

UNIVERSITY OF NAIROBI

DEPARTMENT OF SOCIOLOGY AND SOCIAL WORK

**APPLICATION OF INDIGENOUS FARMING PRACTICES TOWARDS
ELIMINATION OF FOOD INSECURITY AMONG FARMERS IN KIKUYU SUB-
COUNTY, KENYA**

By

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**A research Project submitted in partial fulfilment of the requirements for the award
of the Degree of Master of Arts in Sociology (Rural Sociology and Community
Development).**

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DECLARATION

This research project is my original work and has not been presented for a degree in any other University.

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

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Prof. Edward Mburugu

Date

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Lastly, I thank all my respondents and key informants. Since space may not allow me to list down all those who participated by their names, I say to all thank you very much and God bless you all.

DEDICATION

This piece of work is dedicated to

My husband Isaac Maina Manyeki,

My daughters, Joygladys Njeri & Faith Wamaita and

My beloved parents

LIST OF ABBREVIATION AND ACRONYMS

ASALs	Arid and Semi-Arid Lands
AU	African Union
DDO	District Development Office
FAO	Food and Agriculture Organizations
IFOAM	International Federation of Organic Agriculture Movements
MDGs	Millennium Development Goals
UN	United Nation
UNFAO	United Nations Food and agriculture Organizations

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ABSTRACT

The purpose of this study was to investigate the role of indigenous farming practices in promoting food security among farmers in Kikuyu Sub-County, Kenya. It was guided by the following research objectives: to determine the influence to which indigenous and western farming practices has on food security and the available measures put in place by the government to ensure continuity in utilization of indigenous knowledge. This study was based on Observational learning theory and Social exchange theory. The study adopted a descriptive survey design. Questionnaire tools were adopted to collect the data from farmers and an interview guide to interview the key informants. The study sample population comprised of 90 farmers and ten key informants. Eight key informants were interviewed and 86 questionnaires were returned, realizing an instrument return rate of 94%.

The research findings revealed that Kikuyu Sub-County's level of food security is low due to the small pieces of land for farming in the County and unreliable weather conditions hindering effective food production. On farmers understanding of indigenous farming practices 55.9% of the respondents indicated that indigenous farming practices entails farming without chemicals. However, majority of the respondents indicated that they do not apply indigenous farming practices in their farms due to the long duration taken before the matured indigenous foods are harvested. While on farmers understanding of conventional farming practices 45.3% of the respondents indicated that they understood conventional or western knowledge farming practices as farming using fertilizers to their crops to boost growth. However, application of conventional/western farming practices can lower household levels of food security when the practices degrade the environment and soil quality thus lowering harvest with time as well as increased health complications. The Household Food Insecurity Access Scale (HFIAS) measurement tool revealed that food in the households was insecure due to it being unavailable and inaccessible. This revealed that 8.5% of the households were faced by moderate food insecurity, severe food insecurity 4.7% and 56.5% were food secure.

Based on the study findings the study concluded that Indigenous knowledge represents valuable source of local solutions to food insecurity in terms of accessibility by the rural population, particularly during seasonal food shortage or major stress periods such as droughts. Thus, the researcher made the following recommendations; the government through the ministry of Agriculture should document records on indigenous knowledge practices to ensure that the knowledge is easily passed on between generations. Most farmers proposed that the government should come up with ways to avail indigenous crops, offer farmers with financial aid to buy farm input, start-up rural watering projects and organize awareness forums as some of the measures that could empower farmers to ensure effective utilization of indigenous farming practices.

CHAPTER ONE: INTRODUCTION

1.1 Background of the problem

Food and Agriculture Organization (FAO) of the United Nations (UN) (2002), states that improving productivity and intensifying crop production among farmers could be key to global food security and ending hunger. Food security and insecurity are terms used to describe whether people have access to sufficient quality and quantity of food. The precarious of food security situation has impacts on the population's access to food and water and overall levels of health and nutrition, particularly among the vulnerable people in the society. Poverty, health, food production, political stability, infrastructure, access to markets and natural hazards are some of the determinants of food security, while famine and hunger refer to the effects of food insecurity.

Food security is described as the situation that exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2002). Further, this definition deduce that any farming method used whether conventional or indigenous must ensure that quality, accessibility, affordability and quantity of food produced are by all means not compromised. The challenge of food insecurity persists even after intensive application of conventional farming techniques and minimal utilization of indigenous practices which during the days of our ancestors were being used by farmers leading to bumper harvests (World Bank, 1998).

Conventional farming technique is a large-scale highly mechanized agriculture with monocultures of crops and extensive use of artificial fertilizers, herbicides and pesticides with

intensive animal husbandry (Knorr & Watkins, 1984). This farming method has been working within the global food system to feed the masses via the advents of farming practices to become what is now known as industrial agriculture. This farming technique uses higher amount of labor, allow much more use of land, providing higher yield-output to human labor input ration (Fraser et al, 2005).

Indigenous knowledge is the body of awareness that is held in different brains, language and skills in many development sectors (Sundamani& Ranganathan, 2003). The main feature of indigenous knowledge is that it is not easily codified and it forms the basis for decision making in Agriculture, healthcare, food preparation, education and natural resource management (World Bank, 1998). It is the local or traditional knowledge that has undergone long outstanding traditions and practices of particular communities (Soni, 2007). It is a very fundamental system that guides farmers in making critical decisions that guarantees bumper harvest in the fields of fishing, hunting and gathering as well as agriculture and animal husbandry (Murdoch, 1994). Information workers such as the hunters and gatherers, traditional healers and spiritual leaders basically represents the drivers of this knowledge. Ignoring such resource people would lead farmers to repeating the same mistakes that causes food shortage due to lack of baseline information which is vital before, during and after planting any crop (Rogers, 1986). Indigenous knowledge is therefore very relevant because people and communities weigh greatly what they know best and apply it in farming (Biggerlaar & Gold, 1995).

Proper utilization of indigenous knowledge in farm practices has proven to be very effective in assisting with the reduction of hunger in places like India, Mozambique and Uganda (Warren, 1991). Although indigenous knowledge therefore has much to offer to the world as long as stress periods are concerned, scanty research has been done on how it can be used in the reduction of food insecurity.

Proper application of indigenous farm practices can probably help in eradicating most if not all causes of food insecurity in Kenya. This farming method has minimal side effects and also environmental friendly (FAO, 2008). Modern scientists often ignore the traditional information carriers of indigenous knowledge without noticing the fact that this is an important resource that can solve many local food related problems which become inevitable during periods of food scarcity (Soni, 2007).

Over the years, the government of Kenya has invested in community food security projects as a way of helping local people improve their own livelihoods. For instance a number of communities in the country have been given grants and technical support by both local and international donors, with the intention of helping them combat food insecurity and reduce poverty (World Bank 2003). Despite the many funded food security projects in Kikuyu Sub-County, there is persistent food insecurity among the rural communities.

In the ensuing discourse the task of this study was to understand whether there is any direct correlation between use of indigenous farm practices and food security. It also sought to understand whether Western farm practices have impacted in any way on the utilization of

Indigenous farming practices by local knowledge holders and how this has led to food insecurity.

1.2 Problem statement

Western farming knowledge is portrayed by many scholars as open, systematic, objective and dependent on rationality while indigenous knowledge is perceived as closed, un-intellectual, biased, illogical, primitive and emotional (Herbert, 2000; Howes and Chambers, 1979; Mitchell, 1991 and Warren, 1991). From an Eurocentric view, Western knowledge is perceived to be modern and better, while indigenous knowledge is viewed as simplistic, residual, backward and worst form of knowledge (World Bank, 1998) especially within the agricultural sector. The above perspectives make Scientists, development planners and policy makers to prefer western practices as the best for development ignoring indigenous practices which are perceived to have little to offer to development (World Bank, 1997).

Food security is not only about quantity of the production but there are other relevant principles to consider when looking for sustainable food security. These include; availability, reliability, quality, accessibility and nutritional status. Availability is a function of multiple factors that include community's proximity to centres of production and supply, market forces, restrictions on trade and international markets that affect food supplies. Without food supply, a household is completely vulnerable to hunger (FAO, 2002). The source of food must also be reliable. Seasonal variations in food production and incomes threaten food security at all levels. Food accessibility is also an essential component that ensures food security. Apart from food being

readily available there is need to establish whether the consumers can easily access the produced food (Gojestani, 2000).

Food quality is also a key component of food security confirmation. The available and accessible food must meet the internationally acceptable dietary standards. Access to diversified food enhances quality hence overreliance on one food type threatens food security. During times of drought and famine majority compromise this principle of quality food by opting to go for cheaper and available low quality food stuffs. Lastly, nutritional status generally refers to whether or not you are eating the correct amounts and types of nutrients. It is the status of a person's health in terms of the nutrients in his or her diet.

Conventional farming practices answers the question of quantity ignoring the quality of soil, human and animal health as well as the nutritional levels of the crop products hence creating knowledge gaps. On the other hand those who embrace traditional practices considers not only the quantity but also quality hence the purpose for this study. Researchers have written about organic farming but very minimal on how Indigenous knowledge can be applied to help eliminate the challenge of food insecurity in Kenya. This research sought to find out whether the application of indigenous farming practices could help in the elimination of food in- security in Kikuyu Sub-County.

Drawing from the forgoing discussion, this study was therefore guided by the following questions;

In what ways have indigenous knowledge on farming practices influenced food security?

How have western knowledge farming practices influenced food security?

Are there available measures that the government has put into place to ensure continuity in utilization of indigenous knowledge on food security?

1.3 Research Objectives

1.3.1 General Objective

The general objective was to investigate the role of indigenous farm practices in promoting food security among farmers in Kikuyu sub-county.

1.3.2 Specific Objectives

The specific objectives were;

To determine the influence to which indigenous farming practices has influenced food security.

To determine the influence to which western farming practices has influenced food security.

To identify the available measures that the government has put in place to ensure continuity in utilization of indigenous knowledge on food security.

1.4 Justification of the study

The study recognizes that food insecurity is a major challenge facing the Kenyan government today (Vision 2030 secretariat, 2012) and that use of Indigenous Knowledge can probably be a possible alternative. In the year 2000, 25% of Kenya's population was highly affected by food insecurity (UNFAO 2008). The undernourished people during this time included children below five years, expectant mothers and the aged. These are highly vulnerable persons to malnutrition

(Muriuki, Mwangi and Thorpe, 2001). Incorporation of indigenous knowledge in Agricultural production can probably improve food insecurity in Kikuyu sub-county.

The study hopes to provide the Ministry of Agriculture policy makers and other stakeholders with information to realize the Millennium Development Goal No.2 on poverty and hunger eradication by the year 2015. The finding of this study will also give a clearer picture on the embracement of indigenous practices in relation to food production.

The study also sought to examine whether the continued dominance of western knowledge in agriculture has over time resulted to under-utilization or extinction of indigenous practices by local farmers. It explored whether indigenous farm practices can be improved to fit the modern farmer. Finally, for academic purposes, the study sought to update the existing literature. It captured emerging issues and challenges that arise when indigenous knowledge is neglected to ensure food production. The information gathered will greatly add to the existing body of knowledge, as well as helping to understand the problem further and realize existing solutions.

Scholars like Knorr and Watkins (1984), established that conventional farming is a large-scale highly mechanized agriculture with monocultures of crops and extensive use of artificial fertilizers, herbicides and pesticides with intensive animal husbandry While Fraser et al, (2005), uses higher amount of labor, allow much more use of land, providing higher yield-output to human labor input ration However Sundamani and Ranganathan, (2003) states that Indigenous knowledge is the body of awareness that is held in different brains, language and skills in many development sectors. This revelation differs with scholars like Gudhlanga et al, (1992), who view indigenous farming as only a farm practice for the rural poor, uneducated,

primitive and backward farmers. Thus this study necessitated to find out whether application of indigenous practices do hinder or promote food security.

1.5 Scope and limitation of the study

1.5.1 Scope

The study covered areas where farming practices take place using both conventional and indigenous farming methods in selected wards within Kikuyu sub-County namely Sigona, Karai and Kikuyu. The focus was on indigenous and conventional knowledge users, the government extension officers, development planners and community social organizations within these wards. This study only dealt with application of indigenous farm practices in agriculture without including animal husbandry.

