FACTORS INFLUENCING AGRICULTURAL PRODUCTIVITY AMONG RURAL WOMEN IN MWEA.
A CASE OF MWEA IN KIRINYAGA COUNTY, KENYA

MARGARET MWATHI

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

2012

DECLARATION

This research project is my original work and has never been submitted for an award or degree in any other University.

Signed..... Date.....30/7/12.....

MARGARET W MWATHI

L50/76748/2009

This research report has been submitted for examination with my approval as the University Supervisor

Signed..... Date.....31/7/2012.....

DR. ANNE ASEEY

Lecturer; School of Continuing and Distance Education.

ACKNOWLEDGMENT

I would like to appreciate the University of Nairobi for the opportunity to undertake my Masters programme at this renowned institution.

I appreciate the support from my lecturer Dr Anne Aseey for her patience, continuous encouragement, correction and useful suggestions.

I would like to appreciate my fellow students turned close friends, Washington, Faith and Nancy for their constant encouragement and many hours spent studying.

I appreciate the support financially and emotionally from my Parents and siblings for their constant encouragement throughout my course period.

DEDICATION

This work is a dedicated to my parents, Sospeter Mwathi and Rosemary Mwathi who have been my greatest cheerleaders and inspiration in life.

ABSTRACT

Women perform crucial roles in domestic and economic life of the society but lack the resources and opportunities to be more productive. This greatly costs the society in terms of lost agriculture output, food security and economic growth. The objectives of this study are: to investigate the effects of access to resources on rural women agricultural productivity, to determine how literacy levels among women influence agricultural productivity, to establish the effects of access to finances on agricultural productivity, and to determine access of technology and immerging innovations on agricultural productivity. The Literature review focused on all the above mentioned objectives.

The Research design applied was Survey design. Target population was the rural women from Mwea Division in Kirinyaga County involved in farming. Questionnaires were used as the research instruments. Sample population was determined through Purposive random sampling. Data analysis was done using descriptive statistics. Statistical and Data Management software's were applied

From the findings of this study it was noted that women lack control of major assets such as land, livestock and land machinery this limits women's ability to secure financial assistance as they lack the necessary collateral limiting them from obtaining funds to invest in farming.

It was also observed that a big percentage of women in rural areas have no formal schooling. Most women had limited knowledge on the use of internet.
Findings show that mobile money services are more accessible and preferred by the respondents. The use of agricultural technology, including machinery was heavily skewed against low and middle income earners.

Some of the recommendations are reviews or reform of land tenure, the simplification of lending processes so that illiterate and semi- literate rural women can effectively make use of credit facilities, the promotion of agribusiness in the rural areas as a source of business opportunities and employment, training of rural women on computer literacy

LIST OF ABBREVIATIONS AND ACRONYMS

AIDS: Acquired Immune Deficiency Syndrome

CIMMYT: International Maize and Wheat Improvement Centre

FAO: Food and Agricultural Organization

GDP: Gross Domestic Product

IFAD: International Food and Agriculture Development

MDGs: Millennium Development Goals

SPSS: Statistical Package for Social Sciences

U.N: United Nations

UNDP: United Nations Development Program

Table of Contents

APPENDICES

FIGURES

TABLES

CHAPTER ONE
INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Agriculture is a principal platform for human development and social welfare. It is the foundation upon which diverse economies have been built and provides a pathway out of poverty for millions. Agricultural development is an opportunity to better meet these basic needs. Nearly 1 billion people are hungry today – half of them farmers. Three-quarters of the poor in developing countries live in rural areas – over 2 billion people get by on less than US$ 2 a day.(World Economic Forum Report; 2011.)

There are serious constraints which militate against the promotion of an effective role for women in development in societies which are bound by age-old traditions and beliefs. Patriarchal modes and practices motivated by cultures and/or interpretations of religious sanctions and illiteracy hinder women's freedom to opt for various choices to assert greater mobility in social interactions. Resulting from these situations, women's contribution to agriculture and other sectors in the economy remain concealed and unaccounted for in monitoring economic performance measurement. Consequently, they are generally invisible in plans and programmes. Women are, in fact, discriminated against by stereotypes which restrict them to a reproductive role, and denied access to resources which could eventually enhance their social and economic contribution to the society. (Daman Prakash, 2003.)

Agriculture is the mainstay of Kenyan economy due its big contribution to National Gross Domestic Product (GDP) through provision of food, employment, raw materials for local industries and foreign exchange earnings. A sizable proportion of the rural labor force (over 51%) is engaged in small scale agriculture, women are the majority in the sector. (Institute of Development Studies, 2006).A decline in agriculture has thus far reaching implications in terms of employment and income inequality as well as food security for the country (UNDP, 2002).

There is a wide spectrum of gender issues within the agricultural development sector. It is estimated that women perform 70% o2f food production work; 80% in hoeing and weeding using inefficient and inadequate tools; 80% of food storage. Transport of produce is usually done manually due to limited access to appropriate technology such as animals, bikes or automobile (Curry, Kooijman and Recke, 1999).

Rural women, which constitute more than a quarter of the world's population, are a dually vulnerable group. Almost three quarters of the poor across the world live in rural areas, and women, are of the most poor in the latter part. (FAO.2009).

1.2 Statement of the Problem

Kenya's economy largely depends on the agricultural sector, which accounted for 24% of the GDP in 2003. About 75% of Kenyans owe their livelihood to agriculture.
Over 80% of the Kenyan population live in the rural areas and derive their livelihoods, directly or indirectly from agriculture. Given its importance, the performance of the sector is therefore reflected in the performance of the whole economy. (Institute of Development Studies, 2006)

Women farmers are the pillars of African agriculture. According to the United Nations Food and Agriculture Organization over two thirds of all women in Africa are employed in the agricultural sector and produce nearly 90 percent of food on the continent. They are responsible for growing, selling, buying and preparing food for their families.

Yet even as the guardians of food security, they are still marginalized in business relations and have minimal control over access to resources such as land, livestock and inputs such as improved seeds and fertilizer, credit and technology.

A combination of logistical, cultural, and economic factors, coupled with a lack of gender statistics in the agricultural sector, mean that agricultural programs are rarely designed with women's needs in mind. As a result, African women farmers have no voice in the development of agricultural policies designed to improve their productivity.

Kenya's Vision 2030 stipulates that women's progress into full and equal participation in all aspects of society is critically important for human development.

1.3 Purpose of the Study

Agriculture is the mainstay of Kenyan economy due its big contribution to National Gross Domestic Product (GDP) through provision of food, employment, raw materials for local industries and foreign exchange earnings. A sizable proportion of the rural labor force (over 51%) is engaged in small scale agriculture, women are the majority in the sector.

Equal access to resources will raise total agricultural output in developing countries by 2.5–4 percent, thereby contributing to both food security and economic growth (FAO 2011). Estimates suggest that if women had the same access to productive resources as men, they could increase yields on their farms by 20–30 percent, lifting 100-150 million out of hunger (FAO 2011)

1.4 Objectives

1. To investigate the effects of access to agricultural assets on rural women's agricultural productivity
2. To determine how literacy levels among rural women influence agricultural productivity
3. To establish the effect of access to finances by rural women on agricultural productivity
4. To assess the use of technologies and new ICT innovations in farming by rural women on agricultural productivity

1.5 Research question

1. To what extent will improved access to agricultural assets by rural women impact on agricultural productivity?
2. How do literacy levels among women influence agricultural productivity?
3. How does the ability to access to finances by rural women impacts on agricultural productivity?
4. To what extent does the use of technology and new ICT innovations influence agricultural production by rural women

1.6 Significance of the study

It is the goal of this study that policy-makers, donors and development practitioners will obtain the information and analysis that reflect the diversity of the contributions women make and the specific challenges they are confronted with in order to make gender-aware decisions about the sector it will contribute to improving understanding so that appropriate policies can help foster gender equality in agriculture.

Governments have made major commitments aimed at revitalizing agriculture in developing regions; these efforts are likely to be improved if the government would utilize findings obtained in this study to maximize the productive potential of rural women.

This study will also be beneficially to local farmers and local community by highlighting the major challenges rural women face. The ability to address these issues would lead greater yields from the farms and better production in country thus providing a source of sustenance for families translating to healthier and more empowered families.

1.7 Delimitation of the Study

Mwea division is a big geographical area and covering the whole area for this study was a limitation. Finances were also limited to enable a comprehensive study. To overcome this challenge a smaller population among three sub locations was selected.

Another limitation was that most respondents have very minimum level of education and not all may fully understand English, the Research assistants therefore were expected to understand both English and the vernacular language of the respondents to enable them interpret the questionnaires accurately and without any alterations.

1.8 Basic Assumptions of the Study

The assumption is that the population was a homogeneous one and the sample that was selected was representative enough for the whole region.

The data collection instrument was valid, reliable and measured the desired constructs.

The respondent understood the questions and that the questionnaires were truthfully and accurately answered.

1.9 Definition of Significant terms

Rural Women- Refers to women who live in the villages or Countryside who have no formal employment and earn their living mainly from farming activities.

Agricultural productivity- Refers to the yields obtained from farming activities

1.10 Organization of the Study

The study is divided into five chapters.

Chapter one contains the background of the study, the statement of the problem, the purpose of the study, objectives of the study, research questions. It also contains the significance of the study, delimitation of the study, limitations of the study, assumption of the study and definition of significant terms.

Chapter two contains review of related literature as well as the Conceptual framework.

Chapter three contains the research methodology. It contains various subtopics which include research design, target population, sample selection and sample size, research instruments, methods of data collection, validity and reliability of the instrument

Chapter four contains the data and findings of this study presented in tables

Chapter five contains a summary of finding, discussion, recommendations and likely areas of further research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

This Chapter review literature on rural women in agriculture. There is discussions of the major factors that influence agricultural productivity by rural women this include the land tenure system, the ownership of livestock, the literacy levels amongst rural women, availability and access to financial services/credit, access to new technology and Information/innovation.

2.2 An overview of Rural Women in Agriculture

Agriculture remains the backbone of the Kenyan economy. It is the single most important sector in the economy, contributing approximately 25% of the GDP, and employing 75% of the national labour force.

Over 80% of the Kenyan population live in the rural areas and derive their livelihoods, directly or indirectly from agriculture. Given its importance, the performance of the sector is therefore reflected in the performance of the whole economy. (Institute of development Studies 2006)

Only 20% of Kenya's land is considered arable while the remaining 80% is either arid or semi-arid and therefore characterized by low, erratic rainfall and periodic droughts. Kenya regularly suffers long periods of drought, resulting in huge crop failures and cases of famine are rampant given the dependence on rain-fed agriculture. (Institute of development Studies, 2006)

Rural women in developing countries have been found to play a prominent role in agriculture (Beserup, 1979; UN, 1980; Mencher, 1986).Women constitute the majority of smallholder farmers, providing most of the labour and managing a large part of the farming activities on a daily basis (K.A Saito et al .1994)

Women make significant contributions to the rural economy in all developing country regions. Their roles differ across regions yet they consistently have less access than men to the resources and opportunities they need to be more productive. Increasing women's access to land, livestock, education, financial services, extension, technology and rural employment would boost their productivity and generate gains in terms of agricultural production, food security, economic growth and social welfare.(FAO,2011)

Research in Kenya indicates that increasing woman's levels of physical and human capital (to that of men's in the sample) would increase yields by between 7 and 9 percent. (P.Moock.1976)

The status and role of rural women is thus crucial given their importance in number and decisiveness. As a UNIFEM statement for the world poverty day in 2007 states; women, being deeply affected by poverty, also hold great potential to end it, they constitute a big percentage of the labor force, with 428 million women working in the agricultural sector around the world according to the International Labor Organization (ILO), compared to 608 million men in 2009. (UNDP, 1994)

More than 40% of all small scale farms are operationally managed by women and youth (Kimenye 1999), yet women hold only 1% of the registered land titles in Kenya (5-6% of registered titles being jointly held). Studies conducted by the Ministry of Agriculture and Rural Development (ASIP, 1998) revealed gender disparities/imbalances as key challenges to agricultural production. It was also revealed that farming is dominated by smallholders, majority of who are women.

