

**FACTORS INFLUENCING THE USE OF AGRICULTURE  
INSURANCE AS A MEANS FOR ENHANCING FOOD  
SECURITY IN KIAMBU COUNTY IN KENYA**

**BY**

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**DECLARATION**

This research project is my original work and has not been presented for any award in any other university.

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## **DEDICATION**

This project is dedicated to all those involved in agriculture insurance, the farmers - especially my mother Roselyne K. Nyabochwa, the insurance companies, and all other stakeholders involved in agriculture insurance in Kenya.

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## **LIST OF ABBREVIATIONS AND ACRONYMS**

AFC	Agriculture Finance Corporation
ASDS	Agriculture Sector Development Strategy
CIC	Cooperative Insurance Company
CRMG	Commodities Risk Management Group
ECA	Economics of Climate Adaption
FAO	Food and Agriculture Organization
FSD	Financial Sector Deepening
GDP	Gross Domestic Product
GOK	Government of Kenya
IBWI	Index Based Weather Insurance
ICEA	Insurance Company of East Africa
ILRI	International Livestock Research Institute
IPCC	Intergovernmental Panel on Climate Change
IRI	International Research Institute
KARI	Kenya Agriculture Institute
KES	Kenyan Shillings
KFSSG	Kenya Food Security Steering Group
MDGs	Millennium Development Goals
MGRs	Minimum Guaranteed Returns
MPCI	Multiple Peril Crop Insurance
NASFAM	National Smallholder Farmers Association of Malawi
NGOø	Non Governmental Organizations
US/USA	United States/United States of America

## ABSTRACT

The purpose of this study was to assess the factors influencing the use of Agriculture insurance as a means to promoting food security in Kenya and specifically in Kiambu County. The study was guided by the following objectives: to examine the level of awareness of the existing Agriculture insurance schemes in Kiambu County, to examine how different socio-economic factors influence the acceptance and use of Agriculture insurance as a tool for promoting food security in Kiambu County and to assess the influence of stakeholders on the use of Agriculture Insurance among farmers. Descriptive research design was used for the study. The population for the study was farmers and key informants from organizations offering Agriculture insurance in Kenya. Stratified sampling technique was used to sample the respondents. A total of 259 respondents were targeted by the study (constituting 240 farmers and 19 key informants) out of which 199 responded (180 farmers and 19 key informants) giving a response rate of 77%. Questionnaires and Interview schedules were used as instruments for data collection. Piloting was done to test on the Validity and reliability of the instruments. Quantitative data was analyzed using descriptive statistics while content analysis technique was used to analyze qualitative data collected using interview schedules. Microsoft SPSS package was used to analyze the quantitative data. Descriptive statistics such as frequencies and percentages was used to analyze the data. Also correlation analysis was used to analyze the extent to which the factors influence the use of agriculture insurance in enhancing food security. The study found that awareness influences the use of Agriculture insurance among farmers in Kiambu County. This was evidenced by the fact that 30% of the respondents interviewed had not heard of Agriculture insurance and the fact that only 10% of the respondents interviewed had Agriculture insurance cover for their crops and livestock. The study also found that socio-economic factors such as the cost of insurance, type of farming practiced, risks surrounding crops and livestock and income generated from farming influences the use of Agriculture Insurance. The study finally found that stakeholders influence the use of Agriculture insurance in through offering insurance at high costs premiums, long procedures in the acquisition of the policy, delays in compensation in case of loss, inadequate creation of awareness on the available policies and limited risk coverage by the insurance firms. Using correlation analysis the study found that socio-economic factors influences the usage of agriculture insurance the most (Pearson's correlation coefficient of  $r = 0.843$ ), followed by stakeholders (Pearson's correlation coefficient of  $r = 0.798$ ) and finally farmers' awareness (Pearson's correlation coefficient of  $r = 0.551$ ). The study concluded that lack of awareness, socio-economic factors and stakeholder related factors influences the uptake of Agriculture insurance among farmers in Kiambu County. It was recommended that more awareness should be created among farmers on the benefits and the importance of use of Agriculture insurance. The study finally recommends that another study to be done on the benefits of use of Agriculture insurance to farmers which was not the focus of this study.

## **CHAPTER ONE:**

### **INTRODUCTION**

#### **1.1 Background to the Study**

Agriculture has, for many years, formed the backbone of Kenya's economy. The agriculture sector contributes about 30 per cent of the Gross Domestic Product (GDP) and accounts for 80 per cent of national employment, mainly in the rural areas. In addition, the sector contributes more than 60 per cent of the total export earnings and about 45 per cent of government revenue, while providing for most of the country's food requirements. The sector is estimated to have a further indirect contribution of nearly 27 per cent of GDP through linkages with manufacturing, distribution, and other service related sectors (ASDS, 2010). With no doubt Kenya's Agriculture sector directly influences overall economic performance through its contribution to GDP. Periods of high economic growth rates have been synonymous with increased agriculture growth.

In 2008, the Government of Kenya (GoK) launched Kenya Vision 2030 which has recognized agriculture as a very important sector in its economic pillar. Given the central role the Agriculture sector plays in the economy, the GoK has gone further to develop and launch the Agriculture Sector Development Strategy (ASDS), whose overall aim is to strategically make the Agriculture sector a key driver for achieving the 10 per cent annual economic growth rate expected under the economic pillar of the Vision 2030.