1.5.2 Limitation

The study was carried out in Kikuyu sub-county and could not be extended to other Sub-Counties within Kiambu County due to the limited financial resources. For this reason, the findings from this study may not entirely apply to all areas of Kiambu County, much less to other areas in the country.

1.6 Definition of Key Terms

Indigenous knowledge

This is the traditional, community specific and localized information that is stored in form of skills and techniques. It's acquired through experimentation over a period of time normally imparted orally from generation to generation for the survival of current and future generations.

The know-how is therefore developed and maintained by knowledge bearers through histories and close contact with their natural environment (Flavier et al, 1995).

Conventional knowledge

This is the scientific knowledge taught and adopted in learning institutions. It is perceived by many scholars to be open, systematic, objective and dependent on rationality (Herbart, 2000; Howes & Chambers, 1979; Mitchell, 1991 and Warren, 1991).

Food security

The United Nations Food and Agriculture Organization (UNFAO, 2002) defines food security as; availability of food at all times , where all persons have access to it and the available food is nutritionally adequate in quality, quantity and variety as acceptable within the given culture.

Food insecurity

This is the condition whereby people lack enough basic food intakes to provide them with the energy and nutrients for fully productive lives (Cox et al., 2001)

Local farmers

Local farmers are those individuals involved in farming practices in specific and localized communities (Soni, 2007).

CHAPTER TWO: LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.0 Introduction

The purpose of this chapter is to capture relevant literature relating to indigenous farm practices and their effect in regard to food security. The chapter describes two major themes that have emerged from the literature reviewed namely; the history of food insecurity in Kenya and the place of organic farming in agriculture. This chapter also gives an account of the main theories that can be applied in understanding indigenous knowledge namely; observational learning theory and social exchange theory, the conceptual framework and the operationalization of variables.

2.1 History of food insecurity in Kenya.

The most recent definition of food security by the United Nation's food and Agriculture Organization (FAO) is a situation that exists when all people at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 2002). This description alludes to an idea of food security as not being solely the embodied experience of malnutrition by an individual but is instead about individuals being fully social and active beings.

Typically, food shortage is linked to dietary intake, nutritional status, and ultimately to physical health outcomes like child growth morbidity and mortality. Hunger is both a violation of dignity and an obstacle to social, political and economic progress. Acute or chronic exposure to periods of uncertainty in the food supply can influence mental, physical health outcomes as well as

marked alterations in behavior and ritual during seasonal periods of food scarcity (Agrawal, 1995). Chronic hunger increases one's susceptibility to diseases, reduces one's production ability leaving the hungry person very weak such that he/she is unable to work in order to meet family and public needs. This rupturing of self-reliance inhibits developing economies and contributes to the devastating downward spiral of hunger and poverty.

Food problem in Kenya is mainly transitory in nature. The transitory food insecurity households are those that under normal circumstances are able to produce enough stock, but are vulnerable to supply problems. Thus, when external shocks affect their food production systems or distribution chains for a limited period of time households are vulnerable to food insecurity. This has been mainly caused by periodic droughts over the years, institutional failure and poor policies which cause food crop and livestock production to decline forcing the country to import substantial food stuffs. While food crisis in the Arid and Semi-Arid Lands (ASALs) has always been attributed to climatic and environmental condition, other equally important factors have been documented. These include limited alternative sources of income, exploitative cereal marketing channels, unavailability of drought and disease resistant crop varieties, low limited crop diversification, poor storage methods, lack of credit services, inaccessibility to agricultural services, illiteracy and poverty (Mayanga et al, 2003).

Research has been done on proper strategic programs and initiatives that can assist in tackling the challenge of food insecurity as well as prevention of imminent global food crisis by International organizations, particularly the United Nations Food and Agricultural Organization, introduction of Indigenous farming practices being one of those initiatives. The African Union

(AU) has put in place plans to make Africa food secure by requiring countries in the continent to allocate a substantial portion of their budget to agriculture, provide farming input subsidies, and make available affordable information and communications technology (Abioye, Zaid and Egberongbe, 2011). Yet, cases of food insecurity are still prominent worldwide. Sub-Saharan Africa has the highest proportion of people living in poverty, with nearly half of the population living below the international poverty level of US \$ 1 a day (Tikai, et al 2010).

In Kenya 80% of its population depend on agriculture for their livelihood. The undernourished people range between 35% and 45% comprising mostly children below five years and women (Muriuki, Mwangi & Thorpe, 2001). The government has worked very hard to see to it that the millennium goal target of eradicating hunger and extreme poverty is met before 2015 with much emphasis on use of improved chemical input as well as training farmers on the application of organic manure to increase farm productivity (UNWFP, 2005). The ministry of Agriculture is also committed to working with private sectors, farmers, civil society and the academia in studying and utilizing indigenous knowledge. It is also in the process of formulating food and nutrition policy to determine coherence, coordination and implementation of food security in harvesting and storage (Muriuki, Mwangi & Thorpe, 2001).

World Bank studies have found that the incorporation of indigenous knowledge in Agricultural production could improve food security. Research also indicates that scanty study has been done on how agricultural indigenous farming knowledge can be used in reduction of food insecurity (World Bank 1998). This leaves one wondering how farmers adopt to survive during the stress periods. From such experiences it has now been appreciated that Indigenous knowledge has

much to offer to enlighten the world (Abioye, 2011). Since the application of Indigenous knowledge has impacted places like India, Mozambique and Uganda positively to guarantee food security (Scurrah, et al 1999), challenges scholar to do research on how Kenya can benefit also from such technology, hence the purpose for this study.

Any claim for sustainable Food security therefore demands that farming methods applied towards the fight against food insecurity satisfy the above mentioned requirements. In order to meet these food security requirements today the existing knowledge gap must be filled hence the purpose of this research.

2.2 Organic Agriculture

Organic Agriculture has its roots in traditional agricultural practices where farmers used to pass down knowledge of effective practices onto subsequent generations. This practice became visible on a wider scale in the 1960s, when farmers and consumers became concerned that the amount of chemicals used in crops and animal production could have negative consequences for human health and the environment (FAO, 1998).

Organic Agriculture has generated increased global interest. It produces significant social, economic and environmental benefits. It is also ecosystem-friendly due to its emphasis on minimum tillage and reduced use of pesticide, herbicides and synthetic fertilizers. Organic agriculture helps in fighting desertification as well as preservation of biodiversity hence contributing to food security (FAO (2002).Chemical effects on health have resulted to intense population decrease due to deaths out of hunger and health complications (Berkes et al.,

1999). Researchers concerned with sustainable development have focused on different categories of indigenous farming practices such as crop and land rotation, water conservation methods, preparation of compost manure and recycling of natural resources (Grenier, 1998).

Conventional farming practices promises farmers rapid crop production, increased food production and eased labour, however, Indigenous knowledge has many positive aspects, and incorporating them in farming practices can contribute to local empowerment since serve as an alternative natural resource management strategy. Yet it is the least applied farming practice today especially among the rich farmers (Berkes et al., 1999).

There are common aspects about indigenous knowledge; it is knowledge generated within specific communities and culture. It provides the basis for decision making and survival strategies. It is concerned with critical issues of human and animal life. It entails natural resource management. It is dynamic, based on innovation, adaptation, and experimentation and that its information is disseminated orally within the rural setting (Briggs, 2000). These principles have provoked the researcher to investigate whether Kenyan farmers are knowledgeable about the social, economic and environmental benefits of applying indigenous knowledge. It further sought to find out the reasons why some farmers ignore these organic farming practices.

Organic Agriculture is a system for crops, livestock and fish farming that emphasizes environmental protection and use of natural farming techniques. It is concerned not only with the end product but with the entire system used to produce and deliver the Agricultural product. It is a technique that advocates the exclusion of any usage of artificial products such as improved

crop varieties, pesticides, veterinary drugs, additives and fertilizers. Instead, farmers are advised to use natural farming methods in order to maximize the long-term health and productivity of the ecosystem (Agrawal, 1995).

This is the knowledge that is used by local people to make a living in a particular environment. Such knowledge evolves in a *specific locality* so that it is adapted to the requirements of local people and conditions. It is also creative and experimental; constantly incorporating outside influences and inside innovations to meet new local conditions (Warren, 1991). Organic farming involves the application of indigenous knowledge as a production system that sustains the health of soils, ecosystems and people. It relies on ecological process, biodiversity and cycles adapted to local conditions rather than the use of artificial inputs with adverse ecological effects (Nazarea, et al, 1998). Organic farms aims at consuming less energy than conventional farms. Study shows that organic farms consumes forty five to sixty four percent (45% -64%) of the non-renewable energy (fossil fuels) consumed by conventional farms (Scurrah et al 1999).

The main principles for organic farming as laid down by the International Federation of organic Agriculture Movements (IFOAM) are; to promote food of high nutritional quality in sufficient quantity. To encourage and enhance biological cycles within the farming system, involving micro-organisms, soil flora and fauna. It helps in minimizing all forms of pollution that may result from agricultural practices (Richards, 1979).

The above principle intensifies the demand for in-depth research on how indigenous knowledge can help in ensuring food sustainability in Kenya. Use of chemical farming has not solved the

pest problem in the past five years instead what has been witnessed is a double increment of pest damage of crops, animals and human health. Increased use of artificial pesticides has also damaged the quality of soil. Apart from these dangers, spraying requires high resources, which many of the poor countries mostly affected by locusts cannot afford. Storage of chemicals and the re-use of chemical containers also threaten human health. Chemical use is therefore a costly option. The costs associated with chemical use are extensive and life costing. Pesticides are designed to be toxic to living organisms. Since chemicals are intentionally dispersed in the environment by untrained individuals, they usually leave residues that are consumed hence impacting adversely on non-target organisms that may serve important ecological functions, such as natural enemies of pests, pollinators, earth worms and birds. These challenges can hinder sustainable food production. They can probably be solved through the application of indigenous knowledge and putting into place proper communication mechanisms that support its use.

2.3 Indigenous knowledge and Soil moisture conservation.

Crop mulching has evolved from the experience of farmers and has been in practice ever since times in memorial. Mulching conserves the soil moisture and simultaneously keeps the soil cool. This provides the soil with favourable conditions in initial stages of crop germination and seedling (Ajibade, 1999). With the increased soil moisture farmers are able to plant with certainty that their crops will grow to maturity and that there will be bumper harvests.

2.4 Theoretical framework

Kelinger et al (1964) defines a “theory” as a set of interrelated concepts, definitions, and propositions that present a systematic view of phenomenon by specifying relations among

variables with the purpose of explaining and predicting concepts. It is therefore important to seek theories that explain the phenomenon of indigenous knowledge in ensuring food security. This study adopted social capital and social exchange theories.

2.4.1 Observational learning theory

Observational learning theory (also known as vicarious learning, social learning or modelling) is learning that occurs as a function of observing, retaining and replicating behavior executed by others. The individual notices something in the environment, remembers what he noticed, produces an action that is a copy of what was noticed, and the environment delivers a consequence that changes the probability the behavior will be emitted again (reinforcement and punishment). This is a theory that emphasizes a form of learning whereby individuals acquire both information and new forms of behavior through observing others (Bandura, 1977). It is most associated with the works of psychologist Albert Bandura. It involves the process of learning to copy or model the action of another through observing another doing it. Rather learning can occur through the simple process of observing somebody else's activities.

This type of learning plays a vital role in a very wide range of human activities. It is assumed here that any time farmers observe other farmers, they can learn from each other. Lessons learned could be positive or negative. A financially challenged farmer can learn from a charcoal selling business man that tree cutting to burn charcoals is good only to realize when too late the damage it has in his farm. Another financially challenged farmer can learn from his neighbour about soil moisture conservation by observing from him how to prepare mulching and application of organic manure as long as his neighbour proves successful in the same.

Direct observation does not have to be intentional or even involve another person. Most learning during childhood and apprenticeships is as a result of imitation. When it comes to farming a farmer may see a neighbour's bumper crop harvest and conclude that the variety or technique used is good hence end up applying it in his farm.