The persistence of gender inequalities directly result in poorer agricultural and human development outcomes. A study conducted in four African countries showed that providing women farmers with the same quantity and quality of inputs that men typically receive, and improving their access to agricultural education, could increase national agricultural outputs and incomes by an estimated 10% to 20%.(World Bank;2005)

In India Agriculture is not only the main source of employment, income and food for over 70% of the population, but it is also the main 'culture' for rural families. It is reported that 78% of economically active women are involved in agriculture of which 35% are cultivators and 43% work as agriculture labor. The extent of women involvement in agriculture is even higher in rain fed –semi arid – arid and underdeveloped areas. Migration of men, in search of work, is very high from underdeveloped and resource poor areas and it is the women who bear the burden of agriculture besides looking after the family. (Sangeeta Rangneka)

Banji *et al* (2005) reported that most studies on women showed that trading is the most important activity outside the home, followed by farming. Women are also known to be fully involved in all operations of farming including planting, thinning, weeding, fertilizer application, harvesting, storing, marketing and processing (Mybada, 2000).Rural women in developing countries have been found to play a prominent role in agriculture (Beserup, 1979; UN, 1980; Mencher, 1986).

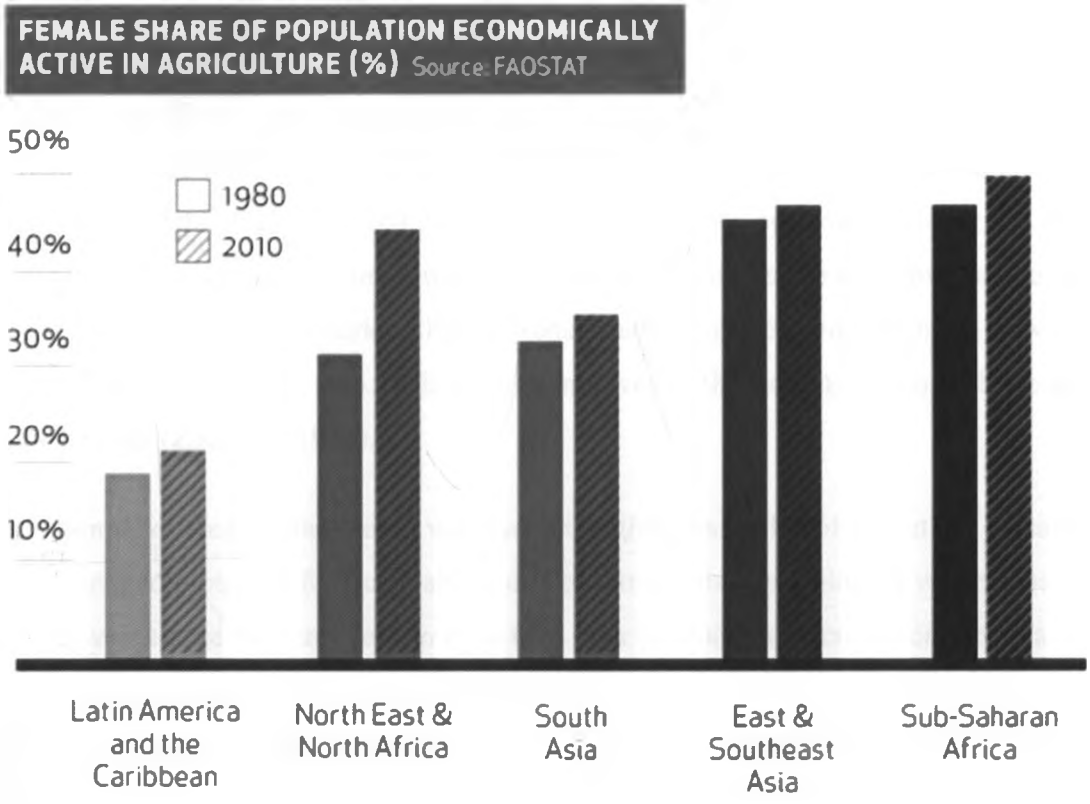


Figure 1; Female share of population economically active in agriculture (FAOSTAT)

In sub-Saharan Africa women contribute between 60 and 80 percent of the labor for food production, both for household consumption and for sale. (FAO.1994). Moreover, agriculture is becoming a predominantly female sector as a consequence of faster male out-migration. (FAO. 1998.) Women now constitute the majority of smallholder farmers, providing most of the labour and managing a large part of the farming activities on a daily basis. (K.A. Saito, H. Mekonnen and D. Spurling. 1994.)

As early as 1928, Baumann noted that as the opportunities for men to work outside of agriculture increased, women's involvement in agriculture also increased (Baumann 1928).

Many changes in the gender division of tasks are related to increasing outmigration of men from agricultural communities, as they seek higher earnings elsewhere. As men leave the area, women take over many of the traditionally male tasks. In addition, when men move into nonfarm activities, women may become more involved in cash cropping. Although the gender division of labor may be changing, it does not appear that men are taking over women's agricultural activities, specifically, the production of food for home consumption. When men move into activities that are traditionally women's, they usually are not substituting their labor for their wives' labor within the household. Rather, usually some new opportunity has arisen and activities that had been considered women's activities have become more productive or profitable.For example, in Burkina Faso, women traditionally picked shea nuts. Now that the sale of these nuts is profitable, men are becoming involved in this activity, often with the assistance of their wives (Zuidberg 1994).

For a sample of Kenyan farmers, it was found that the gross value of output per hectare from male-managed plots was 8 percent above that of female-managed plots. It was estimated that if women were to use the same resources as men their productivity would increase by about 22 percent. The study also concluded that educating women is more likely to increase the use of new technologies than educating men.

Other research in Kenya indicates that increasing woman's levels of physical and human capital (to that of men's in the sample) would increase yields by between 7 and 9 percent. The impact of schooling on farm output was also found to be greater for women than for men because men with more schooling tend to seek off-farm employment and are more likely to be successful in finding and keeping a job. Women, on the other hand, are seldom able to find off-farm work. (FAO,2011)

Many factors explain the weakness of women's productivity in agriculture. Women farmers have quantitatively and qualitatively less access to information, technology, land, inputs and credit. Policy-makers, managers, agents and participants in agricultural support services are generally

males, who are not always sufficiently aware of the specific problems and needs of women farmers.(FAO,2011)

In sub-Saharan Africa women are particularly disadvantaged compared with men because they farm smaller plots of land with more uncertain tenure. Women's access to land is limited by legal and institutional factors such as legal discriminations against their ownership and inheritance of land. Although legislative changes now permit women to own property, in many countries in the region traditions and customs continue to prevent women from having effective ownership.
In Wadi Kutum, the Sudan,

A titling scheme registered most of the land owned by women in men's names, but women did not even protest because, customarily, they do not conduct relations with the state, which has long been considered as men's domain. Without secure title to land, women are often denied membership of cooperatives and other rural organizations. Lack of ownership title also means a lack of collateral and hence access to credit. (FAO; 2007).

Women typically receive less than 10 percent of the credit awarded to smallholders and only 1 percent of the total amount of credit directed to agriculture in Kenya, Malawi, Sierra Leone, Zambia and Zimbabwe. In sub-Saharan Africa, more women than men are too poor to buy inputs such as fertilizer, and they are not generally considered as creditworthy by classical financial institutions. (FAO; 2007)

2.3 Women's access to property and land

Globally there have been many innovative initiatives to secure women's property rights and land tenure, including rights to inherit. Land is not only a productive asset, it is also important as collateral for securing finance and credit. Lack of security in land tenure reduces incentives to invest in improving the land, resulting in lower productivity. Women are disadvantaged in many statutory and customary land tenure systems. They often have weak property and contractual rights to land, water and other natural resources. Even where legislation is in place, lack of legal knowledge and weak implementation often limits the ability of women to exercise their rights.(Quisumbing, A. and L. Pandolfelli;2009)

In many cultures, land is passed on to men and not women. Most rural parcels of land are traditionally registered to men and women can do nothing in increasing fragmentation for sale or other activities. Even though they are the ones that deal with production of the land, its fate is entirely a male issue. There are cases when subsistence food crops are diminishing and major cash crops increasing. Women are involved mostly in provision of food, and when little and poor land is available for subsistence crops, they are forced to work more harder or go long distances to reach scattered parcels of land to farm for domestic food crop use. Therefore land tenure systems and legal structures actually marginalize women when in-fact they are the most affected and real invisible land managers in Kenya. (Volunteers for Africa; 2009.)

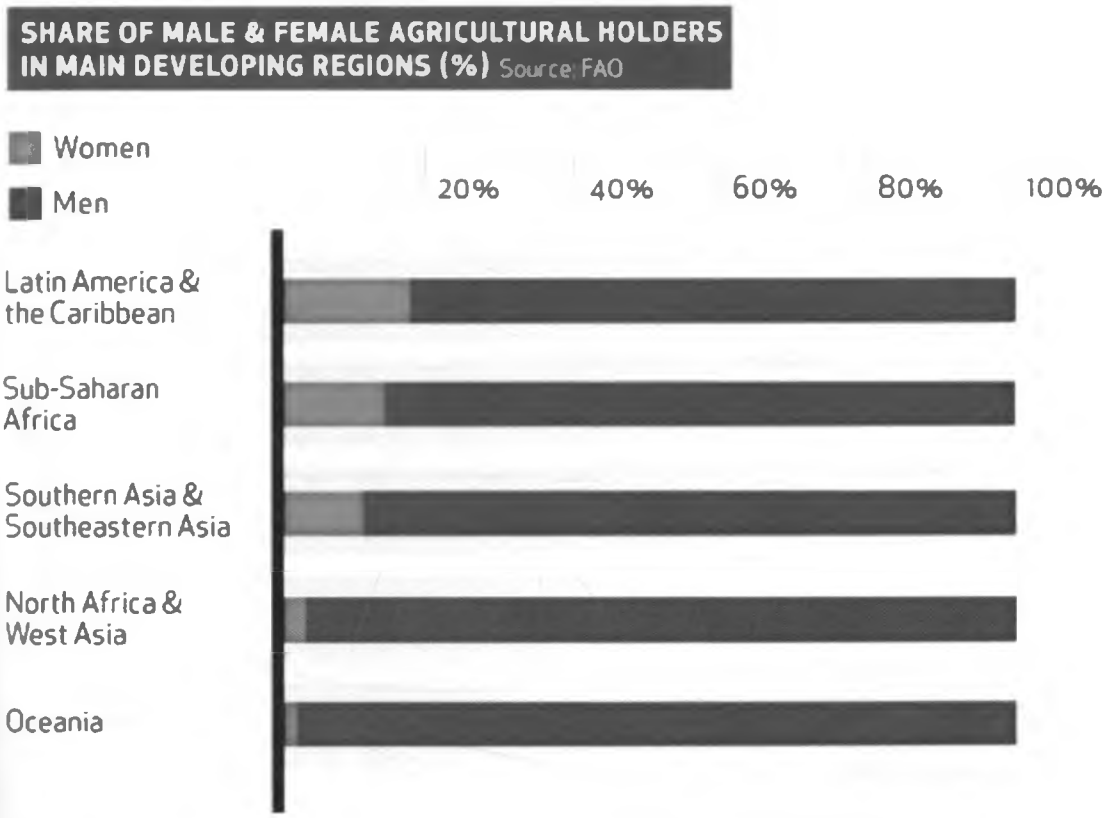


Figure 2; Share of Male and Female Agricultural Holders in Main Developing Regions

In many societies, laws, tradition and access bar women from owning and inheriting land. (FAO)

In most countries, women do not own the land they cultivate. Discriminatory laws and practices for inheritance of and access and ownership to land are still widespread. Land that women do own tends to consist of smaller, less valuable plots (Daman Prakash; 2003)

Land is the most important household asset for households that depend on agriculture for their livelihoods. Access to land is a basic requirement for farming and control over land is synonymous with wealth, status and power in many areas. Strengthening women's access to, and control over, land is an important means of raising their status and influence within households and communities. Improving women's access to land and security of tenure has direct impacts on farm productivity, and can also have far-reaching implications for improving household welfare. Strengthening land ownership by women in Nepal, for example, is linked with better health outcomes for children (Allendorf, 2007).

Women represent fewer than 5 percent of all agricultural holders in the countries in North Africa and West Asia. The sub-Saharan African average of 15 percent masks wide variations, from fewer than 5 percent in Mali to over 30 percent in countries such as Botswana, Cape Verde and Malawi. Latin America has the highest regional average share of female agricultural holders, which exceeds 25 percent in Chile, Ecuador and Panama.(FAO,2011)

In addition to being more likely to hold land, men also typically control larger land holdings than women. Inequality in access to land is more acute in Bangladesh, Ecuador and Pakistan, where average land holdings of male-headed households are more than twice the size of those of female-headed households. (Deere and León, 2003).
In Africa male controlled land holdings are generally larger than female-controlled holdings. (FAO, 1997)

Livestock is another key asset in rural areas (FAO, 2009a). In many countries, livestock is one of the most valuable agricultural assets and represents a source of income and wealth accumulation as well as an important source of resistance to shocks. Draught animals are the main source of power for ploughing, land clearing and transportation in many regions. As was the case for access to land, the evidence for livestock holdings points to systematic gender inequalities.

