00	61.10
129	2.00	1.00	1.00	61.10
130	2.00	1.00	3.00	75.00
131	2.00	1.00	2.00	63.00

132	3.00	3.00	2.00	32.60
133	2.00	2.00	2.00	65.00
134	2.00	2.00	2.00	65.80
135	1.00	1.00	3.00	94.60
136	3.00	1.00	1.00	45.00
137	3.00	3.00	2.00	32.60
138	3.00	3.00	2.00	29.40
139	2.00	3.00	2.00	28.20
140	3.00	2.00	3.00	42.30
141	3.00	2.00	2.00	32.60
142	2.00	3.00	3.00	29.40
143	3.00	3.00	2.00	51.70
144	3.00	2.00	2.00	56.40
145	2.00	3.00	2.00	65.80
146	1.00	3.00	1.00	94.60
147	2.00	3.00	2.00	84.60
148	1.00	2.00	1.00	84.60
149	2.00	2.00	3.00	65.80
150	1.00	1.00	1.00	70.50
151	3.00	3.00	2.00	65.80
152	3.00	2.00	2.00	75.20
153	2.00	3.00	2.00	70.50
154	2.00	3.00	1.00	65.80
155	2.00	1.00	1.00	75.20
156	1.00	1.00	2.00	94.60
157	1.00	1.00	1.00	84.60
158	2.00	3.00	1.00	65.80
159	2.00	2.00	1.00	70.50
160	2.00	2.00	3.00	65.80
161	2.00	1.00	2.00	75.20
162	3.00	1.00	2.00	65.80
163	3.00	3.00	1.00	65.80
164	1.00	3.00	1.00	94.60
165	3.00	3.00	3.00	36.00
166	3.00	2.00	3.00	44.00
167	2.00	2.00	2.00	65.80
168	2.00	3.00	2.00	42.00
169	2.00	1.00	1.00	85.00
170	2.00	1.00	2.00	75.20
171	3.00	1.00	1.00	65.80
172	3.00	3.00	1.00	65.80
173	2.00	2.00	1.00	78.00
174	2.00	2.00	3.00	65.00
175	2.00	1.00	2.00	65.80
176	3.00	1.00	2.00	70.50

177	3.00	3.00	1.00	65.80
178	2.00	3.00	1.00	75.20
179	2.00	3.00	3.00	65.80
180	3.00	2.00	3.00	45.00
181	2.00	2.00	2.00	69.00
182	2.00	2.00	2.00	67.00
183	2.00	3.00	2.00	66.00
184	1.00	1.00	3.00	65.80
185	1.00	2.00	3.00	70.50
186	1.00	1.00	1.00	74.00
187	3.00	1.00	3.00	75.20
188	2.00	1.00	3.00	65.80
189	2.00	3.00	2.00	65.80
190	1.00	2.00	2.00	45.60
191	1.00	2.00	2.00	74.00
192	2.00	2.00	2.00	46.00
193	3.00	2.00	3.00	36.00
194	3.00	2.00	3.00	41.00
195	2.00	1.00	2.00	65.80
196	2.00	2.00	2.00	29.40
197	3.00	1.00	2.00	56.00
198	3.00	3.00	3.00	29.40
199	2.00	2.00	3.00	45.00
200	3.00	3.00	2.00	42.30
201	2.00	1.00	2.00	52.00
202	3.00	3.00	3.00	29.40
203	3.00	2.00	2.00	51.70
204	2.00	3.00	2.00	74.00
205	2.00	3.00	1.00	64.00
206	3.00	3.00	2.00	65.80
207	3.00	1.00	2.00	70.50
208	3.00	3.00	3.00	65.80
209	2.00	2.00	2.00	75.20
210	2.00	3.00	3.00	65.80
211	2.00	1.00	3.00	65.80
212	3.00	3.00	2.00	47.00
213	2.00	3.00	1.00	72.60
214	2.00	2.00	3.00	65.80
215	1.00	2.00	2.00	70.50
216	3.00	1.00	2.00	65.80
217	3.00	1.00	1.00	75.20
218	2.00	1.00	2.00	65.80
219	1.00	2.00	1.00	94.60
220	1.00	3.00	1.00	56.00
221	1.00	2.00	1.00	70.20

222	3.00	2.00	3.00	70.50
223	3.00	2.00	3.00	65.80
224	2.00	3.00	2.00	75.20
225	3.00	1.00	3.00	65.80
226	3.00	2.00	3.00	51.70
227	2.00	1.00	2.00	56.40
228	2.00	2.00	2.00	56.40
229	3.00	1.00	3.00	65.80
230	3.00	1.00	3.00	75.00
231	3.00	1.00	3.00	56.00
232	2.00	2.00	2.00	70.00
233	3.00	2.00	3.00	65.80
234	3.00	2.00	3.00	70.50
235	2.00	2.00	2.00	65.80
236	1.00	2.00	2.00	75.20
237	2.00	3.00	1.00	56.20
238	2.00	3.00	2.00	45.60
239	3.00	3.00	2.00	54.60
240	1.00	2.00	1.00	56.90

APPENDIX G: RESEARCH AUTHORIZATION AND RESEARCH PERMIT

REPUBLIC OF KENYA

NATIONAL COUNCIL FOR SCIENCE AND TECHNOLOGY

Telegrams: "SCIENCETECH", Nairobi
Telephone: 254-020-241349 2213102
254-020-310571, 2213123
Fax: 254-020-2213215, 318245, 318249
When replying please quote

P.O Box 30623-00100
NAIROBI-KENYA
Website: www.ncst.go.ke

Our Ref: NCST/RRI/12/1/AS/05/3

Date 3rd August 2010

Mr. Robert Musyoki Sila Mutloka
University of Nairobi
P. O. Box 2461
NAIROBI

Dear Sir,

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on *"Factors influencing food security projects in Kuria District: A case of Njaa Marufuku Kenya (NMK) - Kuria"* I am pleased to inform you that you have been authorized to undertake research in **Kuria East and Kuria West Districts** for a period ending *30th September 2010.*

You are advised to report to **the District Commissioners, the District Education Officers, the District Agricultural Officers, Kuria East and Kuria West Districts and the Desk Officers, NMK** before embarking on the research project.

On completion of the research, you are expected to submit two copies of the research report/thesis to our office.

DR. M. K. RUGUTT, Ph.D. HSC
FOR: SECRETARY/CEO

Copy to:
The District Commissioners
Kuria East District
Kuria West District

The District Education Officers
Kuria East District
Kuria West District

THIS IS TO CERTIFY THAT

PROF./DR./MR./MRS./MISS MUSHOKA

ROBERT MUSYOKI SILA

of (Address) UNIVERSITY OF NAIROBI

P.O. BOX 2461 KISII

has been permitted to conduct research in .....

..... Location,

KURIA EAST AND KURIA WEST District,

NYANZA Province,

on the topic FACTORS INFLUENCING

FOOD SECURITY PROJECTS IN KURIA

DISTRICT: A CASE OF NIAA MARUFUKU

KENYA (NMK)-KURIA

.....

for a period ending 30TH SEPTEMBER 20 10

Research Permit No NCST/RRT/12/1/AS/05

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Applicant's Signature

Secretary
National Council for Science and Technology