2.4.2 Social exchange theory

Social exchange theory grew out of intersection of economics, psychology and sociology. This theory can be useful in explaining how interpersonal interactions are influential in individual's behaviours (Molm, 1991). According to Homans (1958), social exchange is likened to transactions in the economic market place. Not only is the market permeated by exchange, but also by the economic realm of social relation, situated between individuals, groups and organizations (Blau, 1964). Most social exchange models share the following basic assumptions: that individuals attempt to maximize their rewards and minimize their costs; that social behavior is a series of exchanges of give and take; and lastly that when individuals receives rewards from others, they feel obligated to reciprocate.

Although the above three assumptions refers to general interpersonal transactions, they can also be applied to specific types of transactions such as application of indigenous knowledge passed down from one generation to the other for the benefit of all within one's generation as well as the future generation. Reward in this case is the bumper harvest that is experienced after proper application of the learnt insights. Embracing good farming practices learnt from the neighbour's farms and experiencing good harvest will mean the learning exercise be repeated all over again.

2.5 Conceptual Framework

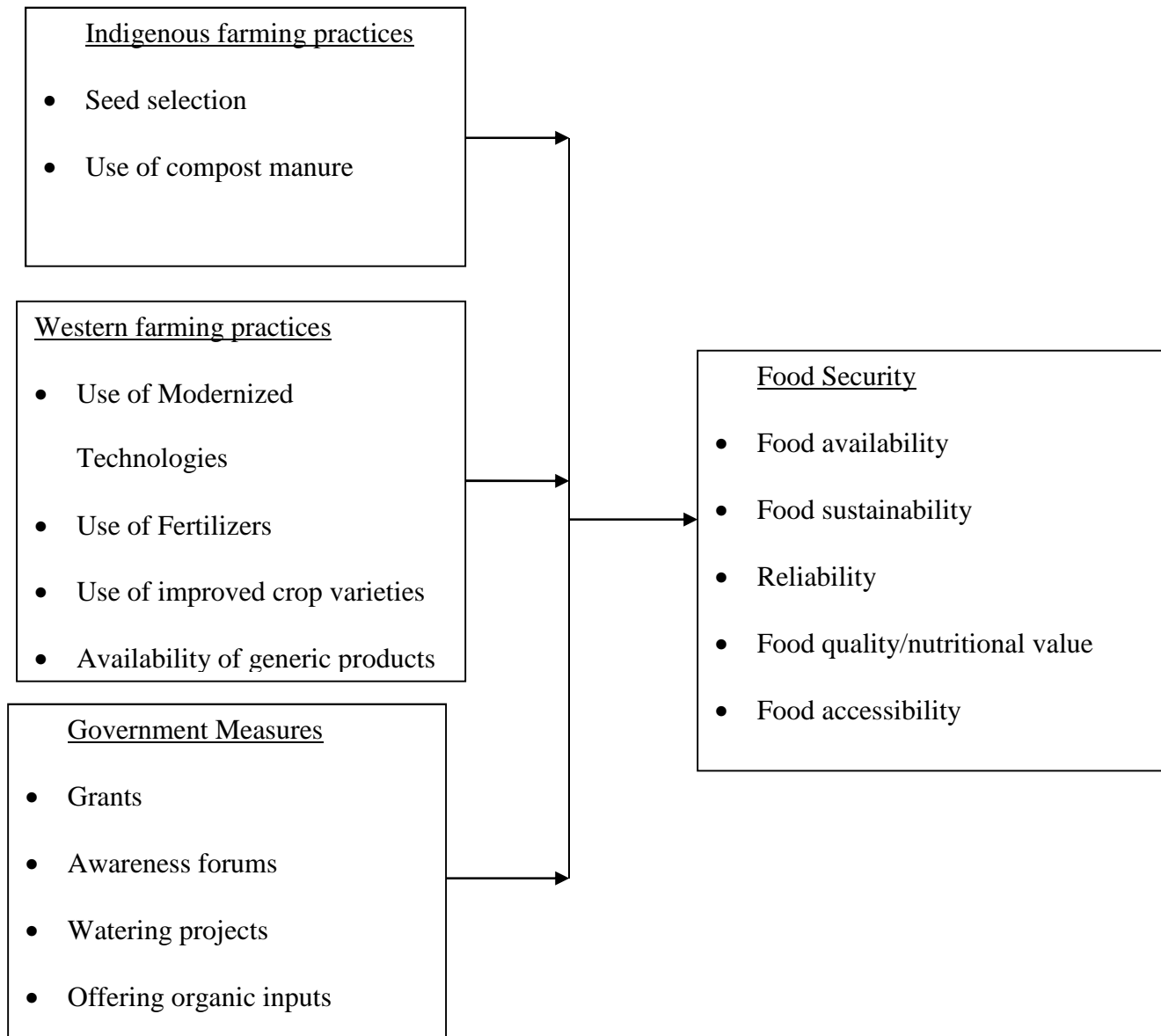
Conceptual Framework

In this study, the dependent variable is the food security while the independent variables are, indigenous knowledge on farming practices, western knowledge on farming practices and government measures on farming practices as presented in figure 2.1.

Figure 2.1: Conceptual Framework

Independent variables

dependent variable



The research conceptualizes that food security in Kikuyu Sub-County is influenced by the farmers' knowledge on indigenous and western farming practices together with the measures that have been put in place by the government on increasing farm production. The indicators of indigenous farming practices used in this study are, seed selection, use of compost manure, crop rotation and grain drying, for western farming practices, the researcher measured the use of modernized technologies, the use of fertilizers, and the use of improved crop varieties and availability of generic products. The government measures on ensuring utilization of indigenous farming practices were measured in terms of financial grants, awareness forums, watering projects, offering organic inputs while food security was measured in terms of food availability, food sustainability, reliability, food quality/nutritional value and food accessibility.

2.6 Operationalization of variables

Figure 2.2 Operationalization of variables

Independent Variables	Dependent Variables	Indicators
<p>Conventional farming practices. This include extensive use of artificial fertilizers, herbicides, pesticides and drugs, use of food preservatives and additives, use of modern storage facilities like fridge and heavy production machines.</p>	<p>High crop production</p>	<ul style="list-style-type: none"> – Air and water pollution – Feeding on improved crop varieties – Increased cases of Health complication – Reduced life expectancy – Reduced population – Unsustainable food security
<p>Indigenous farming practices. This include; use of natural resources, organic farming, use of traditional storage facilities, use of indigenous food preservative and intensive human labor.</p>	<p>-High crop yields</p>	<ul style="list-style-type: none"> – Improved soil nutrient levels – Increased job opportunities – Improved life expectancy – Improved human and animal health – Sustainable food security

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research methodology under the following topics; research design, target populations, sample size, sampling procedures and methods of data analysis.

3.2 Research design

A research design is a plan or blue print on how to conduct a research Strydom et al, (2005). Kombo and Tromp (2006), defines a research design as a blueprint that helps in conducting research with maximum control of factors that interferes with validity of findings. Kerlinger (1964), states that research design is a plan, structure and strategy of investigation conceived so as to obtain answers to research questions as well as control of variance. Research design therefore guides the researcher when collecting or gathering, analyzing and interpreting observed facts of his /her research findings. Descriptive survey research design was used in this study because it enables the researcher to obtain information that describes existing phenomena by asking individuals about their perceptions, attitudes, behavior and values.

3.3 Site Descriptions

This study was carried out in Kikuyu Sub-County in Central Kenya. The Sub-County is in agro-ecological zone with an altitude ranging from 1,400 m to 1,800 m above sea level. It experiences bimodal rainfall between March and May and in October and November with annual rainfall above 1,500 mm to 500 mm. It is situated between latitude 0° and 1° south of the equator and longitudes 36° and 36° east of the Greenwich meridian (DDO, 2009).

This study aimed to understand the effects of indigenous and western farm practices on sustainable food production within the selected wards in Kikuyu Sub-County namely Sigona, Karai and Kikuyu. These wards were selected especially because they are strategically positioned within the outskirts of Nairobi town as well as the fact that these wards practice both subsistence and cash crop farming where crop varieties such as maize, beans, bananas, and horticultural crops are grown. These wards are also selected for their uniqueness in that they comprises of all classes of farmers ranging from low, middle and high income classes. The researcher is also motivated by the fact that majority of the highly educated farmers within Kikuyu sub-County uses the scientific farming practices.

3.4 Unit of Analysis and observation

3.4.1 Unit of Analysis

This research was analyzing how effective it can be the application of indigenous practices towards the elimination of food insecurity among farmers in Kikuyu sub-County. Sigona, Karai and Kikuyu wards being selected as the study sample locations. The distribution of respondent's according to their background information and indigenous/western farming practices were also analyzed.

3.4.2 Unit of Observation

Data sources were from the selected farmers who provided qualitative information on farming practices.

3.5 Target Population

According to Singleton et al (1993) a target population refers to all members of a real or hypothetical set of people, events, or objects to which a researcher wishes to generalize the research results. The study target population comprised of farmers within Kikuyu Sub-County.

3.6 Sample Size and Sampling Procedure

3.6.1 Sample Size

Sampling is seeking of knowledge or information about a population by observing part of this population (sample) in order to extend the findings to the entire population (Mugenda & Mugenda, 2003). In this study a sample of 90 respondents was selected. This comprises 30 participants from each ward. Sampling made the research work easier and more economical since only a limited area was studied with limited respondents. Less time was spent without jeopardizing the end results. Sampled crop variety includes cereals (maize, wheat and sorghum species), vegetables (Sukuma wiki, cabbages and spinach) and legumes (beans, peas black beans).

3.6.2 Sampling Procedure

3.6.2.1 Non-Probability Sampling

In this study purposive sampling procedure was employed. This involved selection three wards namely Sigona, Karai and Kikuyu. The formation of these clusters was arrived at after analyzing with the help of area Agricultural officers each ward's agricultural production levels whereby Sigona ward ranked the strongest followed by Kikuyu and Karai.

3.6.2.2 Probability Sampling

Random sampling method was used in two steps; firstly the researcher identified the number of villages per ward and randomly 30% of the villages were picked for the purpose of the study.

Sigona ward comprises of eleven villages; Nguriu-nditu, Iika-ithano, Gacuthi, Gikira, Kanyanjara, Nduma, Kerwa, Thamanda, Kagira, Nderi and Kiria-niti. Kikuyu ward comprises of nine villages; Kidfarmacco, Mission area, Ondiri, Rumwe, Magoko, Magana, Baraniki, Dagoretti Market and Riu-Nderi.

Karai ward comprises of six villages; Njumbi, Karai, Karii, Gikambura, Rutaria and Mai-ai-ihii.

For this study, the researcher randomly selected two villages in Karai ward (30%) - (Karai and Njumbi) three villages in Kikuyu ward (30%) -(Ondiri, Baraniki and Dagoretti Market) and three villages in Sigona ward(30%)- (Kerwa, Nguriu-nditu and Ika-ithano).

The second step was to carry out a head count of all farmers within the selected villages, whereby Sigona ward had 262, Kikuyu 211 and Karai 327 farmers. Their names were coded into sequential numbers to ease the selection process. Randomly 30 papers representing 30 respondents from each ward were picked. To make this exercise faster and accurate the researcher had appointed three research assistants to help in censuring farmers.

3.7 Data Collection Methods

The study captured both quantitative and qualitative research methods, to be able to make generalizations about the phenomenon under study.

3.7.1 Collection of Quantitative Data

On the quantitative research method, a survey was used. A survey refers to a method of collecting information by asking a set of pre-formulated questions in a predetermined sequence of structured or unstructured questionnaire. In this study respondents filled in the questionnaire attached as appendix 1 which has both structure and unstructured questions.

3.7.2 Collection of Qualitative Data

On the qualitative research method, a field study was conducted whereby through purposive selection method, key informants were selected namely the three areas chiefs, three agricultural extension officers, two community development officers, the Sub-County agricultural officer, and a religious leaders. The researcher was guided by an interview guide attached as Appendix 2.

3.8 Ethical Consideration

3.8.1 Consent

Consent should be sought voluntary without pressure of any kind (McCarthy 1958).