Inequality in livestock holdings appears to be particularly acute in Bangladesh, Ghana and Nigeria, where male holdings are more than three times larger than those of female-headed households. In Indonesia and Pakistan.Net incomes from livestock are significantly higher in male-headed households than in female-headed households.

In Nicaragua, for example, women own around 10 percent of work animals and cattle but 55–65 percent of pigs and poultry (Deere, Alvarado and Twyman, 2009).
Even when women jointly own large animals, they do not necessarily have access to the services they provide, as was found for Indian women and the use of oxen (Chen, 2000).

Studies done and Data obtained from northern Nigeria, for example, indicate that the value of men's livestock holdings is about twice that of women's (Dillon and Quiñones, 2010).
The same study finds that men and women use livestock differently as a store of wealth and as a buffer against shocks. Men are more likely to hold assets in the form of large animals such as cows and bulls while women are more likely to hold assets in the form of small animals, household durable goods and jewellery. Women tend to draw down assets more quickly than men in response to crises and as they get older (Dillon and Quiñones, 2010).

2.4 Literacy Levels among rural women in developing countries

Women remain significantly overrepresented among the illiterate (UN, 2009). Improved access to education and better-quality education will help reduce some of the wage gap and, more importantly, allow women to diversify by widening the opportunities available to them. In countries where agriculture is a major source of employment for women, skill building should address relevant skills and knowledge gaps and focus on extension services and vocational training.

Human capital is a major factor in determining the opportunities available to individuals in society and is closely linked to the productive capacity of households and their economic and social well-being.
The level of human capital available in a household (usually measured as the education of the head of household or the average education of working-age adults in the household) is strongly correlated with measures such as agricultural productivity, household income and nutritional outcomes – all of which ultimately affect household welfare and economic growth at the national level (World Bank, 2007a).Of the 106 countries committed to MDG 3 on gender parity in access to education, 83 had met the target by 2005 (World Bank)

Beyond general educational attainment, higher education for women in agricultural science and technology is particularly relevant in regions where women comprise a large part of the agriculture sector. The number of women working in science and technology research in industrialized and developing countries has increased substantially in recent decades, but remains low in most countries.(FAO,2007)

2.5 Availability of Financial services

Financial services such as savings, credit and insurance provide opportunities for improving agricultural output, food security and economic vitality at the household, community and national levels. Many studies have shown that improving women's direct access to financial resources leads to higher investments in human capital in the form of children's health, nutrition and education.(FAO,2011)

In Africa, rural women have less access to credit than rural men, which limits their ability to purchase seeds, fertilizers and other inputs needed to adopt new farming techniques. A FAO analysis of credit schemes in five African countries, where women predominate in food production (Kenya, Malawi, Sierra Leone, Zambia and Zimbabwe), found that women received less than 10% of the credit directed at smallholders and just 1% of the total credit directed to agriculture (Bullock, 1993:47). In addition, in all of the countries, rural populations generally have less access to credit than urban residents.

Lenders and other financial institutions should promote a gender-sensitive culture through-out their organization (World Bank, FAO and IFAD, 2009).

Producers who are unable to cover their short-term expenses or who want to purchase more productive but more expensive technologies must rely on either credit markets or other credit sources. Without access to credit, producers may be unable to bear the risks and up-front costs associated with the innovations and investment necessary to enhance their productivity, income and well-being.

Evidence shows that credit markets are not gender-neutral. Legal barriers and cultural norms sometimes bar women from holding bank accounts or entering into financial contracts in their

own right. Women generally have less control over the types of fixed assets that are usually necessary as collateral for loans.
Institutional discrimination by private and public lending institutions often either ration women out of the market or grant women loans that are smaller than those granted to men for similar activities (Fletschner, 2009; World Bank, FAO and IFAD, 2009)

2.6 Access to Information and New Technology

Modern information and communication technologies (ICTs) such as radio, mobile phones, computers and Internet services can also play an important role in transferring information. ICTs offer opportunities for accessing and sharing information faster, networking, the mobilization of resources and educational purposes. Mobile phone subscriptions in developing countries have doubled since 2005. To date, 57 out of 100 inhabitants (up from 23 in 2005) in developing countries have a mobile phone subscription (ITU, 2010).

These technologies may be beneficial for rural women whose ability to travel to distant markets is restricted. Rural women may face barriers in accessing ICTs because of their limited education and financial and time constraints. Locations that are convenient and appropriate for women to visit can help improve women's access (Best and Maier, 2007).
In Kenya the technology industry has led to the creation of new computer applications by technology enthusiasts that could be greatly beneficial to the rural women farmers e.g. The iCow, the money exchange transfer mobile application M-pesa and M-Farm,

M-Farm is a mobile-based marketplace that creates transparency for agricultural produce so that farmers and brokers can achieve better prices for their produce, the farmer sends an SMS to the code 3535, noting the product and the location they're interested in, and in less than 10 seconds the service sends them the price, which lets them decide where to sell. (Pisani F,2011)

The iCow is a voice based mobile information application for dairy farmers. The iCow helps farmers efficaciously track a cow's estrus cycle, manage nutrition and breeding, which will enable them to yield more milk and calves—the two indicators of a cow's economic value. This demand-drive and culturally appropriate technology complements the ubiquitous cellphone to address key agricultural challenges. Chief among these challenges are: Poor record keeping;

outmoded and hard to acquire and comprehend calendars, including the cardboard wheel system; and the gaping information vacuum. It delivers prompt farmers about their cow's nutrition, illness and diseases, vaccinations, milk hygiene, milking technologies and techniques. This is done via a series of voice prompts and SMS messages sent to the farmer throughout the cow cycle. Critically, the voice-based nature of this application combats the problem of literacy. (Tyrone Hall,2011)

Improvements in food security have been mentioned as one of the four major effects of M-PESA. While the other three effects are money circulation, transaction ease, and security of money . The food security aspect is important USAID (2010) reports that recurrent seasons of failed or poor rains, sustained high food prices, environmental degradation, outbreaks of disease, and flooding have led to deteriorating food security conditions throughout Kenya, leaving an estimated 3.8 million Kenyans highly food-insecure. Food security refers to sustained food production, and access to and consumption of adequate and nutritious food by most households to lead a healthy life. (Haas and Geeta Nagarajan,2011)

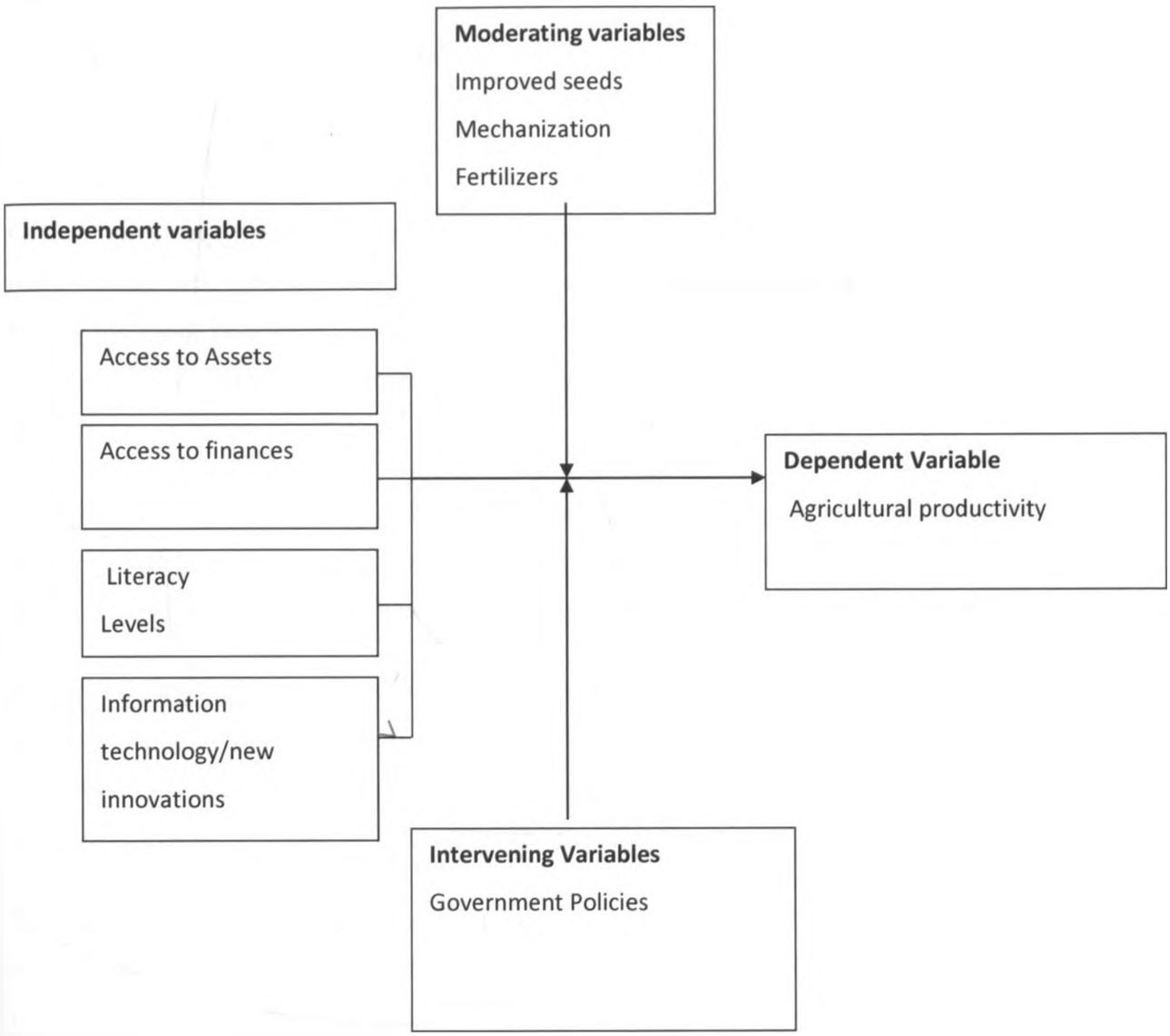
M-PESA (mobile money) is an agent-assisted, mobile phone-based, person-to-person payment and money transfer system that was launched in Kenya in 2007. It quickly grew and has become the most well-known system of its kind in the developing world. In May 2011, over 14 million people were M-PESA users, enabling them to send money in electronic form, store money on their mobile phones in an electronic account, and deposit or withdraw money in the form of hard currency at any of the 24,000 nationwide M-PESA agent locations. (Haas and Geeta Nagarajan, 2011)

One of the effects of M-PESA is in supporting the agricultural production system by increasing rural residents' ability to access funds in a timely manner.
M-PESA remittances help time-sensitive farming activities. There has been a noted increase in agricultural productivity in communities and often had experienced this increase themselves. For those that received remittances, M-PESA appears to increase the likelihood of being able to pay for seeds, casual labor, and other inputs at the time it is most needed, and allows them to plant more of their fields, customers receive money quickly and plant early and fully. In the past, famers might have missed the best quality seeds, fertilizers, or might not have had money in time

to plant their fields completely. In addition, in a study done many M-PESA receivers reported a savings in travel time and transport costs to obtain remittance money that they now could effectively use on productive agricultural activities. This has enabled them to plant their fields more fully and hire more labor when it can be most productive.

Effects of M-PESA on food security could also be sustained by augmenting its effects through effective partnerships with other service providers that are essential for improving agricultural productivity. They include financial institutions, insurance agents and water companies (Haas and Geeta Nagarajan,2011)

2.7 Conceptual framework



The Independent Variables in this study is the access to Assets that include land and livestock ownership, increased Literacy Levels, access to financial services including credit, access to information, technology and new innovations.

Land tenure is important in promoting equitable, sustainable agricultural development. Closing the gap on the agricultural land held by women could increase yields on their land to the levels achieved by men.

Access to will help reduce some of the wage gap and, more importantly, allow women to diversify by widening the opportunities available to them.

Increased Literacy allows rural women to access information on new seeds, developments and innovations; they are able to make informed choices on better farming practices and conservation methods useful to ensure maximum production.

Giving women equal rights to enter into financial contracts is crucial in countries where legal and customary restrictions prevent women from opening savings accounts, taking loans or buying insurance policies in their own right, access and availability of Microfinance programmes have been highly effective in overcoming the barriers faced by women in accessing formal credit markets.