To ensure that participants agree to give information freely, two meetings were conducted per ward for introduction and familiarization of both the researcher and the assistants. Heightened awareness and negotiations sessions were conducted to build up rapport. This helped the respondents to freely cooperate in the study.

3.8.2 Sensitive Information

Since questions on income, age, and marital status are treated as intrusive a lot of care was taken when collecting this data by telling respondent early in advance the type of information they are

going to be asked and giving them sufficient time to decide if they want to participate without any inducement.

3.8.3 Confidentiality

In this research, the identity of the persons from whom information was gathered was highly protected hence not left lying around in notebooks or un-protected files.

3.8.4 Avoiding Bias

To avoid this error proper recording of findings was done on a note book per every field- work visit both by the researcher and all the assistants.

3.8.5 Benefits, Costs and Reciprocity

The researcher made it clear to all the respondents that this project work is completely done for academic purposes and not commercial hence no payment of any kind or compensation will be done upon participation. She therefore requested respondents to offer information voluntarily.

3.9 Data Analysis

Data analysis refer to a variety of activities and processes that a researcher administers to make certain decisions regarding the data collected from the field, in order to get meaning and be able to explain various features from raw materials (Mbwesa, 2009). The data were edited first to identify the errors made by the respondents. Data collected were analyzed both qualitative and quantitative. Quantitative data were analyzed by use of descriptive statistic technique and presented in frequency distribution tables, pie charts, bar graphs and percentages. Qualitative

data were analyzed and interpreted by organizing data into emerging sub- themes derived from the objectives of this study.

Objective one had the following sub-themes; farmers' understanding of indigenous farming practices and indigenous methods known to farmers, respondents responses on different traditional farm practices, response on whether farmers' practically do apply indigenous farming practices, reasons for applying or not applying indigenous farm practices, respondents production rates after using indigenous farm practices and challenges for exclusive use of indigenous farm practices. Lastly, a cross tabulation is done on the distribution of respondents according to gender and education and indigenous farm practices.

Objective two had the following sub-themes; respondents' understanding of conventional farming, respondents response on whether they apply conventional farming practices or not, reasons for applying or not applying conventional farm practices, duration taken when applying conventional farm practices, impact of conventional farm practices on farm production, impact of conventional farm practices on indigenous knowledge, comparing indigenous farming practice with conventional farming practice. Lastly a cross tabulation is carried on the distribution of respondents according to gender and education and conventional farm practices (use of modernized technologies, use of fertilizers, use of improved crop varieties and availability of generic products). Objective three was analyzed basically by requesting respondents to list down various measures that the government has put into place to ensure effective utilization of indigenous farming practices.

CHAPTER FOUR: DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter deals with data presentation and analysis of the findings based on the research objectives (determining the influence to which indigenous knowledge has influenced farming practices, establishing the influence to which western knowledge has influenced farming practices on food security and the available measures put in place by the government to ensure continuity in utilization of indigenous knowledge).

4.2 Questionnaires Return Rate

The sample population for the study was 90 farmers and eight key informants. Thus, a total of 90 questionnaires were issued to the respondents and 10 interview guides to interview the key informants. Eight key informants were interviewed with two key informants being unavailable because during the research information collection some agricultural extension officers had travelled for the Nyeri Agricultural show, while 86 questionnaires were returned from the farmers. Therefore the study realized an instrument return rate of 94%, which was deemed satisfactory for the purpose of the study.

4.3 Demographic Information of Respondents

This study first sought to find out the age, gender, marital status, presence of children, education qualification and employment status. This information was to establish an insight on the study respondents' characteristics and also find out whether farmers characteristics has any impact on the levels of household food security. The respondents' age brackets were presented in Table 4.1.

Table 4.1: Respondents' age distribution

Age in years	Frequency	Percent
Below 30	5	5.8
31 - 40	16	18.6
41 - 50	9	10.5
51 – 60	33	38.4
Over 60	23	26.7
Total	86	100.0

From the study findings, majority of the respondents (75.6%) were over forty one years old, while only 5.8 percent of the respondents were below thirty years old. These findings imply that most of the young generation do not engage in farming activities, therefore these is an indication that indigenous knowledge which is passed on between generations orally may not be effectively passed on in the absence of young people.

The researcher sought to establish respondents' gender and presented the findings as shown in Table 4.2.

Table 4.2: Respondents' gender

Gender	Frequency	Percent
Male	47	54.7
Female	39	45.3
Total	86	100.0

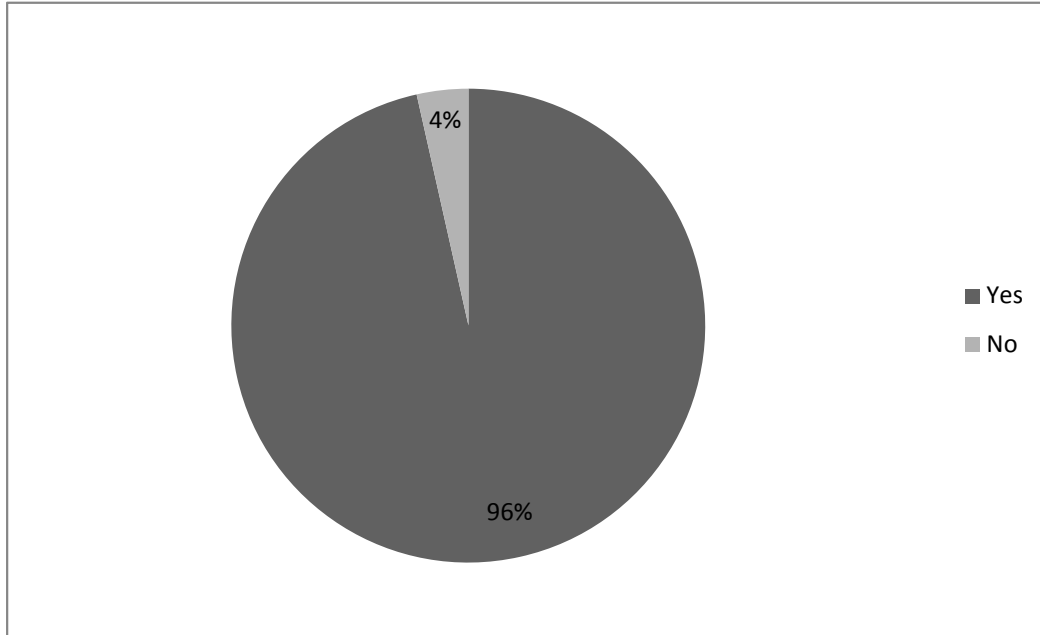
From the study findings male population among farmers is higher than that of female farmers. This was an indication that majority of the men in the study area are responsible of their families' farms. The researcher sought to find out the respondents' marital status and presented the findings in Table 4.3.

Table 4.3: Respondents' marital status

Marital status	Frequency	Percent
Single	7	8.1
Married	63	73.3
Divorced	1	1.2
Widowed	15	17.4
Total	86	100.0

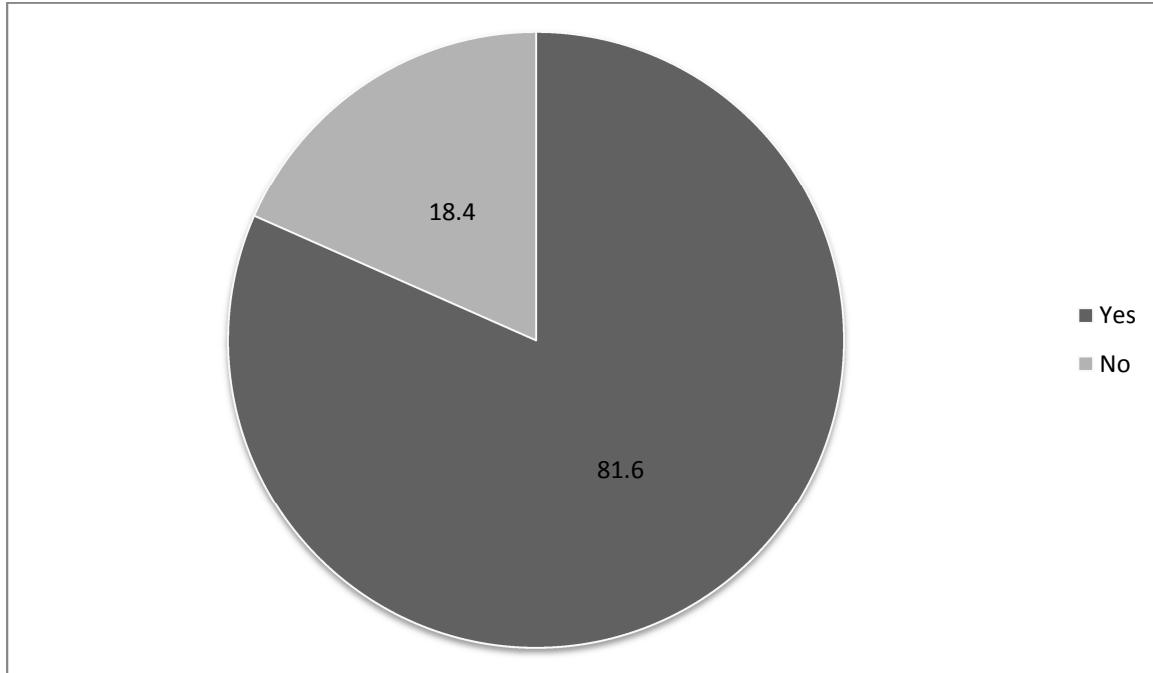
Study findings in Table 4.3 shows that majority of the respondents were married. These findings implied that the majority of the respondents' responses reflect the situation in the households rather than individual's situation. Thus their responses represented the whole families' levels of food security. Then the respondents' responses on whether they had children were presented in Figure 4.1.

Figure 4.1: Respondents' response on whether they have children



From fig 4.1 the study findings shows that overwhelming majority (97%) of the households had children. These findings imply that presence of children or minors in a household easily reflect the level of food security since minors do not produce food but utilize the availed food. Therefore the researcher sought to find out whether the farmers live with children. The findings were presented in Figure 4.2.

Figure 4.2: Respondents' responses on whether they live with their children



The research findings show that majority of the respondents households live with their children (81.6%). These findings were an indication that all the test scores for the Household Food Insecurity Access Scale (HFIAS) were effectively quantified in the study, since households with children can easily depict levels of household food security/insecurity (availability, accessibility and utilization). This is due to an increase in the number of persons who utilize the available food, hence in the presence of children in a household there is an increase of food partakers to the ratio of providers. To establish the academic qualification of the respondents the researcher requested to indicate their highest level of education. Their responses were presented in Table 4.4 below.

Table 4.4: Respondents highest level of education

Level of education	Frequency	Percent
Not been in school at all	6	7.0
Never completed primary education	4	4.7
Completed primary education	34	39.5
Never completed secondary education	5	5.8
Completed secondary education	24	27.9
Have attained a certificate	7	8.1
Have attained a diploma	4	4.7
Have a degree	2	2.3
Total	86	100.0

From the study findings more than half of the respondents had attained primary education or less as their highest education levels. These findings are an indication of the prevailing low levels of education in the study area. These findings were confirmed by the Sub-County agriculture who on an interview stated that low level of education has been a big challenge facing some marginalized parts of the district though the county is national regarded to as one among the developed counties due to its geographical location from the capital city. However there is a connection between household literacy levels and food production and preservation, since literacy not only comes with effective application of farming practices but also in other avenues of financial family support. Thus the researcher sought to find out the respondents' employment

status to establish whether they engage in any other source of finances the findings were as shown in Table 4.5 below.

Table 4.5 Respondents' employment status

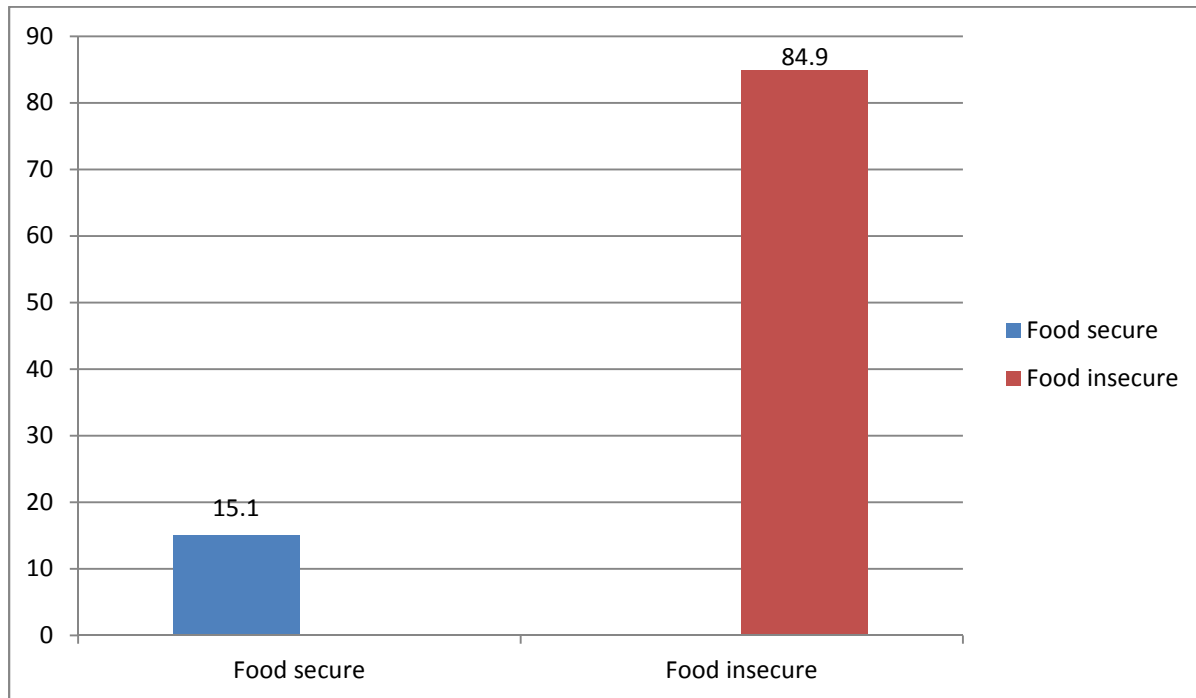
Employment status	Frequency	Percent
Employed	5	5.8
Unemployed	32	37.2
self-employed	49	57.0
Total	86	100.0

Study findings in Table 4.5 shows that majority of the respondents indicated that they are self-employed while only a minority 5.8 percent indicating that they were employed. This was a clear indication that other than farming majority of the area residents venture into informal self-employment thus being in a position to uplift their households' levels of food security.

4.4 Farmers knowledge on indigenous farming practices

To investigate whether the respondents were aware of the situation of food security in their county the researcher requested them to indicate their perception on food security in Kikuyu Sub- County. Their responses were tabulated in Figure 4.3

Figure 4.3: Respondents' perception on the level of food security in Kikuyu Sub- County



From the study findings, majority of the respondents (84.9%) indicated that Kikuyu Sub-County's level of food security to be insecure. Data from the three wards chief reveals that many households are faced by hunger especially in Kerwa ward during drought seasons. Therefore the researcher requested the respondents to substantiate their perception on the level of food security in the County. Their reasons were presented in Table 4.6.

Table 4.6: Respondents' indicators of low level of food security in Kikuyu Sub- County

Reasons	Frequency	Percent
Given relief foods	2	2.3
Small pieces of land	45	52.3
Unreliable weather	32	37.2
Residents are financially capable	7	8.2
Total	86	100.0

From the study findings majority of the respondents (52.3%) indicated that they felt that Kiambu County was food insecure due to the small pieces of land for farming in the County, while 37.2 percent indicated that the County is faced with unreliable weather conditions hindering effective food production and a minority 2.3 percent indicated that residents in the extreme dryer parts in county are given relief food during drought seasons. On the other hand the minority who indicated that the County is food secure stated that the residents were financially capable to raise their household food budget. The findings were also confirmed by the church leader who indicated food production in the Sub-county has being on the decline and many residents feed their families from other economic activities other than farming. Thus, the substantial on the reason that majority of the residents opt for self-employment to meet their dietary needs. Further the church leader stated that they at times give food to hunger challenged families during long periods of drought.

Objective I: The researcher sought to find out the influence of indigenous farming practices on food security by investigating the respondents' responses on the sub- themes here below;

Table 4.7: Respondents' understanding of indigenous farming practices

Farmers' understanding	Frequency	Percent
Growing foods that has no side effects	7	8.1
Use of organic farming	15	17.4
Farming without chemicals	48	55.9
Natural farming	16	18.6
Total	86	100.0

From the study findings majority of the respondents (55.9%) indicated that they understand indigenous farming practices as farming without chemicals, though majority of their other responses were in the same context on farming the natural way. The researcher then asked the respondents to state the methods of indigenous practices they know and tabulated the findings in Table 4.8.

Table 4.8: Methods of indigenous farming practices known to the farmers

Indigenous farming practice	Frequency	Percent
Seed selection	8	9.3
Use of compost manure	59	68.7
Crop rotation	7	8.1
Grain drying	12	13.9
	86	100.0

Table 4.8 shows that use of compost manure was the highest known indigenous farming practice, followed grain drying, seeds selection and crop rotation respectively. These findings concur with the extension agricultural officers in the wards who stated that many formers in the area rear cattle so as to make manure that is applied in their farms. This realization was an indication that farmers in the areas were aware of the various indigenous farming practices that they can apply in their farms. Then the researcher did a cross-tabulation of the distribution of respondents according to gender and indigenous farming practices as presented in table 4.9 below;

Table 4.9: Distribution of Respondents according to gender and indigenous farming practices

Practices	Male				Female			
	Yes	No	Total		Yes	No	Total	
			%	N			%	N
Seed Selection	100.0	-	100.0	47	53.8	46.1	100.0	39
Use of compost manure	100.0	-	100.0	47	82.1	17.9	100.0	39
Crop Rotation	100.0	-	100.0	47	36.0	64.0	100.0	39
Grain Drying	100.0	-	100.0	47	64.0	36.0	100.0	39

On the use of indigenous farming practices, all male farmers indicated that they use all the tested methods, i.e. seed selection, compost manure, crop rotation and grain drying. Among the female farmers, 82.1% have knowledge on the use of compost manure, 64% dry the grains, 53.8% use seed selection while 36% use crop rotation. This implies that men are the ones who mostly deals with issues of ensuring that the family is food secure and since farming is their main economic activity they invest more on the indigenous methods of farming to maximize on food production from their farms. Then the researcher did a cross tabulation of the distribution of respondents according to education and indigenous farming practices and this was presented in table 4.10 below.

Table 4.10: Distribution of Respondents According to Education and Indigenous Farming**Practices**

Practices	Primary and below		Secondary and below		Tertiary and above		Total	
	Yes	No	Yes	No	Yes	No	%	N
Seed selection	51.2	-	27.9	5.8	-	15.1	100.0	86
Use of Compost Manure	51.2	-	33.7	-	7.0	8.1	100.0	86
Crop Rotation	51.2	-	19.8	13.9	-	15.1	100.0	86
Grain Drying	51.2	-	32.6	1.2	-	15.1	100.0	86

From the table, the results show that most of the farmers who have primary education use of the methods that were tested in the study at 51.2%. Those with secondary school education mostly use compost manure at 33.7%, grain drying at 32.6%, seed selection at 27.9% and crop rotation at 19.8%. Those who have higher level of education with diplomas and certificates in various fields use the compost manure at 7.0% without using the rest of the methods. This is an indication that most of the farmers who have attained higher education go for other alternatives other than indigenous practices for food production.

Thus the researcher requested the respondents to indicate their perception on farm production after applying compost manure as an indigenous farming practice. Their ratings were presented in Table 4.11.

Table 4.11: Respondents' rating on farm production after application of compost manure as an indigenous farming practice

Rate	Frequency	Percent
Low	4	4.7
Very low	6	7.0
Average	29	33.7
High	37	43.0
Very high	10	11.6
Total	86	100.0

From the study findings majority of the respondents (54.6%) indicated that farm production after application of manure as an indigenous farming practices would be on the higher side. These findings imply that majority of the farmers were aware of the notion that application of this indigenous practice can improve household levels of food security.

4.5 Traditional farming practices and food security

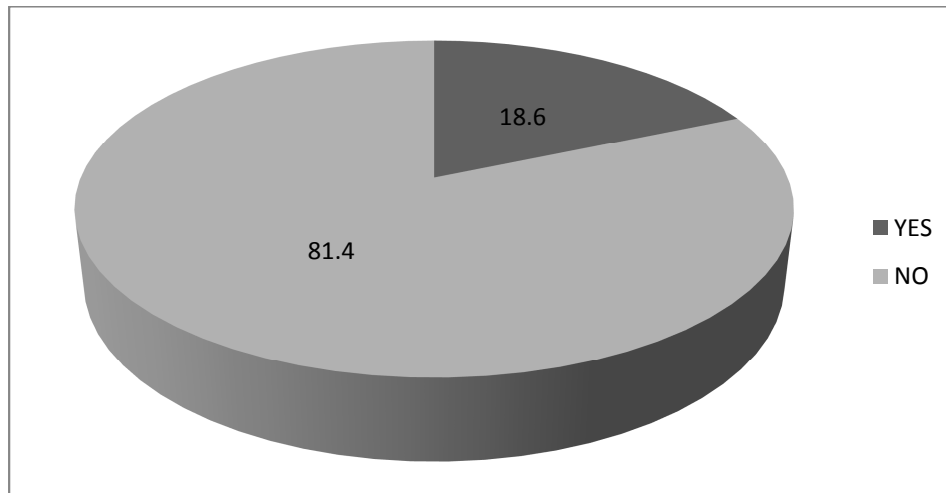
To establish the how traditional practices can ensure food security, the researcher asked the respondents to indicate possible ways to enhance the practices. Their responses were presented in Table 4.12

Table 4.12: Respondents' responses on traditional practices used to ensure food security

Traditional practice	Frequency	Percent
Apply manure	41	47.7
Land rotation	25	29.1
Crop rotation	9	10.5
Use drought resistant crops	11	12.7
	86	100.0

Study findings in Table 4.12 shows that all the respondents indicated that application of manure would ensure food security, seconded by land rotation and use of drought resistant crop respectively. Crop rotation scores lowest among other practices. This is an implication that composite manure application in the most appropriate indigenous farming practice known to the study area's farmers. The researcher sought to find out whether respondents apply indigenous knowledge in their farms and presented the findings as shown in Figure 4.4

Figure 4.4: Respondents' responses on whether they apply indigenous knowledge in their farms



Study findings in Figure 4.4 shows that majority of the respondents indicated that they do not apply indigenous farming practices in their farms. This was an indication that despite some of the

farmers being knowledgeable on the indigenous farming practices they do not apply them in their farms. Thus the findings are an implication that farmers could be applying alternative practices other than indigenous knowledge practices. The researcher then asked the respondents to indicate why they apply indigenous knowledge practices. Their responses were presented in Table 4.13.

Table 4.13: Respondents' reasons for applying or not applying indigenous practices

Reasons	Frequency	Percent
Long duration for food maturity	36	41.9
Involved hard labour	12	13.9
Lack of assured pest control	11	12.8
Planting quality seeds	10	11.6
Soil improvement	9	10.5
Cheaper	8	9.3
	86	100.0

From the study findings, long duration taken before maturity of indigenous foods is harvested was the main reason why farmers in the study area do not apply indigenous knowledge on their food production. Nearly 14 percent of the respondents indicated that indigenous farming practices require very hard labour while 12.8 percent indicated that indigenous farming practices do not assure effective pest control. On the other hand those that apply indigenous knowledge felt that application of indigenous farming practices entails planting quality seeds, and soil improvement. The researcher requested the respondents to rate the levels of their food harvest and presented their responses as shown in Table 4.14

Table 4.14: Farmers' rating of their levels of food harvest

Rate	Frequency	Percent
Very plenty	19	22.1
Plenty	51	59.3
Not plenty	9	10.5
Not very plenty	7	8.1
Total	86	100.0

From the study findings majority of the respondents indicated that application of indigenous farming practices produce plenty food harvests. This was an implication that adoption of indigenous farming practices could yield plenty harvests. The researcher asked the respondents to state indigenous knowledge practices they can apply to boost the levels of food harvest. The responses were presented in Table 4.15

Table 4.15: Farmers' response on indigenous knowledge practices to boost food harvest

Ways	Frequency	Percent
Manure application	36	41.9
Land rotation (idle land)	23	26.7
High quality seeds	15	17.4
Double fallowing	12	14.0
Total	86	100.0

Study findings in Table 4.15 shows that most respondents indicated that manure application is the most appropriate indigenous farming practice to boost food harvest. This was an indication that application of indigenous knowledge practices would boost food harvest that translates to

high levels of food security. To establish whether exclusive application of indigenous knowledge harms households the researcher requested the respondents to indicate possible challenges they can face and presented the findings in Table 4.16.