Technological innovations such as the mobile phone service M-pesa plans to make money payments and transfer easier for women .These more accessible outlets can be particularly beneficial for rural women who have difficulty travelling to central business locations.

The Moderating variables are mechanization and improved seeds .Women's access to a broad range of technologies could help free their time for more productive activities, enhancing their agricultural productivity, improving the market returns they receive and empowering them to make choices that are better for themselves and their families.

Intervening variables are government policies. Policy Makers will obtain the information and analysis that reflect the diversity of the contributions women make and the specific challenges they are confronted with in order to make gender-aware decisions about the sector it will contribute to improving understanding so that appropriate policies are implemented

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design, target population, sample selection and sample size, research instruments, methods of data collection, validity and reliability of the instruments that were used in this study.

3.2 Research design

This study applied survey design. A survey is an attempt to collect data from members of a population in order to determine the current status of that population with respect to one or more variables (Mugenda 2003). It is also defined as a method of gathering primary data based on communication with a representative sample of individuals (Zikmund 2002).

A variable is a concept that stands for variation within a class of objects (Fraenkel 2000). According to Mugenda 2003 a variable is a measurable characteristic that assumes different values.

The survey design sought to describe the existing phenomena by asking individuals about their perception, attitude and behavior or values. It is a type of descriptive research. It can be used for explaining or exploring the existing status of two or more variables at a given point in time. It was chosen because it is the best method for collecting original data for the purpose of describing a population which is not easy to observe directly.

According to Fraenkel (2000) surveys possess the following characteristics. Information is collected from a group of people in order to describe some aspects or characteristics of the population of which that group is part. Information is collected by asking questions and the answers to the questions constitute the data of the study. Information is collected from a sample rather than from every member of the population.Survey design depends on cooperation of respondents

3.3 Target Population

A population is the total collection of elements about which we wish to make some inference (Cooper 2006).It can also be defined as an entire group of individuals, events or objects having a common observable characteristic (Mugenda O. and Mugenda A. 2003).

The study was conducted in Mwea Division of Kirinyaga district in Central Kenya .
Mwea Division is located about 100Km North east of Nairobi. The administrative capital of Kenya. It has an area of approximately 513 square Kilometers and a Population of 126,000 persons. (Kirinyaga District Strategic Plan 2005)
This Study's Target Population was Child-bearing/Married Women from Mwea in Kirinyaga.

3.4 Sample size estimation

A sample in a research study is a group on which information is obtained (Fraenkel 2000). A sampling design is a definite plan for obtaining a sample from a given population. It refers to the technique or procedure the researcher would adopt in selecting a sample (Kothari 1990). The whole idea of sampling is that by selecting some of the elements in a population we may draw conclusions about the entire population (Cooper 2006).

From the National Population Consensus for 2009 Male Versus female % Population was 50:50 in 2009. (Kenya Population Census 2009).The State of Kenya Population 2011 report from Kenya's Ministry of Planning indicates that 48% of Kenya's women are of child bearing stage (15-49) years old.The study targeted this particular age set of women who may be already married, settled and minding a family or a home.70% of Kenya's women population living in the rural areas derives their livelihood from the agricultural sector. (Ministry of Agriculture; 2010)

The total sample size is distributed within the study Sub-locations based on their population sizes as shown in the table below.

Sub Location	Total Population	FEMALE POPULATION (50% of Total population)	Women of Reproductive age (48% of Female Population)	70% of Rural women
MUTITHI	22439	11219	5385	3769
THIBA	31689	15844	7605	5323
NYANGATI	12812	6406	3074	2151
TEBERE	32915	16457	7899	5529
MURIDUKO	22593	11296	5422	3795
TOTAL	122,448	61222	29386	20570

Table 3.1; Total Population Mwea Constituency

The Sample size was determined by using Yaro Yamani Formula: (Yamane, 1967)

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

Where n = Sample size

N = Population of the study

e = Tolerable error (10%)

$$n=\frac{20570}{1 + 20570(0.1)^2}$$

=99.51

Round off 100

Assuming a dropout rate of 10%

100+10% (100)

Sample size = 110

3.5 Research Instruments

Questionnaire

Structured Questions were asked for basic and objective kind of information to establish the environment of the respondent's e.g. The Marital Status, Close ended questions that require either a YES or NO response were used. Unstructured open ended questions were asked where the respondents gave brief responses to questions in their own words.

3.6 Validity of the Instrument

According to Mugenda (2003), validity is the accuracy and meaningfulness of inferences which are based on research results. It is the degree to which results obtained from the analysis of data actually represent the phenomenon under study. It is the extent to which differences found with a measuring instrument reflect true differences among those being tested (Kothari 1990). Validity of a sample depends on accuracy and precision (Cooper 2006).

The Questionnaire was tested among a pilot group of 20 women from Uthiru in Nairobi.The questionnaire was revised and corrections done based on the feedback from the pilot study.

3.7 Reliability

Reliability is a measure of the degree to which a research instrument yields consistent results or data, after repeated trials (Mugenda 2003). Nachmias (1992) defines it as the extent to which a measuring instrument contains variable errors, that is errors that appear inconsistently from observation to observation during any one measurement attempt or that vary each time a given unit is measured by the same instrument. It is the degree to which an instrument will give similar results for the same individuals at different times.

Conditions under which the measurement took place were standardized by ensuring that external sources of variation such as boredom and fatigue are minimized to the extent possible. This was be done by creating a lively and friendly environment before carrying out the research.

3.8 Data Collection Procedure

The Questionnaires was administered to the rural women at the weekly "chamaa" meeting within the three respective sub locations. At this meeting, simple random sampling approach was employed, in which women were made to draw lots to indicate whether they would include in the study or not.

The Research assistants approached the group chair and request for special permission to explain the purpose of the study to the women and likely benefits of this study.
Women were requested to spare 30-45 minutes filling the questionnaires.
The research assistants were at hand to clarify and help out in the filling out process.

3.9 Data Analysis Technique

Data was entered and analyzed using the Statistical Package for Social Sciences software (SPSS version 19.0). Descriptive statistics was used to describe the baseline and socio-demographic characteristics of the women. Data on qualitative responses will be synthesized into themes and entered into electronic software (Microsoft Access 2007) for analysis

3.10 Operationalization of variables

The following is a table showing the operational definition of both dependent and independent varoables.

Table 3.2 Operationalization of variables

Objective	Variable	Indicators	Measurement scale	Data collection methods	Data analysis
1.To investigate the effects of access to land and livestock on rural women's agricultural productivity	**Dependent** Agricultural Productivity **Independent** Access to Land and Livestock	• Possession of tittle deeds • Ownership of livestock • Total monthly income	Ordinal	Questionnaire	Descriptive
2. To determine how literacy levels among rural women influence	**Dependent** Agricultural Productivity **Independent** To determine how literacy levels	• Level of education • Computer/internet literacy	Ordinal	Questionnaire	Descriptive

agricultural productivity	among rural women influence agricultural productivity	• Employment status • Knowledge on improved crop varieties, animal breeds, pest control.			
3.To establish the effects of access to finance by rural women on agricultural productivity	**Dependant** Agriculture productivity **Independent** Acess to finances	• Employment status • Benefits from Finance groups • Total monthly income • Knowledge on finance groups	ordinal	Questionnaire	Descriptive

4.To assess the use of emerging and new technologies in farming by rural women on agricultural productivity	**Dependent** Agricultural Productivity **Independent** New and emerging technologies	• Possession of Mobile Phones • Use of high breed seeds, fertilizers • Mechanization of farming.	Ordinal

Table 3.2 Operationalization of variables

Questionnaire	Descriptive

CHAPTER FOUR

DATA ANALYSIS PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter presents and interprets the findings of the study based on the research objectives. It presents findings on the factors influencing agricultural productivity among rural women in Mwea, Kirinyaga County.

4.2 Questionnaire Return Rate

The study group was the rural women. A sample of 110 women was selected by simple random sampling technique to ensure they were representative of all women farmers in Mwea. Chapter 3 elaborates further on the sampling methodology. Out of this sample, 91 useable questionnaires were recovered and used in this analysis, indicating a response rate of 82.7%.

SECTION A: RESPONDENTS BACKGROUND INFORMATION

Background information about the respondents that was relevant to the study objectives was captured. Tables 4.1 – 4.6 present these findings.

Table 4.1 Respondents Age

Age Bracket	Frequency	Percentage	C. Frequency
20-29	2	2.2	2
30-39	22	24.2	24
40-49	16	17.6	40
50-59	25	27.5	65
60-69	23	25.0	88
70+	3	3.3	91
Total	91	100.0	

A majority of respondents (27.5%) were between the ages 50-59 years. Over 50% respondents lied between the ages 50-69. This finding does reflect a general trend in Kenya, where farming activities are mostly practiced by middle aged people, approaching old age. This could be because farming is the major occupation of most retirees, who fall in the age brackets that most

farmers were found to fall and this adds up the number of farmers in that age bracket. Farming was least popular among the 20-29 years age bracket (2.2%), who are the youth.

This finding also reflects a common trend in Kenya where youth shun the country side, and opt to search for employment in the cities. The reason cited by most youth is that 'there is no money in agriculture and the country side'. The consequence of this trend is an influx of unemployed youth, searching for jobs in the urban areas.

Considering that agriculture is one of Kenya's main stays, the promotion of agribusiness can be a worthy cause as far as creating business opportunities, circulation of money and employment in the rural areas is concerned and as a result, attract more youth, who are the majority in the unemployed statistic, to employment in farming.

Table 4.2 Respondents Marital status

The researcher wanted to know what the marital status of the respondents was. This was necessary because in most women who are married are limited in their access to agricultural resources and most of the decisions are made by men who are the household heads. The results were tabulated in table 4.1 as shown

Table 4.2. Marital status of women respondents

Marital Status	Frequency	Percentage	C. Frequency
Single	9	9.9	9
Monogamous	52	57.1	61
Polygamous	18	19.8	79
Widowed	9	9.9	88
Divorced	3	3.3	91
Total	91	100.0	

Most respondents (57.1%) are married in monogamous unions, followed by 19.8% in polygamous unions. This finding reflects the popular trends in Kenya's social fabric, where monogamous marriages are the most preferred among the female gender, while polygamous unions, though fading, are still common place, especially in the rural areas, where this study was centered.

Table 4.3 Respondents Employment status

The researcher was interested to know the employment status of the respondents. This was necessary because employed respondents are more likely to be more knowledgeable and have greater access to finances, credit facilities and information compared to respondents not employed.

Table 4.3 employment status

Employment	Frequency	Percentage	C. Frequency
Employed	27	29.7	27
Not Employed	64	70.3	91
Total	91	100.0	

The majority, 70.3% of respondents had no alternative form of employment other than farming. This finding is aligned to the finding that most farmers were of post retirement age, as well as the assumption that farming is the major activity that most Kenyans retire too after formal employment. In addition, considering that farming is conducted in rural areas, which presents few economic opportunities outside farming, it is logical to conclude that a study of rural women involved in farming will yield a majority of respondents engaged primarily in farming activities.

Table 4.4 Respondents Level of education

The researcher wanted to know what the education level of the respondents was. This was necessary for the research study because the researcher wanted to know if education contributed to the use of improved agricultural practices in agriculture

Table 4.4 respondents' level of education

Education	Frequency	Percentage	C. Frequency
No Schooling	10	11.0	10
Primary	24	26.4	34
Secondary	31	34.0	65
College and Above	26	28.6	91
Total	91	100	

A majority of respondents (34%) were schooled up to secondary level, with 26.4% in primary level and 28.6% being of college level. This finding suggests that most respondents are literate enough to understand and respond to the questionnaires issued and so their responses can be considered reliable.

Table 4.5 Respondents Years in farming

The researcher wanted to know the number of years the respondents had been involved in farming. This was necessary because respondents with experience in farming were better placed to understand the issues under investigation.

Table 4.5 years in farming

Years of farming	Frequency	Percentage	C. Frequency
0-5	7	7.7	7
6-10	15	16.5	22
11-15	9	9.9	31
16-20	18	19.8	49
20+	42	46.1	91
Total	91	100.1	

46.1% of the respondents have been in farming for 20+ years, followed by 19.8% who have farmed for 16-20 years. With this finding, it is safe to assume that respondents were experienced and well versed with farming practices and could be relied upon to offer insightful responses to the questions raised by this study that is centered on farming practices among rural women.

Table 4.6 Respondents Computer literacy

The researcher wanted to find out from the respondents if they were computer literate and therefore able to use internet or not. This was necessary for the research study because internet is useful tool for information that be utilized to improve agricultural productivity.