Table 4.16: Challenges faced by households due to exclusive application of indigenous knowledge

Challenges	Frequency	Percent
No challenges	16	18.6
Long duration to mature	41	47.6
Unavailability of seeds	25	29.1
Hard labour	4	4.7
Total	86	100.0

The study findings revealed that long duration between planting and harvesting is the cause of farmers opting out on application of indigenous knowledge practices while, also unavailability of indigenous seeds and required hard labour hinder preferences on this farming practices. Whilst the minority who apply these practices indicated that they face no challenges. These findings imply that challenges experienced in application of indigenous knowledge practices are associated in the nature of application of the practices.

OBJECTIVE II: The researcher sought to find out the influence of Conventional/western practices on food security.

Data was collected following the sub-themes here below;

4.6 Farmers Understanding of the Difference Between Indigenous and Conventional Farming Practices.

To establish whether farmers are aware of the difference between the indigenous and conventional farming practices, the researcher asked the respondents to indicate their understanding of conventional or western farming. Their responses were presented in Table 4.17.

Table 4.17: Respondents' understanding of conventional/western farming practices

Understanding	Frequency	Percent
Use of modernized technologies	26	30.3
Use of fertilizers	39	45.3
Planting improved crop varieties	8	9.3
Availability of generic products	13	15.1
Total	86	100.0

From the study findings most of the respondents (45.3%) indicated that they understand conventional or western knowledge farming practices as farming using fertilizers to their crops to boost growth. This was seconded by use of modernized technologies, existence of generic products and planting improved crop varieties respectively. This was a clear indication that

farmers were knowledgeable on the various definitions presumed by convectional farming practices. Then the respondent did a cross tabulation of distribution of respondents according to gender and western farming practices. This was presented in table 4.18 below;

Table 4.18: Distribution of respondents according to gender and western farming practices

Practices	Male				Female			
	Yes	No	Total		Yes	No	Total	
			%	N			%	N
Use of Modernized Technologies	55.3	44.7	100.0	47	-	100.0	100.0	39
Use of Fertilizers	83.0	17.0	100.0	47	-	100.0	100.0	39
Use of improved crop varieties	19.1	80.9	100.0	47	-	100.0	100.0	39
Availability of generic products	27.7	72.3	100.0	47	-	100.0	100.0	39

The knowledge of the farmers on the western farming practices was highest among men where 83.0% indicated that they have knowledge on the use of fertilizers, 55.3% had knowledge on the use of modernized technologies, and 19.1% had knowledge on the availability of generic products while 27.7% have knowledge on the use of improved varieties. The female farmers indicated that they do not have knowledge on the use of any of the tested western farming practices. The results imply that the male farmers invest more on their farming skills than women and combine local farming practices with western knowledge to enhance food production. Then

the researcher did a cross tabulation of the distribution of respondents according to education and western farming practices. This was presented in table 4.19 below;

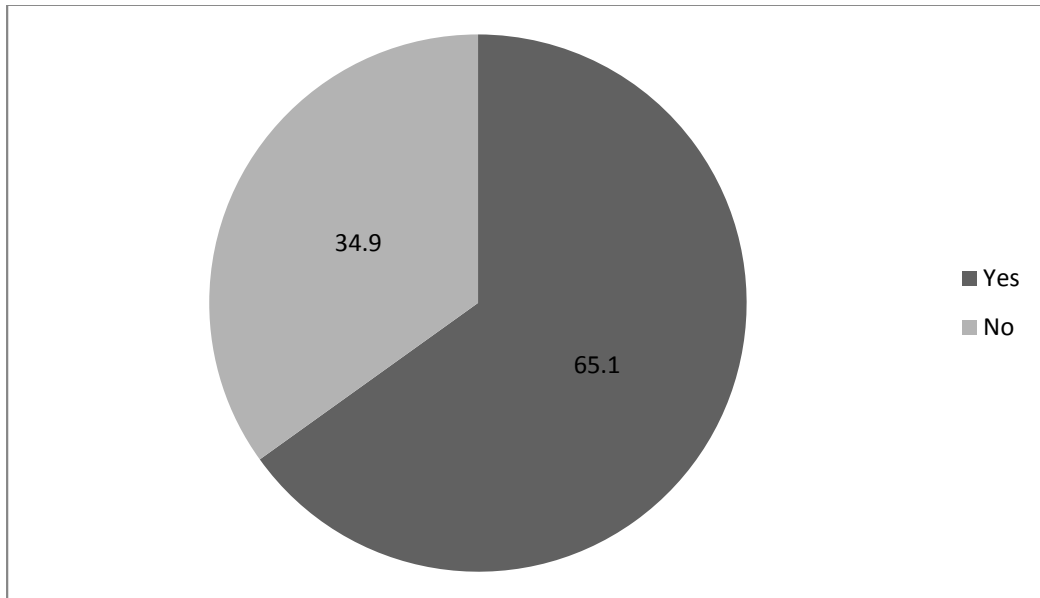
Table 4.19: Distribution of respondents according to education and western farming practices

Practices	Primary and below		Secondary and below		Tertiary and above		Total	
	Yes	No	Yes	No	Yes	No	%	N
Use of Modernized Technologies	30.2	20.9	-	33.7	-	15.1	100.0	86
Use of Fertilizers	45.3	5.8	-	33.7	-	15.1	100.0	86
Use of improved crop varieties	10.4	40.7	-	33.7	-	15.1	100.0	86
Availability of generic products	15.1	36.0	-	33.7	-	15.1	100.0	86

Most of the farmers have attained primary level of education or below and mainly use fertilizers at 45.3% and modernized technologies at 30.2%. The use of improved varieties among the farmers with the primary education or less is also the poorest at 10.4% and availability of generic products at 15.10%. The other group of farmers with secondary, tertiary and graduate level of education indicated that they do not use either of the given methods of western farming practices. This is an indication that farmers who are active in farming have very low level of education which influences negatively their crop production as confirmed by the three area chiefs.

Then the researcher asked the respondents whether they apply conventional or western farming practices in their farms and presented the results in Figure 4.5

Figure 4.5: Respondents response on whether they apply conventional/western farming practices



The study findings in Fig 4.5 show that majority of the respondents indicated that they apply conventional farming practices on their farms. This was an indication that more farmers apply conventional knowledge practices than those that use indigenous knowledge. The researcher sought to find out the farmers reasons for applying conventional/western farming practices and presented the findings in Table 4.20.

Table 4.20: Farmers reasons for applying or nor applying conventional/ western farming practices

Reasons	Frequency	Percent
Western practices lead to soil and environmental pollution	2	2.3
Do not apply because they are expensive	12	14.0
Do not apply due to lack of application know how (use of chemicals)	3	3.5
Apply because it eases work	64	74.4
Apply because of fast growing seeds for economic purposes	5	5.8
	86	100.0

From the study findings 64 farmers indicate that they apply conventional farming practices because it eases farm work. These findings imply that application of conventional/Western knowledge farming practices is popular due to their general simplification of food production process. Further the findings were in line with an agricultural officer from a non-governmental organization in Kari who stated that farmers are aware of the dangers they are exposed to on the application of conventional knowledge practices, but since the study area is an industrial region they embrace these practices for profit making. To establish the academic qualification of the respondents the researcher requested to indicate their highest level of education. Their responses were presented in Table 4.21.

**Table 4.21: Respondents response on the duration they have practiced conventional/
Western farming**

Duration	Frequency	Percent
5 years	7	8.1
10 years	15	17.4
20 years	12	14.0
More than 20 years	45	52.3
None	7	8.2
Total	86	100.0

The study findings in Table 4.21 shows that majority of the respondents indicated that they have practiced conventional/western farming for more than twenty years. This was an indication that majority of the farmers have practiced conventional/ western farming practices for a very long time. Therefore the study findings imply that farmers could have forgotten application of indigenous knowledge. The researcher sought to find out of whether conventional/western farming practices has an impact on food security. The respondents' responses were presented in Table 4.21.

Table 4.22: Respondents' responses on the impact of conventional/western farming practices on food security

Response	Frequency	Percent
Fast growing food production	37	43.0
Environmental and soil degrading	31	36.0
Health implications	12	14.0
Poor harvest with time	3	3.5
Lack of resources	3	3.5
Total	86	100.0

From the study findings most of the respondents (43%) indicated that the application of conventional/western farming practices influence food security. Firstly with the use of fast maturity crops will translate that the levels of food security will be improved when crops planted take a shorter period to mature. Second the application of conventional farming practices improves the household levels of food security through the use easier pest control methods. Alternatively application of conventional/western farming practices can lower household levels of food security when the practices degrade the environment and soil quality thus lowering harvest with time. This implies that after extensive use of fertilizers and chemicals farm productivity deteriorates thus, lowering the levels of food security. The researcher requested the respondents to indicate the impact of western knowledge on application of indigenous knowledge and presented the findings in Table 4.23.

Table 4.23: Impact of western knowledge on application of indigenous knowledge

Impact	Frequency	Percent
Soil and environmental degradation	26	30.2
Extinction of indigenous crops	26	30.2
Easier pest control	13	15.1
Increase in diseases	6	7.1
Upcoming technology (green houses)	15	17.4
Total	86	100.0

The research findings revealed that conventional farming pest control methods are deemed to be a lot easier to apply than indigenous pest control measures. However, conventional/ western knowledge farming practices has negative impact on the environment and human health. This is an indication that applications of various conventional practices methods are despite their commercial benefits are a hazard to both the environment and the human body. The respondents were requested to indicate their perceptions on the statement that traditional farming methods are not affected by plant diseases. Their responses were presented in Table 4.24.

Table 4.24: Respondents' perception on traditional farming methods are not affected by plant diseases

Rate	Frequency	Percent
Agree	50	58.1
Somewhat agree	25	29.1
Disagree	11	12.8
Total	86	100.0

The study findings shows that more than half of the farmers indicated that they were in agreement with the statement that traditional farming practices are not affected by plant diseases. These findings imply that the study area residents were knowledgeable on the advantages of the application of indigenous farming methods. The respondents were requested to indicate their perceptions on the statement western farming techniques produce more yields that traditional methods. Their responses were presented in Table 4.25

Table 4.25: Respondents' perception on why western farming techniques produce more yields than traditional methods

Rate	Frequency	Percent
Agree	43	50.0
Somewhat agree	12	14.0
Disagree	12	14.0
Somewhat disagree	19	22.0
Total	86	100.0

Study findings in Table 4.25 shows that half of the respondents agreed that western farming techniques produce more yields than traditional methods. This was an indication that farmers were in agreement with the notion that modern food production supersedes traditional methods in terms of quantity. The respondents were requested to indicate their perceptions on the statement that western farming techniques are more advanced than traditional methods. Their responses were presented in Table 4.26

Table 4.26: Respondents' perception on Western farming techniques are advanced than traditional methods

Perception	Frequency	Percent
Agree	63	73.3
Somewhat agree	18	20.9
Disagree	1	1.2
Somewhat disagree	4	4.6
Total	86	100.0

The study findings show that there was an overwhelming agreement on notion western farming techniques are more advanced than traditional methods. This was an indication that majority of the farmers view application of indigenous knowledge as backwardness. The researcher requested the respondents to suggest on mitigation measures to deal with current corrosion of indigenous knowledge. The responses were presented in Table 4.27

Table 4.27: Respondents' response on mitigation measures to deal with current corrosion of indigenous knowledge

Measures	Frequency	Percent
Extension agricultural offices revised training	20	23.3
Reviving extinction indigenous crops	62	72.1
Planting trees in order to have rain	4	4.6
Total	86	100.0

From the study findings majority of the farmers (72.1%) indicated that individual farmers need to reintroduce indigenous crops so as to revive them from extinction, while 23.3 percent of the respondents indicated that county extension agricultural officers need to be trained on indigenous knowledge practices to revise on their roles in the ground. Whilst 4.7 percent of the respondents felt that if farmers plant more trees climatic conditions would improve. These findings imply that farmers felt that there was still room for change on their revolving issues on food security. Information from the county agricultural officer states that farmers the initial start point on the reviving of indigenous knowledge practices.

OBJECTIVE III: The researcher sought to find out the respondents’ awareness on Governmental measures established to ensure utilization of indigenous farming practices.

4.7 Government Measures

The researcher requested the respondents to suggest ways the government can empower farmers to ensure effective utilization of indigenous farming practices. Their responses were presented in Table 4.28 below;

Table 4.28: Ways the government can empower farmers to ensure effective utilization of indigenous farming practices

Responses	Frequency	Percent
Organizing forums to create awareness	20	23.3
Start-up watering projects	12	14.0
Financial aid on farm inputs	26	30.2
Availing organic products	28	32.5
Total	86	100.0

Table 4.28 reveals that the farmers proposed that if the government was to come up with ways to avail indigenous crops, offer financial aids to buy farm input, start-up rural watering projects and organization of awareness forums are some of the measures that could empower farmers to ensure effective utilization of indigenous farming practices. This was an indication that a lot need to be done collectively by all stakeholders since effective utilization of this knowledge would take the nation a milestone on the levels of household food security. This was further

confirmed by the area chief who stated that county government should spearhead programmes that will ensure effective utilization of indigenous knowledge.

4.8 Summary on the level of households' food security

To confirm on the levels of household food security in Kikuyu Sub-County, the researcher provided the respondents with the Household Food Insecurity Access Scale (HFIAS) measurement tool to find out on the pervading condition in the level of food security in the households. The findings were presented in Table 4.29

Table 4.29: Household Food Security Access Scale measurement tool on households

Question	Never		Rarely		Sometimes		Often		TOTAL	
	F	%	F	%	F	%	F	%	F	%
In the past 6 months, did you worry that your household would not have enough food?	39	45.3	30	34.9	13	15.1	4	4.7	86	100.0
In the past 6 months, were you or any household member not able to eat the kinds of food you preferred to eat because of lack of resources?	32	37.8	16	18.6	16	18.6	22	25.6	86	100.0
In the past 6 months, did you or any household member have to eat a limited variety of foods due to lack of resources?	30	34.9	43	50.0	11	12.8	2	2.3	86	100.0
In the past 6 months, did you or any household member have	30	34.9	45	50.0	11	12.8	0	0.0	86	100.0

to eat some foods that you really did not want because of lack of resources to obtain other types of foods?										
In the past 6 months, did you or any household member have to eat a smaller amount of food than you felt you needed?	51	59.3	24	27.1	11	12.8	8	9.3	86	100.0
In the past 6 months, did you or any member of your household have to eat fewer meals in a day because there was not enough food?	50	58.1	19	22.1	9	10.5	2	2.3	86	100.0
In the past 6 months, was there ever no food to eat of any kind in your household because of lack of resources to get food?	62	72.1	9	10.5	13	15.1	0	0.0	86	100.0
In the past 6 months, did you or any household member go to sleep at night hungry because there was not enough or no food?	76	88.4	4	4.7	6	7.0	2	2.3	86	100.0
In the past 6 months, did you or any member of your household go a whole day and whole night without eating anything because there was not enough food?	64	77.9	13	15.1	4	4.7	0	0.0	86	100.0

The study findings reveal that in households, 34.9 percent of the respondents rarely worried that their households would not have enough food in the last six months, 18.6 percent indicated that they rarely were not able to eat the kind of food they preferred to eat due to lack of resources, 50.0 percent indicated that a member of the household had to eat limited variety of food and ate food they did not really want due to lack of resources. Whilst 27.1 percent had to eat smaller amount of food than needed, 50.0 percent ate fewer meals in a day and 27.1 percent had no food to eat due to lack of enough food. However 4.7 percent indicated that they slept hungry and 15.1 percent ate nothing the whole day and night due to lack of food. These findings implied that food in the households was insecure due to it being unavailable, inaccessible and unutilized at a given time in the last six months. Whenever households reported that, either; sometimes, rarely or often they did not have enough food at one point they were considered food insecure.

The measure of food security using Household Food Security Access Scale measurement tools were ranged using the three universal indicators that is mild, moderate and severe to depict food insecurity, while none of the three indicators reflects, the aspect of food security is achieved. From the study findings an average 14.4 percent of households indicated that they were food secure at all times in the last six months since they differed to the statements that were to indicate food insecurity. The statements that depicted mild food insecurity whereby in the households they worried about not having enough food (18.2%), were unable to eat the food they preferred due to unavailability (20.9%), they were forced to eat foods that were not of their prevalence (21.7%) and ate a monotonous diet that was available (20.9%). Some (16.4%) ate monotonous diet or undesirable foods so as to ensure that they always had food and others (11.6%) had to start cutting back on the quantity of food to ensure that the foods were enough.

The study revealed that they (8.5%) were faced by moderate food insecurity. While those that depicted severe food insecurity (4.7%) often skipped meals to cut the number of meals they ate or ran out of food, 4.7 percent went to bed hungry and 6.6 percent were hungry a whole day and night even as frequently as rarely. Therefore, from the HFIAS the average levels of food security were; 56.5 percent of the households were food secure, 25.9 percent were mildly food insecure, 12.2 percent were moderately food insecure while 5.2 percent were severely food insecure.

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study findings, conclusions and recommendations based on the study findings and objectives. It also makes suggestions for further research on knowledge gaps created by the study.

5.2 Summary of the study

The purpose of the study was to investigate the role of indigenous knowledge in promoting food security among farmers in Kikuyu Sub-County, Kenya. It was guided by the following research objectives; determining the extent to which indigenous knowledge has influenced farming practices and traditional food preservation practices, establishing the extent to which western knowledge has influenced farming practices on food security and the available measures put in place by the government to ensure continuity in utilization of indigenous knowledge. The study was based on Observational learning theory and Social exchange theory. The study adopted a descriptive survey design. Questionnaire tools were adopted to collect the data from farmers and an interview guide to interview key informants. Test- retest method was used to test the reliability of the tools. The study sample population comprised of 90 farmers and eight key informants. Therefore, 90 questionnaires were issued 10 interview guides used. Eight key informants were interviewed and 86 questionnaires were returned. Thus the study realized an instrument return rate of 94%. The data collected were analyzed both qualitatively and quantitatively.

On the respondents' demography the age bracket, gender, marital status, presence of children, education qualification and employment status sought. This information was to establish an insight on the respondents' characteristics and find out whether farmers characteristics has any impact on the levels of household food security. The study findings revealed that majority of the respondents (75.6%) were over forty one years old, while only 5.8 percent of the respondents were below thirty years old. Therefore there was an indication that indigenous knowledge which is passed on between generations orally may not be effectively passed on in the absence of young people in farming. Male population among farmers was higher than that of females. The respondents marital status revealed that majority of the respondents were married thus, an implication that the majority of the respondents' responses reflect the situation in the households' levels of food security.

The study findings revealed that more than half of the respondents had attained primary education as their highest education levels, an indication of the prevailing low level of education in the study area. These findings were confirmed by the Sub-County agricultural officer and the area chiefs who stated that the low level of education has been a big challenge facing some marginalized parts of the district. However, there is a connection between household literacy levels and food production and preservation, since literacy not only comes with effective application of farming practices but also in other avenues of financial family support. Further the study findings revealed that majority of the respondents were self-employed while only a minority 5.8 percent indicating that they were employed. This was an indication that other than farming majority of the area residents venture into other informal self-employment thus being in a position to uplift their households' levels of food security.

To determine the influence in which application of indigenous knowledge on farming practices has influenced on food security (Objective I), the research findings revealed that majority of the respondents (84.9%) indicated that Kiambu County's level of food security is insecure. Data from the three wards chief reveals that many households are faced by hunger especially in Kerwa ward during drought seasons. Moreover, majority of the respondents (52.3%) indicated that food insecurity in Kiambu County was due to the small pieces of land for farming in the County, while 37.2 percent indicated that the County is faced with unreliable weather conditions hindering effective food production and a minority 2.3 percent indicated that residents in the extreme dryer parts in county are given relief food during drought seasons.

The respondents who indicated that the County is food secure stated that the residents were financially capable to raise their household food budget. The findings were also confirmed by the church leader who indicated food production in the Sub-county has been on the decline and many residents feed their families from other economic activities other than farming. He further stated that at times churches and other well-wishers give food to hunger challenged families during long periods of drought.

Nevertheless majority of the respondents (55.9%) indicated that indigenous farming practices entails farming without chemicals, farming the natural way and God's way. The study findings revealed that use of compost manure was the highest known indigenous farming practice, followed grain drying, seeds selection and crop rotation respectively. These findings concur with the extension agricultural officers in the wards who stated that many farmers in the area rear cattle so as to make manure that is applied in their farms. Majority of the respondents (53.6%)

indicated that farm production after application of indigenous farming practices would be on the higher side. These findings imply that residents are aware of the notion that application of indigenous knowledge can improve household levels of food security.

To establish how traditional practices can ensure food security, the research findings revealed that that all the respondents indicated that application of manure would ensure food security, seconded by land rotation and use of drought resistant crop respectively. Crop rotation scores lowest among other practices. However, majority of the respondents indicated that they do not apply indigenous farming practices in their farms. The long duration taken before the matured indigenous foods are harvested was the main reason why farmers in the study area do not apply indigenous knowledge on their food production. 62.8 percent of the respondents indicated that indigenous farming practices require very hard labour while 38.8 percent indicated that indigenous farming practices do not assure effective pest control. In contrast those that apply indigenous knowledge felt that application of indigenous farming practices entails planting quality seeds, soil improvement and affordable seed variety.

The study findings revealed that majority of the respondents indicated that application of indigenous farming practices produce plenty food harvests. This was an implication that adoption of indigenous farming practices could yield plenty harvests. Though most respondents indicated that manure application is the most appropriate indigenous farming practice to boost food harvest that translates to high levels of food security, these practices are not extensively applied.

To establish whether exclusive application of indigenous knowledge harms households the study findings revealed that long duration between planting and harvesting is the cause of farmers opting out on application of indigenous knowledge practices while, also unavailability of indigenous seeds and required hard labour hinder preferences on this farming practices. Whilst the minority who apply these practices indicated that they face no challenges.

To establish whether farmers are aware of the difference between the indigenous and conventional farming practices (Objective II), the study findings shows that most of the respondents (45.3%) indicated that they understand conventional or western knowledge farming practices as farming using fertilizers to their crops to boost growth. This was seconded by use of modernized technologies, existence of generic products and planting of improved crop varieties respectively. Whilst, majority of the respondents indicated that they apply conventional farming practices on their farms. The study findings revealed that the farmers who apply conventional farming practices majority of them (74.4%) indicated that they use these practices because they easy farm work.

These findings imply that application of conventional/western knowledge farming practices was due to their simplified of food production. Further the findings were in line with an agricultural officer who stated that farmers are aware of the dangers they are exposed to on the application of conventional knowledge practices, but since the study area is an industrial region they embrace these practices for profit making. Majority of the respondents indicated that they have practiced conventional/western farming for more than twenty years. This was an indication that majority of the farmers have practiced conventional/ western farming practices for a very long time implying

that farmers could have forgotten some of the required procedures in preparation of indigenous knowledge practices.

From the study findings most of the respondents (43%) indicated that the application of conventional/western farming practices influence food security. Firstly on the use of fast maturity crops will translate that the levels of food security will be improved when crops planted take a shorter period to mature thus more food production. Second the application of conventional farming practices improves the household levels of food security through the use of rapid pest control methods. Food production is increased when pest control methods are effective. Alternatively application of conventional/western farming practices can lower household levels of food security when the practices degrade the environment and soil quality thus lowering harvest with time. This implies that after extensive use of fertilizers and pesticides, soil fertility deteriorate thus, lowering the levels of food production as well as increased health complications.