Table 4.6 Respondents Computer Literacy

Literacy on computer and internet	Frequency	Percentage	C. Frequency
YES	26	28.6	26
NO	65	71.4	91
Total	91	100.0	

Only 28.6% of respondents were found to be computer literate and able to use the internet. This is a grim finding considering the potential the internet presents to businesses that use it as a tool to leverage their market share as well as gather knowledge on how to improve their business operations. Proper use of the internet can empower the rural women with information on modern farming practices as well as open doors to an expanded market, for the agricultural entrepreneur. This finding suggests that women in the study area are missing out on opportunities to develop their farming activities in terms of new markets as well as the mine of information that the internet presents.

To provide more insight, cross tabulation and correlation analysis was conducted to establish existence of interrelationships between study items. These were conducted on some key indicators of the main study variables of literacy levels, access to finance and access to farm assets.

Indicators identified for literacy levels were: level of education; computer/internet literacy; age; employment status; agricultural technology knowledge; knowledge on improved crop varieties; knowledge on improved animal breeds; knowledge on fertilizers; knowledge on pest control. Indicators for access to finance: employment status; benefit from finance groups; total monthly income; knowledge on finance groups. Indicators for access to farm assets: livestock ownership; use of technology/machinery; total monthly income.

(i) Cross tabulation of Indicators for literacy levels as a variable

Table 4.7: Age against Computer / Internet literacy cross tab

Age		20-29	30-39	40-49	50-59	60-69	70+
Computer Literate	Yes	4	5	7	5	0	0
	No	0	20	7	23	15	5
Total		4	25	14	28	15	5

Cross tabulation revealed the existence of a relationship between age of respondents and their computer literacy. All respondents in the 20 – 29 age bracket were computer literate. This

however seemed to decrease with increasing age. In the older age brackets, fewer employees could use the computer and internet.

At age 60+ no respondent could use the internet or computer. Table 4.6 summarizes these findings. This finding reflects society, where younger members are more tech savvy than the older ones. The internet is a known source of a wealth of information, including information on agriculture, as well as being a tool for communication, which can facilitate the exchange of ideas and networking for business.

In the context of this study, this finding indicates that the older respondents are at a disadvantage when it comes to accessing information from the internet, including information that could be vital to improving agricultural productivity, as well as trailing the younger respondents in taking advantage of the networking opportunities that the internet presents which could also be used to improve agricultural productivity.

Education Level		Never attended School	Primary	Secondary	College
Are you employed	Yes	0	0	21	4
	No	5	33	26	2
Total		5	33	47	6

Table 4.8: Level of Education aganist Employment cross tab

Table 4.8 above presents the cross tabulation between level of education and employment status. It indicates that higher levels of education had more respondents in employment compared to lower levels. All respondents with primary level or lower qualification were unemployed, while majority of respondents with college level education were employed.

Majority of respondents with secondary qualifications were unemployed. Consequently, it can be said that employment is dependent on level of education, which reflects on respondents' literacy. Hence, it can be said that employed respondents were more literate, and were likely to use their literacy to improve their agricultural productivity.

Table 4.9 Level of Education against Computer / Internet literacy

Education level		Never attended school	Primary	Secondary	College
Are you employed	Yes	0	0	17	4
	No	5	33	30	2
Total		5	33	47	6

Computer/internet literacy was highest among those respondents with secondary and college level qualifications, while all respondents with primary level or no schooling, were not computer literate. In the context of this study, based on the fact that the internet provides a wealth of information on various topical issues, including agriculture, respondents with higher levels of education were likely to get access to information from the internet that would inform their decisions on productive farming, hence improve their productivity.

The impact of the level of education on respondents' knowledge about various key inputs of productive agriculture, such as agricultural technology, including machinery, improved crop varieties, improved animal breeds, fertilizer use and pest control measures was also investigated. The general trend was that knowledge on these key inputs was positive among respondents with higher levels of education hence dependent on the level of education. Tables 4.10 – 4.14 summarize these findings.

Table 4.10: Level of Education aganist Agriculture Technology knowledge

Education level		Never attended School	Primary	Secondary	College
Technical Knowledge About machinery	Yes	0	16	45	6
	No	5	17	2	0
Total		5	33	47	6

All respondents with no schooling had no knowledge on technology and agricultural machinery while all those with college and above education indicated that they had knowledge on agricultural technology, including machinery. At the secondary level, 95% of respondents (45 of

47) indicated that they had knowledge on machinery and technology (Table 4.10). This finding suggests that higher levels of education empowered respondents with knowledge on technologies that are needed to improve agricultural productivity, hence increased the chances of them improving their productivity.

Table 4.11: Level of Education aganist Knowledge on improved crop varieties

Education Level		Never attended school	Primary	Secondary	College
Knowledge about Improved crops/seeds	Yes	0	31	45	6
	No	5	2	2	0
Total		5	33	47	6

Education levels also had a similar impact on knowledge on improved crop varieties. All respondents with no schooling had no knowledge on improved crop varieties, while all those with college and above education indicated that they had this knowledge. At the secondary level, 95% of respondents (45 of 47) indicated that they had this knowledge (Table 4.11). This finding suggests that higher levels of education empowered respondents with knowledge on improved crop varieties that are needed to improve agricultural productivity, hence increased the chances of them improving their agricultural productivity.

Table 4.12: Level of Education against Knowledge on improved animal breeds

Education Level		Never attended school	Primary	Secondary	College
Knowledge About improved Animal breeds	Yes	0	28	40	6
	No	5	5	7	0
Total		5	33	47	6

On knowledge on improved animal breeds, a similar trend was observed where all respondents with no schooling had no knowledge on improved animal breeds, while all those with college and above education indicated that they had this knowledge. At the secondary level, 85% of respondents (40 of 47) indicated that they had this knowledge (Table 4.12). Based on this

finding, it can be said that higher levels of education empowered respondents with knowledge on improved animal breeds that are needed to improve agricultural productivity, hence increased their chances of improving their agricultural productivity.

Table 4.13: Level of Education against Knowledge on fertilizers

Education Level		Never attended school	Primary	Secondary	College
Knowledge About Fertilizers	Yes	0	31	45	6
	No	5	2	2	0
Total		5	33	47	6

Knowledge on fertilizers was similarly tied to education level with all respondents with no schooling indicating that they had no knowledge on fertilizers, while all those with college and above education indicated that they had this knowledge. At the secondary level, 95% of respondents (45 of 47) indicated that they had this knowledge (Table 4.13). Once again, this finding shows that higher education levels create opportunities for respondents to improve their crop productivity by using fertilizers as the education empowers them with relevant knowledge on fertilizers, which is needed if the fertilizers are to be used effectively.

Table 4.14: Level of Education against Knowledge on pest control cross tabulation

Education level		Never attended school	Primary	Secondary	College
Knowledge about Pest Control	Yes	0	16	37	6
	No	5	17	10	0
Total		5	33	47	6

All respondents with no schooling were unaware of these inputs that increase agricultural productivity, while all respondents with college level and above certifications were aware of these inputs. This shows that higher levels of education also increased respondents' literacy levels on agricultural inputs that are critical to increased productivity.

Table 4.15: Age against Level of Education cross tabulation

Age bracket	Level of education			
	No schooling	Primary	Secondary	College and above
20-29	0	0	2	2
30-39	0	16	9	0
40-49	0	4	8	2
50-59	0	21	7	0
60-69	2	11	0	2
70+	3	2	0	0

Older the respondents were less educated. This was the general trend established by this study. As presented in table 4.15 above, the only respondents with no schooling were above 60 years, while the 20 – 29 age bracket had all respondents in the secondary and college and above levels of education. Consequently, based on this finding, it can be concluded that older respondents had lower general literacy levels, and were therefore less likely to access information required to improve agricultural productivity when compared to younger respondents who had higher levels of education, indicating higher literacy levels and a higher capacity to access and comprehend information that could guide their decisions on increasing agricultural productivity.

Contribution of the internet / computer literacy to respondents' knowledge on key farm inputs for improving agricultural productivity.

Improving agricultural productivity requires the use of relevant inputs to increase both crop and animal productivity. Some of these inputs captured in this study include agricultural technologies / machinery, improved crop varieties, improved animal breeds, fertilizers and pest control measures.

The use of these technologies presupposes knowledge of their existence and effective application. Among the sources of information on these inputs available to the respondents are the extension services at the district level. Considering efforts being put in place to bridge the digital divide, the internet was also considered as another possible source of information on these inputs to the respondents.

This study therefore sought to determine the contribution of the internet to the respondents' knowledge on these inputs using correlation analysis of select indicators for literacy levels. The indicators selected were those that cross cut both the knowledge on the computer / internet as well as knowledge on farm inputs for improving productivity. This correlation also shows the contribution of the internet to knowledge of microfinance groups among other correlations.

As is evidenced in table 4.16, the highest correlation between the internet knowledge and knowledge on key farm inputs that boost productivity is that with knowledge on agricultural technology at a score of 0.328. This is a very weak correlation though positive. It means that the internet only contributes 32.8% to respondents' knowledge on agricultural technology. Other scores are 0.181 (Internet and knowledge on improved crop varieties); 0.263 (internet and knowledge on improved animal breeds); 0.181 (internet and knowledge on fertilizers); 0.241 (internet and pest control knowledge). In addition, respondents only gain 15.8% of their knowledge about finance groups from the internet, as it has a weak correlation of 0.158.

Consequently, it is safe to conclude that the internet is not a major source of information for the respondents. However, strong correlations existed between some of the indicators. The highest was between improved crop varieties and fertilizer at 0.753. Other indicators which scored above 0.5 were agricultural technology and fertilizers (0.554); improved crop varieties and improved animal breeds (0.502); improved crop varieties and knowledge on finance groups (0.595); improved animals and fertilizers (0.502); improved animals and pest control (0.533); pest control and agricultural technology (0.552). This means that respondents who are knowledgeable agricultural inputs, know about more than one input.

		Internet/comp literacy	Agric. Tech Knowledge	Knowledge on improved plants	Improved animal knowledge	Fertilizers knowledge	Pest control knowledge	Finance groups knowledge
Internet/comp. literacy	Pearson Correlation	1	.328**	.181	.263*	.181	.240*	.158
	Sig. (2-tailed)		.002	.085	.012	.085	.022	.134
	N	91	91	91	91	91	91	91
Agric. Tech Knowledge	Pearson Correlation	.328**	1	.386**	.481**	.554**	.552**	.108
	Sig. (2-tailed)	.002		.000	.000	.000	.000	.308
	N	91	91	91	91	91	91	91
Knowledge on improved plants	Pearson Correlation	.181	.386**	1	.502**	.753**	.450**	.595**
	Sig. (2-tailed)	.085	.000		.000	.000	.000	.000
	N	91	91	91	91	91	91	91
Improved animal breeds knowledge	Pearson Correlation	.263*	.481**	.502**	1	.502**	.533**	.391**
	Sig. (2-tailed)	.012	.000	.000		.000	.000	.000
	N	91	91	91	91	91	91	91
Fertilizers knowledge	Pearson Correlation	.181	.554**	.753**	.502**	1	.296**	.319**
	Sig. (2-tailed)	.085	.000	.000	.000		.004	.002
	N	91	91	91	91	91	91	91
Pest control knowledge	Pearson Correlation	.240*	.552**	.450**	.533**	.296**	1	.219*
	Sig. (2-tailed)	.022	.000	.000	.000	.004		.037

		N	91	91
Finance knowledge	groups	Pearson Correlation	.158	.108
		Sig. (2-tailed)	.134	.308
		N	91	91

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

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

Table 4.16: Correlations on some indicators of literacy levels

91	91	91	91	91
.595**	.391**	.319**	.219*	1
.000	.000	.002	.037	
91	91	91	91	91

ACCESS TO FARM ASSETS

Effect of access to land, livestock and machinery assets on rural women agricultural productivity

The respondents were required to indicate if they owned any land and if they did who owned the land. This was necessary because the researcher was interested to know the extent to which women owned and controlled land as an asset for agricultural production. The findings revealed that land ownership was heavily biased towards household heads.

Table 4.17 Land ownership

Land ownership	Frequency	Percent	C. Percent
Household head	75	82.4	82.4
Spouse	8	8.8	91.2
Grandparents	5	5.5	96.7
Others	3	3.3	100
Total	91	100	

With this finding, it is safe to conclude that land ownership would be a limiting factor on rural women agricultural productivity. The fact that land title is vested on the household head in 75% of the cases investigated, who is traditionally considered to be a male figure in most of the cases, means any action the woman takes on the land must be approved by the head, and this curtails the women's freedom to exercise and realize their full agricultural productivity potential.

Table 4.18 Size of land

Acreage	Frequency	Percent	C. Percent
0-1	66	72.5	72.5
2-3	12	13.2	85.7
3-4	8	8.8	94.5
>4	5	5.5	100
Total	91		

Most respondents practiced their farming on a maximum of 1 acre piece of land. This size of farm limits a farmer to subsistence farming, as intensive commercial farming requires land sizes far greater than 1 acre. Consequently, based on this finding, it is safe to conclude that limited land sizes are another limiting factor on rural women agricultural productivity. The land sizes used by 74% of respondents confine them to small scale subsistence farming, which is not

profitable and focuses on food production for the household. Therefore, land size is a limiting factor toward the rural women launching into profitable commercial large scale farming.

(ii) Cross tabulation of Indicators for access to farm assets as a variable

Farm assets considered in this case were cattle and agricultural machinery. Indicators used were livestock ownership,agricultural technology including machinery, total monthly income and benefit from finance groups.

Table 4.19: Livestock ownership against Benefit from micro finance groups cross tabulation

Livestock Ownership	Benefit from Micro Finance groups		Total
	Yes	NO	
Yes	38	24	62
No	21	8	29
Total	59	32	91

Most respondents who owned livestock also benefited from microfinance loans. According to the findings of this study, less than 40% of respondents who owned livestock assets had not benefited from financing by external sources/finance groups. This shows the vital role, finance groups play in helping farmers acquire and enlarge the sizes of their livestock herds, which are farm assets, and hence boost their productivity of livestock based products.

Table 4.20: Total monthly income against Livestock ownership cross tabulation

Total monthly Income CATTLE

Count

	CATTLE		
	Yes	NO	Total
Income <2500	2	2	4
2500-5000	10	15	25
5000-10000	18	8	26
10000-20000	9	2	11
20000-30000	7	2	9
>30,000	16	0	16
Total	62	29	91

The relationship between the earning capacity of the respondents and their ownership of farm assets like livestock was also tested. The findings revealed that all farmers who earned over kshs 30,000 per month own cattle. Most cattle owners are in the 10,000 and above monthly income range. It was therefore sufficient to conclude that low earning capacity is a limitation toward farmers owning cattle as assets and hence improving their productivity.

Count

		Tech/machinery use		
		YES	NO	Total
Income	<2500	2	2	4
	2500-5000	0	25	25
	5000-10000	2	24	26
	10000-20000	0	11	11
	20000-30000	4	5	9
	>30,000	9	7	16
	Total	17	74	91

Table 4.21: Total monthly income aganist Agriculture technology / machinery use

The use of agricultural technology, including machinery was heavily skewed against low and middle income earners. In all the income categories, there were a remarkably low number of respondents using machinery compared to those not using the machines. In the 10,000 – 20,000 income category for instance, there were a total of 11 respondents, none of them using machines. In the above 30,000 monthly income category, majority of respondents were using machinery. Consequently, it is safe to conclude that the current cost of using machinery is prohibitive for most respondents, hence, limits their agricultural productivity.

ACCESS TO FINANCIAL SERVICES AND USE OF MODERN I.C.T. INNOVATIONS IN FARMING

Table 4.22 Total monthly household income

Income	Frequency	Percent	C. Percent
2500	4	4.4	4.4
2500-5000	9	9.9	14.3
5000-10000	20	22.0	36.3
10000-20000	23	25.3	61.5
20000-30000	26	28.6	90.1
>30000	9	9.9	100
Total	91	100.0	

28.6% of households represented had monthly incomes ranging between Kshs. 20,000-30,000, 25.3% had incomes ranging Kshs. 10,000-20,000, while 22% had incomes ranging Kshs. 5000-10,000. Therefore, 75.9% of households represented had monthly incomes of Kshs. 5000-30,000. I addition, 9.9% of households had monthly incomes >Kshs. 30,000. Considering that 70.5% had agriculture as their only source of livelihood, this finding reflects the earning potential of agricultural activities in the area. Consequently, it is safe to conclude that up scaling agricultural activities in the area will greatly improve the earnings of the households and women under this study

Mobile money transfer and bank transactions use frequency

The frequency with which the respondents used mobile money transfer services as well as their frequency of conducting bank transactions were captured and used as indicators of respondents' use of modern ICT innovations in farming and access to financial resources. Tables 4.23 and 4.24 summarize these findings.

Table 4.23 Frequency of using mobile money transfer services

Frequency of use	Frequency	Percent	C. Percent
Very often	4	4.4	4.4
Often	28	30.8	35.2
Sometimes	16	17.6	52.7
Rarely	25	27.5	80.2
Never	18	19.8	100
Total	91	100	

Table 4.24 Frequency of using the bank for financial transactions

Frequency of use	Frequency	Percent	C. Percent
Very often	7	7.7	7.7
Often	4	4.4	12.1
Sometimes	10	11.0	23.1
Rarely	27	29.7	52.7
Never	43	47.3	100
Total	91	100	

35.2% of respondents indicated that they used mobile money services often or very often, as opposed to 12.1% of respondents who indicated that they used the bank often or very often to make transactions. This finding shows that mobile money services are more accessible and preferred by the respondents. Consequently, the promotion of access to mobile money innovations among the rural women will have a more rapid impact in as far as the input of financial services to promoting agricultural productivity among rural women is concerned, as opposed to promoting banking services, whose accessibility and adoption among the study group seems to lag far behind the adoption, accessibility and use of mobile money services.

(iii) Cross tabulation and correlation of Indicators for access to finance as a variable

To determine whether knowledge on finance groups contributed towards benefiting from them, both cross tabulations and a correlation analysis of these indicators was conducted. Tables 4.25 and 4.26 present these findings.

Table4.25: Knowledge on finance groups against benefit from finance groups cross tabulation

Finance groups knowledge ,Benefited from finance group

Count

		Benefited from group		
		YES	NO	Total
Knowledge groups	on YES	57	27	84
	NO	2	5	7
	Total	59	32	91

Cross tabulation seemed to indicate that most of respondents who benefited from these finances were aware of the groups offering them. About 69% of respondents who benefited had knowledge of the groups that offer financing. However, considering the important role that financing plays in empowering farmers to acquire assets that would improve their productivity, the strength of the relationship between knowledge of finance groups and acquisition of loans was tested further using correlation analysis.

Table 4.26 Correlation between knowledge on finance group and acquiring loan

		Finance groups knowledge	Benefited from groups
Finance knowledge groups	Pearson Correlation	1	.219*
	Sig. (2-tailed)		.037
	N	91	91
Benefited from groups	Pearson Correlation	.219*	1
	Sig. (2-tailed)	.037	
	N	91	91

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

Findings reveal a correlation of only 0.219, which is way below the threshold of 0.5 that would indicate the existence of a significant relationship between variables. This means that knowledge about a finance groups only contributes 21.9% toward acquiring a loan facility to improve agricultural productivity. Consequently, knowledge about finance groups will not contribute significantly to acquiring financing.

Table 4.27 Total monthly income, Benefit from finance group cross tabulation

Total monthly income aganist Benefited from group

Count

	Benefited from group		
	YES	NO	Total
Income <2500	2	2	4
2500-5000	18	7	25
5000-10000	17	9	26
10000-20000	7	4	11
20000-30000	6	3	9
>30,000	9	7	16
Total	59	32	91

In all the income categories, most respondents have benefited from finance groups. This finding indicates that financing is accessible for most respondents in the study area, regardless of their earning capacity.

Table 4.28: Total monthly income, Employment status cross tabulation

Total monthly income against Employment status

Count

		Employment status		
		Yes	No	Total
Income	<2500	2	2	4
	2500-5000	2	23	25
	5000-10000	7	19	26
	10000-20000	0	11	11
	20000-30000	4	5	9
	>30,000	10	6	16
	Total	25	66	91

Employment is perceived as an additional source of income, and therefore, it increases earning capacity and access to finance. In this study, majority of respondents in the highest earning category (>30,000) are also employed. This finding indicates that the earning capacity of agriculture is low, and that employment increases the respondents' access to finance

CHAPTER 5

SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

INTRODUCTION

This chapter summarizes the findings of the study and draws conclusions from the findings. It also gives recommendations on what should be done. It identifies gaps that exist and suggests areas of further research.

SUMMARY OF FINDINGS

From the findings of this study there is a general trend in Kenya, where farming activities are mostly practiced by middle aged people, approaching old age. This could be because farming is the major occupation of most retirees; this may reflect a scenario where the gains and benefits from agriculture especially in the rural areas may not be maximized since most of the younger middle aged and able generation opt to migrate to urban centers and cities in search of formal employment.

Data obtained from an assessment of Land ownership revealed that land ownership was heavily biased towards household heads. With this finding, it is safe to conclude that land ownership would be a limiting factor on rural women agricultural productivity. The fact that land title is vested on the household head in 75% of the cases investigated, who is traditionally considered to be a male figure in most of the cases, means any action the woman takes on the land must be approved by the head, and this curtails the women's freedom to exercise and realize their full agricultural productivity potential.

In most cases for women to borrow any form of credit from financing institutions they would need collateral such as Tittle deeds which in this case they don't own. This becomes a limiting factor when sourcing for financing to improve farming limiting productivity

Most respondents practiced their farming on a maximum of 1 acre piece of land. This size of farm limits a farmer to subsistence farming, as intensive commercial farming requires land sizes far greater than 1 acre.
In most cases land was generally subdivided among male heirs reducing the pieces of land owned per family substantially. Consequently, based on this finding, it is safe to conclude that limited land sizes are another limiting factor on rural women agricultural productivity.

Most respondents who owned livestock also benefited from microfinance loans. According to the findings of this study, less than 40% of respondents who owned livestock assets had not benefited from financing by external sources/finance groups. This shows the vital role, finance groups play in helping farmers acquire and enlarge the sizes of their livestock herds, which are farm assets, and hence boost their productivity of livestock based products.

A majority of respondents (34%) were schooled up to secondary level, with 26.4% in primary level and 28.6% being of college level. This finding suggests that most respondents are literate enough to understand any information supporting modern agriculture practices and efforts should be made to offer training at the grassroots.

Only 28.6% of respondents were found to be computer literate and able to use the internet. This is a grim finding considering the potential the internet presents to businesses that use it as a tool to leverage their market share as well as gather knowledge on how to improve their business operations.

Proper use of the internet can empower the rural women with information on modern farming practices as well as open doors to an expanded market, for the agricultural entrepreneur. This finding suggests that women in the study area are missing out on opportunities to develop their farming activities in terms of new markets as well as the mine of information that the internet presents.

Cross tabulation and correlation analysis was conducted to establish existence of interrelationships between study items.

Cross tabulation revealed the existence of a relationship between age of respondents and their computer literacy. All respondents in the 20 – 29 age brackets were computer literate. This however seemed to decrease with increasing age.

Cross tabulation between level of education and employment status. It indicates that higher levels of education had more respondents in employment compared to lower levels. All respondents with primary level or lower qualification were unemployed, while majority of respondents with college level education were employed.

The impact of the level of education on respondents' knowledge about various key inputs of productive agriculture, such as agricultural technology, including machinery, improved crop varieties, improved animal breeds, fertilizer use and pest control measures was also investigated. The general trend was that knowledge on these key inputs was positive among respondents with higher levels of education hence dependent on the level of education

Education levels also had a similar impact on knowledge on improved crop varieties. All respondents with no schooling had no knowledge on improved crop varieties, while all those with college and above education indicated that they had this knowledge. At the secondary level, 95% of respondents (45 of 47) indicated that they had this knowledge (Table 4.10). This finding suggests that higher levels of education empowered respondents with knowledge on improved crop varieties that are needed to improve agricultural productivity, hence increased the chances of them improving their agricultural productivity.

On knowledge on improved animal breeds, a similar trend was observed where all respondents with no schooling had no knowledge on improved animal breeds, while all those with college and above education indicated that they had this knowledge. At the secondary level, 85% of respondents (40 of 47) indicated that they had this knowledge (Table 4.11)

Knowledge on fertilizers was similarly tied to education level with all respondents with no schooling indicating that they had no knowledge on fertilizers, while all those with college and above education indicated that they had this knowledge. At the secondary level, 95% of respondents (45 of 47) indicated that they had this knowledge (Table 4.12).