The research findings revealed that most of the respondents indicated that conventional/western farming practices have early maturing foods thus causing extinction of long duration indigenous foods. In conventional farming, pest control methods are deemed to be a lot easier to apply than indigenous pest control measures. However, conventional/ western knowledge farming practices has negative impact on the environment and human health. This is an indication that applications of various conventional practices methods are despite their commercial benefits are a hazard to both the environment and the human body.

The study findings shows that more than half of the farmers indicated that they were in agreement with the statement that traditional farming practices are not affected by plant diseases. These findings imply that the study area residents were knowledgeable on the advantages of the application of indigenous farming methods. The respondents were requested to indicate their perceptions on the statement western farming techniques produce more yields than traditional methods. Nonetheless, half of the respondents agreed that western farming techniques produce more yields than traditional methods. This was an indication that farmers were in agreement with the notion that modern food production supersedes traditional methods in terms of quantity. The respondents were requested to indicate their perceptions on the statement that western farming techniques are more advanced than traditional methods. Furthermore, the study findings show that there was an overwhelming agreement on notion that modern farming practices supersedes the traditional methods in terms of food production. This was an indication that majority of the farmers view application of indigenous knowledge as backwardness. The researcher requested the respondents to suggest on mitigation measures to deal with current corrosion of indigenous knowledge.

From the study findings on objective iii, majority of the farmers (72.1%) indicated that individual farmers need to reintroduce indigenous crops so as to revive them from extinction, while 23.3 percent of the respondents indicated that county extension agricultural officers need to be trained on indigenous knowledge practices to revise on their roles in the ground. Whilst 4.7 percent of the respondents felt that if farmers plant more trees, climatic conditions would improve. These findings imply that farmers felt that there was still room for change on their

revolving issues on food security. Information from the county agricultural officer states that farmers the initial start point on the reviving of indigenous knowledge practices.

The research findings revealed that most farmers proposed that the government should come up with ways to avail indigenous crops, offer farmers with financial aid to buy farm in-put, start-up rural watering projects and organization of awareness forums are some of the measures that could empower farmers to ensure effective utilization of indigenous farming practices. This was an indication that a lot need to be done collectively by all stakeholders since effective utilization of this knowledge would take the nation a milestone on the levels of household food security. This was further confirmed by the area chief who stated that county government should spearhead programmes that will ensure effective utilization of indigenous knowledge.

On the levels of household food security in Kikuyu Sub-County, the Household Food Insecurity Access Scale (HFIAS) measurement tool revealed that food in the households was insecure due to it being unavailable, inaccessibility and unutilized. Whenever households reported that, either; sometimes, rarely or often they did not have enough food at one point they were considered food insecure. Therefore from the HFSA scale the average levels of food security were 56.5 percent of the households were food secure, 25.9 percent were mildly food insecure, 12.2 percent were moderately food insecure while 5.2 percent were severely food insecure.

However, from the study findings an average 14.4 percent of households indicated that they were food secure at all times in the last six months since they differed with the statements that were to indicate food insecurity. The statements that depicted mild food insecurity whereby in the

households they worried about not having enough food (18.2%), were unable to eat the food they preferred due to unavailability (20.9%), they were forced to eat foods that were not of their prevalence (21.7%) and ate a monotonous diet that was available (20.9%). Some (16.4%) ate monotonous diet or undesirable foods so as to ensure that they always had food and others (11.6%) had to start cutting back on the quantity of food to ensure that the foods were enough. This revealed that they (8.5%) were faced by moderate food insecurity. While those that depicted severe food insecurity (4.7%) often skipped meals to cut the number of meals they ate or ran out of food, 4.7 percent went to bed hungry and 6.6 percent were hungry a whole day and night even as frequently as rarely.

5.3 Conclusions

Based on the study findings the study came up with the following conclusions:

Indigenous knowledge represents valuable source of local solutions to the food insecurity in terms of accessibility by the rural population, particularly during seasonal food shortage or major stress periods such as droughts. The traditional life cycle of rural people is a continuous process of acquiring, experiencing, possessing and sharing of traditional knowledge. Traditional food processing and preservation activities constitute a crucial body of indigenous knowledge handed down from one generation to another. Through understanding of indigenous knowledge, there is potential for sustaining food security in an environment of climate change and socio-economic problems.

Further, climate change and land sizes appear to have a negative impact on food production which eventually translates to food insecurity, since they affect availability, accessibility, stability and use of food in households. This is done to relieve the stress of seasonal food scarcity particularly during periods of rain shortage or drought and thus achievement of household food security. To improve food security, individual agency and social structure should interact to mutually shape decision processes and behaviours.

5.4 Recommendations

Based on the findings and conclusions of the study, the researcher made the following recommendations;

- i. The government through the ministry of gender, culture and social affairs should document records on indigenous knowledge practices to ensure that the knowledge is easily passed on between generations.
- ii. The ministry of Agriculture should sensitize farmers on the most appropriate farming methods in Kikuyu Sub-County to ensure maximum food production. They should also be enlightened on the best farming practices of food preservation and production for future food storage. Proper mechanisms to provide farm inputs to the farmers should also be put in place.
- iii. Non-Governmental Organizations community members should participate in projects geared towards ensuring food security in households and also involves them in community development activities.
- iv. Community development officers and other stakeholders should mobilize young people in ways to embrace agricultural production as a commercial venture to uplift their livelihood.

5.5 Suggestions for further research

The researcher suggests that;

- i. A similar study needs to be replicated in other regions in the country to compare the findings.
- ii. Further research should therefore concentrate on the investigation of climate change and food security issues for the communities.
- iii. Further research to be carried out on the nutritional values of the indigenous food and its impact of human health.
- iv. Future research should be conducted on how Indigenous farm practices that are embedded in farmers' dynamic system of spirituality, kinship, local politics and other factors are tied together, how they influence one another in regard to food security.

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APPENDICES

Appendix I: Questionnaire for farmers

My name is Mercy. I am a sociology student from the University of Nairobi carrying out a research on the application of indigenous farming practices in the elimination of food shortage in Kikuyu Sub-County as part of my masters' academic requirements. I am therefore visiting farmers in this area to please find out their understanding of these practices. The information given will be treated with uttermost confidentiality.

Kindly spare time and fill in this questionnaire for me. Thank you in advance. God bless you.

PART I: FARMER'S DEMOGRAPHIC INFORMATION

1. Name of respondent
2. Year of birth.....
3. Gender of respondent: Male [] Female []
4. Marital Status:
Single [] Married [] Separated [] Divorced [] other s [] specify
5. Do you have children Yes [] No []
6. If yes do you stay with them? Yes [] No []
7. Highest level of education:
 - a. Not been in school at all []
 - b. Never completed primary education []
 - c. Completed primary education []
 - d. Never completed secondary education []
 - e. Completed secondary education []

- f. Have attained a certificate []
- g. Have attained a diploma []
- h. Have a Degree []
- i. Am a post-graduate []

8. Employment status other than in farming

Employed [] Unemployed [] Self-employed []

PART 2: KNOWLEDGE OF FARMERS ON INDIGENOUS FARMING PRACTICES AND THEIR IMPACT ON FARM PRODUCTION

(Please tick where option is provided)

1. a) Is Kiambu food secure or insecure?

i. Secure [] insecure []

b) Which indicators can you give to substantiate your claim of food insecurity or security in Kiambu?

.....

2. What is your understanding of indigenous farming practices?

.....

3. Which indigenous farming practices are you familiar with?

.....
.....
.....

4. When you apply the specified indigenous farming practices, how do you rate your farm production?

Low [] Very low [] Average [] High [] Very high []

**PART 3: FARMERS KNOWLEDGE ON INDIGENOUS FARMING PRACTICES
AND THEIR EFFECT ON FARM PRODUCTION**

5. Which traditional agricultural practices are you familiar with that can help in ensuring food security here in Kiambu?

6. Have you ever applied any indigenous farm practice in your farm?

Yes [] No []

Give reason (s)

- a)
- b)
- c)
- d)
- e)

7. How would you rate your harvest after applying the stated indigenous farm practice(s)?

Very plenty [] plenty [] not plenty [] not very plenty []

8. How do you adjust in case your harvest is not very plenty? YES [] NO []

Reason (s)

- a.
- b.
- c.
- d.
- e.

9. What challenges can your household face due to your exclusive application of indigenous farm practices?

.....
.....

PART 4: FARMERS UNDERSTANDING OF THE INFLUENCE OF THEIR APPLICATION OF WESTERN FARMING PRACTICES ON TRADITIONAL FARMING PRACTICES

10. What is your understanding of conventional /western farming practices?

.....
.....
.....

11. Do you apply any conventional/Western farming practice?

a. Give reasons:

- i.
- ii.
- iii.
- iv.

b. For how long have you used the practice(s)?

5 years [] 10 years [] 20 years [] more than 20 years []

12. What impacts can the application of conventional /western farming practices has towards ensuring food security today?

.....
.....

13. How has western farming practices impacted on farmers' application of indigenous knowledge in Kiambu?

.....
.....

14. How do you rate the following statements?

(Agree 1, somewhat agree 2, disagree 3, somewhat disagree 4)

Description of statement comment

1. Traditional farming methods are not affected by plants diseases
2. Western farming methods produce more yields than traditional methods
3. Western farming practices are more Advanced than the traditional methods

PART 5: MEASURES TAKEN BY THE GOVERNMENT OF KENYA TO ENSURE CONTINUED UTILIZATION OF INDIGENOUS FARMING PRACTICES

15. What mitigation measures can be put into place to deal with the current corrosion of indigenous farm practices in Kenya?

.....

.....

.....

.....

.....

.....

16. What do you think the government can do to empower farmers so that they can effectively utilize indigenous farming practices?

.....

.....

17. Use of Household Food Insecurity Access Scale (HFIAS) measurement tool to measure food insecurity in households in Kikuyu Sub-County

Please tick along the code provided:

1=rarely (Once or twice in the past 6 months), 2=Sometimes (three to ten times in the past 6 months), 3=Often (more than ten times past 6 months), 4= Never happened in the last 6 months

No	Question	1	2	3	4
1.	In the past 6 months, did you worry that your household would not have enough food?				
2.	In the past 6 months, were you or any household member not able to eat the kinds of food you preferred to eat because of lack of resources?				
3.	In the past 6 months, did you or any household member have to eat a limited variety of foods due to lack of resources?				
4	In the past 6 months, did you or any household member have to eat some foods that you really did not want because of lack of resources to obtain other types of foods?				
5.	In the past 6 months, did you or any household member have to eat a smaller amount of food than				

	you felt you needed?				
6.	In the past 6 months, did you or any member of your household have to eat fewer meals in a day because there was not enough food?				
7.	In the past 6 months, was there ever no food to eat of any kind in your household because of lack of resources to get food?				
8.	In the past 6 months, did you or any household member go to sleep at night hungry because there was not enough or no food?				
9.	In the past 6 months, did you or any member of your household go a whole day and whole night without eating anything because there was not enough food?				

Appendix 2: Interview guide for key informants

Date of interview.....

Place of interview.....

Name of respondent.....

Occupational role.....

Background information of the interviewees

Sex.....

Age.....

Marital status.....

Level of education.....

Questions

1. Is there food shortage in Kikuyu Sub-County?
2. Does the community perceive food shortage as a problem worth addressing?
3. What is your understanding of indigenous farming practices and their impact on the elimination of food shortage in Kikuyu Sub-County?
4. According to your standards, are farmers within Kikuyu Sub-County aware of indigenous farm practices?

Are these practices being applied by farmers? Give reasons

If yes what percentage?

5. Do the following factors influence the farming practices of farmers in Kikuyu Sub-County?

- i. Age
- ii. Gender
- iii. Education level

(Please explain how each factor influence farmers' farming practices)

6. Which other common farming practices are being practiced within Sigona, Karai and Kikuyu wards?

7. Why have these practices become popular?

8. Which measures can the government of Kenya take to sensitize farmers on proper application of indigenous practices?