As is evidenced in table 4.15, the highest correlation between the internet knowledge and knowledge on key farm inputs that boost productivity is that with knowledge on agricultural technology at a score of 0.328. This is a very weak correlation though positive. It means that the internet only contributes 32.8% to respondents' knowledge on agricultural technology. Other scores are 0.181 (Internet and knowledge on improved crop varieties); 0.263 (internet and knowledge on improved animal breeds); 0.181 (internet and knowledge on fertilizers); 0.241 (internet and pest control knowledge). In addition, respondents only gain 15.8% of their knowledge about finance groups from the internet, as it has a weak correlation of 0.158.

About 69% of respondents who benefited from finance groups had knowledge of the groups that offer financing. However, considering the important role that financing plays in empowering farmers to acquire assets that would improve their productivity, the strength of the relationship between knowledge of finance groups and acquisition of loans was tested further using correlation analysis

Findings reveal a correlation of only 0.219, which is way below the threshold of 0.5 that would indicate the existence of a significant relationship between variables. This means that knowledge about a finance groups only contributes 21.9% toward acquiring a loan facility to improve agricultural productivity. Consequently, knowledge about finance groups will not contribute significantly to acquiring financing.

In all the income categories, most respondents have benefited from finance groups. This finding indicates that financing is accessible for most respondents in the study area, regardless of their earning capacity

About 28.6% of households represented had monthly incomes ranging between Kshs. 20,000-30,000, 25.3% had incomes ranging Kshs. 10,000-20,000, while 22% had incomes ranging Kshs. 5000-10,000. Therefore, 75.9% of households represented had monthly incomes of Kshs. 5000-30,000. In addition, 9.9% of households had monthly incomes >Kshs. 30,000. Considering that 70.5% had agriculture as their only source of livelihood, this finding reflects the earning potential of agricultural activities in the area. Consequently, it is safe to conclude that up scaling agricultural activities in the area will greatly improve the earnings of the households and women under this study

The frequency with which the respondents used mobile money transfer services as well as their frequency of conducting bank transactions were captured and used as indicators of respondents' use of modern ICT innovations in farming and access to financial resources.35.2% of respondents indicated that they used mobile money services often or very often, as opposed to 12.1% of respondents who indicated that they used the bank often or very often to make transactions.

This finding shows that mobile money services are more accessible and preferred by the respondents. Consequently, the promotion of access to mobile money innovations among the rural women will have a more rapid impact in as far as the input of financial services to promoting agricultural productivity among rural women is concerned.

The use of agricultural technology, including machinery was heavily skewed against low and middle income earners. In all the income categories, there were a remarkably low number of respondents using machinery compared to those not using the machines. In the 10,000 – 20,000 income category for instance, there were a total of 11 respondents, none of them using machines. In the above 30,000 monthly income category, majority of respondents were using machinery. Consequently, it is safe to conclude that the current cost of using machinery is prohibitive for most respondents, hence, limits their agricultural productivity

DISCUSSION

To improve women farmers' productivity in the region, less discriminatory laws and policies must replace legislation and customs that constrain women's access to factors of production such as land, credit, inputs, information and technology. The interventions must be situation-specific. Actions must be technically relevant and be suited to the sociocultural and religious precepts of the farming community and the resources of the community

When women do own or have access to land they often have a limited access to agricultural support services, such as credit with which they can purchase inputs, and to advice and training in agricultural technology. This limited access may arise from a range of factors, including legal restrictions (such as the need for a male signatory); lack of collateral (e.g. land title); lack of

information about credit availability; and lack of small-scale services such as micro-credit schemes.

Giving women equal rights to enter into financial contracts is a crucial first step in countries where legal and customary restrictions prevent women from opening savings accounts, taking loans or buying insurance policies in their own right.

Micro - credit schemes are important in order to stimulate the economy at the local level. Such schemes are potentially of great usefulness in helping rural women create their own paths out of poverty.

Women must have access to loans for all types of profitable agricultural activities, not just those prescribed by gender stereotyping. This will require a realistic assessment of the loan required and the likelihood of default.

Credit facilities should be accompanied by agricultural technical skills and human development training both for women and community leaders, to enable them to utilise and receive full benefit from loans. Collective enterprises undertaken by women's groups for farming enterprises on leased land or joint ownership can succeed when the groups are provided with management training and support.

Equal access to credit means more than just micro-credit. The full range of economic policies, including banking regulations and access to commercial credit and other financial services, needs to be reviewed to ensure that there are no explicit or implicit barriers to full gender equality and equity.

The most appropriate strategy to reach and assist greater numbers of rural women is to integrate them in mainstream agricultural programmes with the objective of reaching both women and men with all types of agricultural services and resources.

The integration of women in agricultural programmes can be achieved by specifically including women as a target in all major agricultural components, such as credit, technological skills and

other training, delivery of extension and inputs, access to expanding markets, agricultural research and education and price support of agricultural products.

The changes needed to make existing policies, programmes and projects gender sensitive will require close monitoring and evaluation), and are best achieved by pressure from groups within countries such as CBOs and NGOs.

CONCLUSION

Increasing women's access to land, livestock, education, financial services, technology and rural employment would boost their productivity and generate gains in terms of agricultural production, food security, economic growth and social welfare.

RECOMMENDATIONS

I recommend that there needs to be an Increase rural women's access to land, credit services and entrepreneurship training.

I recommend that any review or reform of land tenure legislation fully considers the needs of women farmers, especially in situations where there are significant numbers of female-headed households further to preserve women's traditional or communal land rights through non-discriminatory registration and titling. There needs to be amendment or adoption legislation to ensure that women can own and inherit land and Insist that women farmers be given fair treatment in the allocation of land following any resettlement.

I recommend that there be a Simplification of lending processes so that illiterate and semi-literate rural women can effectively make use of credit facilities.

I recommend that there be enacted legislation to ensure that there are no restrictive procedures for borrowing, e.g. regarding collateral, with which women cannot comply.

I recommend the promotion of agribusiness in the rural areas as a source of business opportunities and employment

I recommend training of rural women on computer literacy either though mobile internet clinics or through their chamaas where they are taught the benefits of using internet to find new

information on better farming practices, find new markets for their crops and network to share and exchange information and experiences. New innovations such as M-pesa,icow and M farm would greatly influence yields if the rural women were trained on their benefits.

AREAS OF FURTHER RESEARCH

Based on the findings of this research, I suggest further research should be done on agro-based processing and marketing of produce with emphasis laid on agribusiness infrastructure development, finding markets for farm produce and how to effectively market their products to gain maximum profits

Further studies need to be done on the benefits of offering entrepreneurship training to rural women farmers and the implications on farm productivity

REFERENCES

Alila, P. and Atieno, R (2006). Institute of Development studies..*Agricultural production in Kenya Issues and Process*, A paper for the Future Agricultures Consortium workshop

Badr,K. (2010).*Rural women and agriculture in the MENA*: International center for advanced Mediterranean Studies.

CIMMYT Economics Program Paper No. 99-02. Mexico .*Implications for Agricultural Research Institutions*; with an Annotated Bibliography

Doss, C.R. (1999).*Twenty-Five Years of Research on Women Farmers in Africa: Lessons and Implications for Agricultural Research Institutions*; with an Annotated Bibliography. CIMMYT Economics Program Paper No. 99-02. Mexico

FAO. (1998).*Rural women and food security: current situation and perspectives*. Rome.

FAO. (1994).*Women, Agriculture and Rural development, a synthesis report of the Africa region*.Rome.

FAO (1994).Corporate Document Repository, Economic and Social Development department: *A synthesis report of the Near East Region -Women, agriculture and rural development* :adapted from Human Development Report and Country Papers, UNDP, 1994

FAO. (2009). *Women and Rural Employment, Economic and Social Perspectives*, Policy brief number 5.Rome

FAO. (2011).*The state of food and agriculture,2010-2011: Women in agriculture, closing the gender gap for development* .Rome

Haas and Geeta Nagarajan.(2011).*Transforming mobile money into food in Kenya*: the Iris Centre University of Maryland College Park.

Hall T.2011, Sustainable Agriculture. http://agriculture.gbiportal.net/2011/06/07/kenyan-the-land-of-the-apps-churns-out-the-icow/ (Accessed: 1st April, 2012).

International Food Policy Research Institute. (2002). *Reaching sustainable food security for all by 2020, Getting the priorities and responsibilities right.* Washington,DC.

International Women Media Foundation Report.(2009).*Sowing the Seeds.*

K.A. Saito, H. Mekonnen and D. Spurling.(1994). *Raising productivity of women farmers in sub-Saharan Africa.*World Bank Discussion Paper 230.Washington, DC.

Kothari, C. (1990). *Research methodology: Methods and techniques.* New Delhi: New Age International (P) Limited

Moock. 1976. The efficiency of women as farm managers: Kenya.
American Journal of Agricultural Economics: Proceedings Issue, 58(5): 831-835.

MapLibrary (2007)
(http://www.maplibrary.org/stacks/Africa/Kenya/Central/Kirinyaga/index.php

Ministry of Planning and National Development.2010.*Kirinyaga District Strategic Plan 2005-2010 for Implementation of the National Population Policy for Sustainable Development.*Kenya
Ministry Of Agriculture. (2010).*Gender Mainstreaming Strategy.* Kenya

Mugenda O. and Mugenda A. (2003) *Research Methods: Quantitative and Qualitative approaches.* Nairobi ACTS PRESS

Nachmias, F.(1992).*Research methods in the social sciences.* London: St Martin's press

Pisani F. (2011). M-Farm Lets Kenyan farmers find Price with SMS,
http://www.capgemini.com/winch5-blog/2011/10/mfarm-lets-kenyan-farmers-find-market-prices-sms/ (Accessed: 1st April, 2012).

Quisumbing, A. and L. Pandolfelli. (2009). *Promising approaches to address the needs of poor female farmers - resources, constraints and interventions* :IFPRI discussion paper 00882, IFPRI, Washington.

Rosegrant et al. (2005).*Looking Ahead, Long-Term prospects for Africa's Agricultural Development and Food Security.*Washington D.C.: IFPRI

Sangeeta Rangneka; *The Role of Women in Small-Holder Rain fed and Mixed Farming in India.*India

Selvin S. (1991). *Statistical analysis of epidemiological data.* Oxford Univ. Press. New York; 87-89.

Unite Nations. (2008).*Mainstreaming Gender into trade and development Strategies in Africa,* Trade Negotiations and Africa series No 4. UN

United Kingdom Department for International Development (2010) Agenda. (2010). - *The turning point on poverty*: background paper on gender.

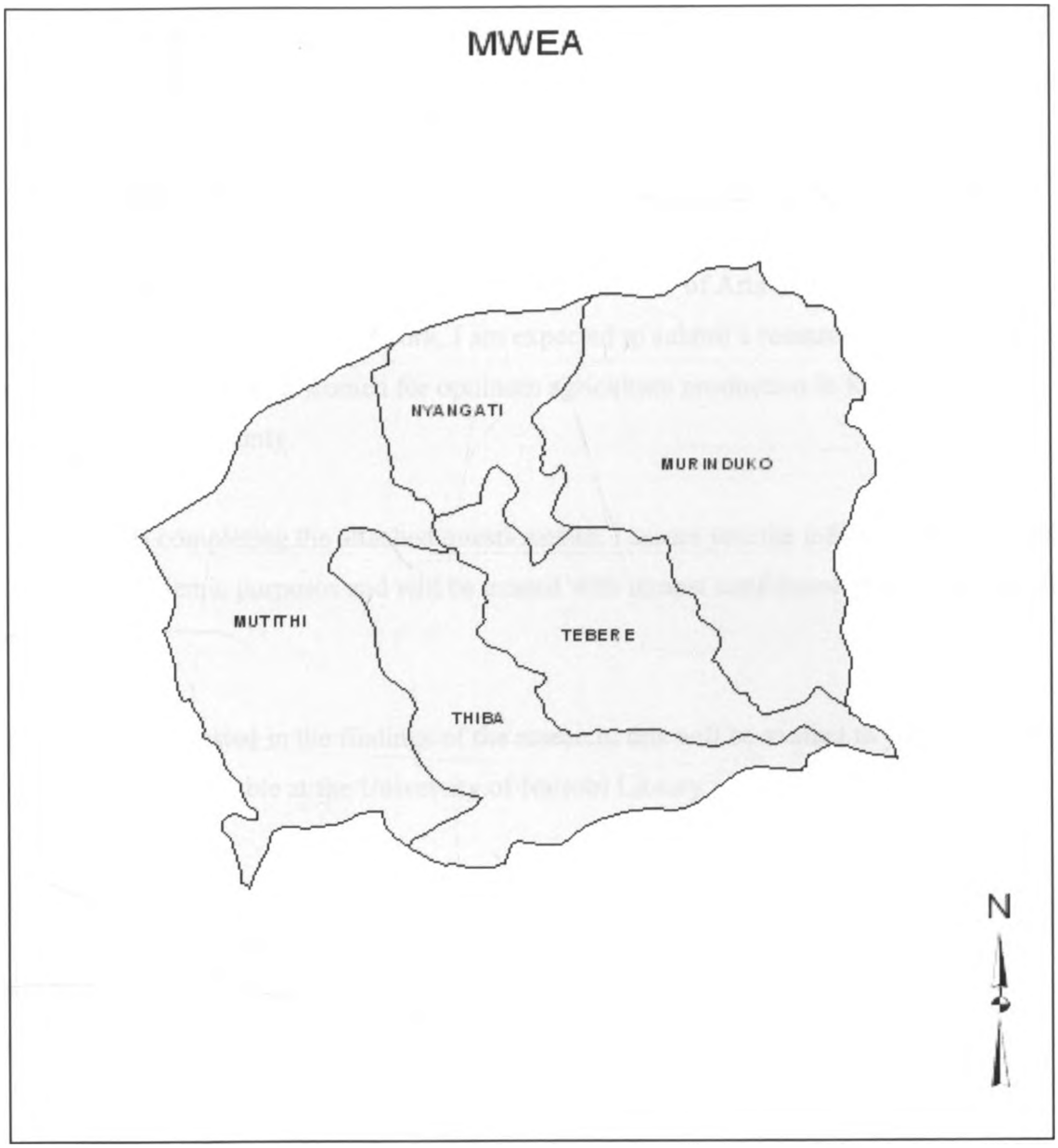
World Bank.(2005).*Gender and shared growth in sub-Saharan Africa,* Briefing notes on critical gender issues in sub-Saharan Africa, 2005-1.World Bank, Washington.

Volunteers for Africa. (2009).*The role of women in natural resource management in Kenya.*Kenya

Zikmund, W. (2002*). Business research Methods*. Mason: Thompson South- Western.

APPENDICES

Appendix 1: Map of Mwea



Ref; http://www.maplibrary.org/stacks/Africa/Kenya/Central/Kirinyaga/index.php

Appendix 2: Letter of Introduction

Margaret Mwathi
P.O BOX 52572
NAIROBI

Dear Sir/Madam,

RE: REQUEST FOR YOUR PARTICIPATION IN AN M.A RESEARCH PROJECT

I am a student at the University of Nairobi pursuing a Master of Arts in Project Planning and Management. As part of my coursework, I am expected to submit a research project report on the Impact of empowering rural women for optimum agriculture production in Kenya, Case of Mwea in Kirinyaga County.

Kindly assist in completing the attached questionnaire. I assure you the information you provide is purely for academic purposes and will be treated with utmost confidence. Names will not be disclosed.

Should you be interested in the findings of the research, this will be availed to you on request. A copy will also be available at the University of Nairobi Library.

Yours faithfully,

Margaret Mwathi.
Reg: L50/76748/2009

Appendix 3

STUDY QUESTIONNAIRE FOR THE RURAL WOMEN)

Date __ __/__ __/__ __ Time started _____ Time ended _____

Name of enumerator _____

Village name_____

SECTION A: RESPONDENTS BACKGROUND INFORMATION

1. Provide the following details about yourself.

Age (Years)	
Marital status	
Sex **1=M, 2=F**	
Employed **1=Yes, 2=No**	
Number of years in General farming	
Primary activity (Occupation)	
Secondary activity (Occupation)	
% time spent on farm activities	
Can read and write in an official language? **1=Yes, 2=No**	
Education level	
Computer literate? **1=Yes, 2=No**	
Do you use internet? **1=Yes, 2=No**	
Marital status 1=Single 2=monogamously married 3=Polygamous married 4=Widowed 6=Divorced 7=Other (specify)_____	

1.1. Respondents position in the household [_____]

Relationship to head	
1 = Household head	5 = Grandchild
2 = Spouse	6 = Niece
3 = Daughter	7 = House maid
4 = Daughter-in-law	8 = Grandparent
	9 = Other (specify)_____

1.2. Who is the **farm owner?** _____

1.3. Who is the **farm manager?** _____

SECTION B: FARM ASSETS AND WOMEN SPECIAL NEEDS

Effects of access to land and livestock assets on rural women agricultural productivity

2.1. Does the household own any land? [_____] =Yes [_____] =No (tick)

2.2. What is the Total area of your farm (both cultivated and uncultivated)?

[_____] 1=acres [_____] 2=Hectares [_____] 3=others specify_____

2.3 Is the land title deed written in your name? [_____] =Yes [_____] =No (tick)

If No who's name? (Use codes):_____

Who's name			
1 = Head	3 = Heads mother	5 = Daughter	
2 = Spouse	4 = Heads father	6 = Son	7 = Other joint (Specify codes)

2.4. How much of this land do you own? [_____]

2.5. How much of this land area do you rent-in? [_____]

2.6. How much Rent do you pay per year? [_____]

2.7. How much of your owned land do you rent-out? [_____]

2.8. How much money do you earn per year from the rented –out land? [_____]

2.9. Do you currently employ any farm laborer? [_____] =Yes [_____] =No (tick)

3.0. Who does the following main activities in the farm?

Activity type	**Who normally**	**How often**	**Amount of time spent(no of hrs)**

	does it?		
Looking after children			
Cooking			
Fetching water			
Fetching firewood			
Washing			
Going to the market			
Tilling			
Planting/Sowing			
Weeding			
Spraying			
Harvesting			

Who mainly does the activities

1 = Head
2 = Spouse
3= Son
4 =Daughter
5 = House help
6 = Casual labourer (Male)
7= Casual labourer (female)
8=Others specify

How Often codes

1=Daily
2=Weekly
3=Fortnightly
4= Monthly
5=Yearly
6=Others specify

3.1. Do women participate in farming when Pregnant? [_____] =Yes [_____] =No (tick)

Explain:_____

3.2. Do women participate in farming after childbirth? [_____] =Yes [_____] =No

Explain:_____

3.3. Please give more Information on the Maize crop in your farm for the past year harvest.

Plot No	Type of crop	Land units(Acreage)	Production Units	Yields How much	Land Preparation
1	Maize				
2.	Maize				
3.	Maize				

Units of land	Units of production	Land preparation
1=Acres	1=Kg	1=Hand
2=Hectares	2=Debes	2=Animal
3=Plot specify size___	3=90 kg sack	3=Tractor
4=Meter___specify_____	4=70 kg sack	4=Other specify
5=Others specify	5=Others specify	

Livestock Inventory

Does your household have any cattle? [____]=Yes [____] =No

3.4.Indicate the number of animals kept on the farm.

Livestock	Number owned by the household	Who owns them	Number kept but not owned	Number owned by Household but kept else where
Cattle	Local			
	Cross			
	Exotic/Pure			

Goats	Local			
	Exotic			
Sheep	Local			
Poultry	Exotic			
	Local			
Rabbits	Exotic			
Donkey/horses				
Pigs				
Other				

SECTION C: DETERMINE HOW AGRICULTURAL LITERACY LEVELS AMONG RURAL WOMEN INFLUENCE AGRICULTURAL PRODUCTIVITY

Knowledge and use of mechanization/modern farming practices

4.1. Which of the following are women familiar with up to date?

Are you familiar with the following Agriculture technologies?	**Have you ever used it in the last 2 years?**
i) Agricultural technologies, including machines and tools? [____]=Yes [____] =No	[____]=Yes [____] =No
ii) Improved plant varieties? [____]=Yes [____] =No	[____]=Yes [____] =No
iii) Improved animal breeds? [____]=Yes [____]	[____]=Yes [____]
iv) Fertilizers? [____]=Yes [____]	[____]=Yes [____]
v) Pest control measures? [____]=Yes [____]	[____]=Yes [____]
vi) Pests management techniques? [____]=Yes [____]	[____]=Yes [____]
Other specify	

4.2. Do rural women use machinery to ease their work? [____]=Yes [____]

4.3. Do women rely on traditional/ conventional methods? [____]=Yes [____]

4.4. Have you ever heard about improved seeds crops? [____]=Yes [____] =No

4.5. If Yes what does Improved seeds technology mean to you?

_____

4.6. As a farmer, what are the disadvantages of improved seeds crops?

4.7. In your Opinion what are the known benefits of improved seeds crops growing?

i) _____

ii) _____

iii) _____

4.8. Have you planted any improved seeds crops? [____]=Yes [____] =No

4.9. If No, why? (Use below codes)__[ ] [ ] [ ]

Why reasons
1=The seeds/planting materials are too expensive
2= The seeds/planting materials are not available
3= They require too much water
4= They require too much nutrients (fertiliser or manure)
5= Other Specify

4.10. Which crops do women prefer to grow?_____

1=Maize	3=Banana
2=Cassava	4=other(Specifiy)

4.11(Questions in box below)

Activities	Source of information
Do you get specialized advice/ information on cattle farming? [____]=Yes [____] =No	

Do you get specialized advice/ information on crop farming? [____]=Yes [____] =No	

4.12. What are your most 3 constraints in crop farming?

i) _____

ii) _____

4.13. What are your most 3 constraints in livestock keeping?

i) _____

ii) _____

4.14. Do you plan to expand crop farming? [____]=Yes [____] =No

4.15. Do you plan to expand livestock farming? [____]=Yes [____] =No

4.16. Are you able to purchase pesticides, fertilizers and seeds? [____]=Yes [____] =No

4.17. If No, give reasons?

i) _____

ii) _____

SECTION D: ACCESS TO FINANCIAL SERVICES AND USE OF MODERN I.C.T. INNOVATIONS IN FARMING ON RURAL WOMEN AGRICULTURAL PRODUCTIVITY

5.1. Who in the household has a bank account? [ ] [ ] [ ] [ ]

5.2. Who in the household has a fixed account? [ ] [ ] [ ] [ ]

5.3. Who in the household has Insurance policy? [ ] [ ] [ ] [ ]

5.4. Are Women able and willing to borrow loans from co-operatives and self-help groups (Chamaas)? [____]=Yes [____] =No

5.5. Does the household or **farm have** the following assets (tick)

Household assets	**No. owned now**	**Who owns (Codes)**
Radio [ ]		

Television[ ]			**Who owns codes** 1 = Head 4 = Heads mother 7 = Daughter 2 = Spouse 5 = Heads father 8 = Other joint (Specify c ode 3 = Household (All) 6= Son 9 = Other
Mobile phone [ ]			

5.6. Are you registered to the any Mobile cash Transfer System (Tick accordingly)

a) Safaricom`s M-pesa( )

b) Airtel Zap ( )

c) Orange Money Transfer ( )

d) Other ( ) Explain.

5.7. If No, give reasons why?

i)_____

ii)_____

5.8. Are women aware of women's finance groups, E.g. Women Finance Trust? [____]=Yes [____] =No

5.9. Have they asked for Help? [____]=Yes [____] =No

5.10. Have you ever benefitted? [____]=Yes [____] =No

5.11. Has anyone in the Household ever obtained any term of credit (loans) for your farming activities?

[____]=Yes [____] =No

5.12. If Yes, **who obtained, which needs** credit was obtained, **when** and from **what credit source**

Who(code in the Household	**Sex 1=Male 2=Female**	**Credit needs (Code)**	**Year Obtained**	**Source of Credit (Code)**	**As money=1 Material=2**

Who 1 = Head, 2 = Spouse, 3= Son, 4 =Daughter 5 = House help, 6 = Casual labourer (male), 7=Casual labourer (female) 8=Others specify	
Credit needs	**Source of credit**
1=To rent land 2= To purchase improved seeds 3= To purchase pesticides 4= To plough/cultivate land 5=To manage crop 6=To harvest crop	1=Government bank/agency 2=Commercial bank 3=Informal lenders 4=Co-operative 5=Project/NGO 6=Self help group 7=Relatives 8=Other specify

5.13. If No credit was obtained, why not? [____] [ ] [ ] (code)

1=Credit required but didn't get	6=Fear of being unable to pay
2=Credit not available	7=Never thought of it
3=Credit was too costly	8=Does not need credit
4=Lack of collateral	9=Other specify
5=Didn't know/not aware do not have Such information or advice	

5.14. In which of the following categories do you estimate your total monthly household income?

Ksh per month	Tick
<2,500	
2,500-5,000	
5,000-10,000	
10,000-20,000	
20,000=30,000	
>30,000	

Thank you.