The achievement of national food security is to be a key objective of the agriculture sector. In the recent years, and especially starting from 2008, the country has been facing severe food insecurity problems. These are depicted by a high proportion of the population having no access to food in the right amounts and quality. Official estimates indicate over 10 million people are food insecure with majority of them living on food relief. Households are also incurring huge food bills due to the high food prices. Food security is closely linked to poverty which is estimated at 47% nationally.

As with other countries, the GoK responded to the food crises through three major policy intervention: Supply, prices and income related policies. All of them aimed at achieving the national, household and individual food security throughout the country, the successes have been mixed. This is because all these interventions have ignored the fact that there are also risks that arise in the production process which are beyond the control of the agriculturists/farmers. For instance, if you ensure the farmer acquires inputs at a subsidized price and even go further and give them credit to acquire those inputs, when a disease affects his animal or crop will the farmer be able to repay the loan or have the little money that he/she had to acquire the subsidized inputs. Therefore, there is a need to have a way of taking care of the ever changing weather, diseases and pests as well as price fluctuations. Agriculture insurance is that tool that will ensure risks and uncertainties that the farmer could face in the producing or after production.

Agriculture Insurance is a means of protecting the agriculturist against financial losses due to uncertainties that may arise from named or all unforeseen perils beyond their control. Agriculture insurance is one method by which farmers can stabilize farm income and investment and guard against disastrous effect of losses due to natural hazards or low market prices. Agriculture insurance not only stabilizes the farm income but also helps the farmers to initiate production activity after a bad agriculture year. It cushions the shock of agriculture losses by providing farmers with a minimum amount of protection. It spreads the agriculture losses over space and time and helps farmers make more investments in agriculture. It forms an important component of safety-net programs. The size of insurance market can be viewed not only as an indicator of development, but also as an indicator of social and cultural fabric of any society (CCC, 2009). Putting the issue of premium cost aside, there is a general expectation that the Government or NGOs will come forward to rescue in the aftermath of any disaster.

Unfortunately, agriculture insurance in Kenya has not made much headway even though the need to protect Kenyan farmers from agriculture variability should be of great concern in any agriculture policy. Agriculture insurance can be utilized effectively to ensure risks are spread and farmers are encouraged to produce more without fear of price

fluctuations and losses. Despite technological and economic advancements, the condition of farmers continues to be unstable due to natural calamities and price fluctuations. However, one need to keep in mind that agriculture insurance should be part of overall risk management strategy. Insurance comes towards the end of risk management process. Insurance is redistribution of cost of losses of few among many, and cannot prevent economic loss. It is also important to note that agriculture insurance is not only limited to crop but also includes livestock, bloodstock, forestry, aqua culture, and greenhouses

## **1.2 Problem Statement**

In recent years, agriculture production and farm incomes in Kenya are frequently affected by natural disasters such as droughts, floods, pests and diseases. Susceptibility of agriculture to these disasters is compounded by the outbreak of epidemics and man-made disasters such as fire, sale of spurious seeds, fertilizers and pesticides, price crashes, scrupulous middlemen etc. All these events severely affect farmers through loss in production and farm income, and they are beyond the control of the farmers, this further affect the country's food security. The question is how to protect farmers and increases productivity by minimizing such losses. For a section of farmers, subsidizes for some farming inputs provide a measure of income stability but doesn't necessary prevent the declining food security. There are various mechanisms like contract farming and futures trading which can be established to provide some insurance against price fluctuations directly or indirectly in Kenya. Most farmers have resolved to producing just enough for their household. Therefore a solution has to be found, and implemented urgently if Kenya is to be able to feed its citizens, achieve the MDG1, vision 2030 and more specifically the ASDS 2010-2020 it has the capacity; hence this study.

## **1.3 The Purpose of the Study**

The purpose of this study was to assess the factors influencing the use of agriculture insurance as a means for enhancing food security in Kiambu County.

#### **1.4 The Objectives of the Study**

The study was guided by the following objectives:

1. To examine the level of awareness of the existing agriculture insurance schemes in Kiambu County.
2. To examine how socio-economic factors influence the acceptance and use of agriculture insurance as a tool for enhancing food security in Kiambu County
3. To assess the influence of the different stakeholders in implementation of agriculture insurance in ensuring a food secure economy.

#### **1.5 Research Questions**

In view of the problem statement, the study addressed the following research questions with regard to the use of agriculture insurance as a means of promoting food security.

1. To what extent does awareness influence the use of agriculture insurance as a means of enhancing food security in Kiambu County?
2. To what extent do the prevailing socio-economic factors have influenced the adoption of agriculture insurance as a means of enhancing food security in Kiambu County?
3. To what extent does the stakeholders influence the implementation agriculture insurance as a means of promoting food security in Kiambu County?

#### **1.6 Significance of the Study**

The findings of this study will be of importance to the companies offering agriculture insurance. By assessing the factors influencing the use of agriculture insurance in Kenya, these organizations may come up with different strategies of promoting agriculture insurance among farmers.

Also the study is important considering the inadequate disaster preparedness and response in the country. There is low preparedness, response capacity and coping

mechanisms in the event of disasters such as drought, floods, fires, diseases and pests. Pests and diseases cause heavy losses through deaths, reduced productivity and loss of markets for products. Crop pests and diseases reduce yields substantially, sometimes by over 50 per cent or even total crop failure. Livestock pests and diseases also do affect livestock production and new diseases are emerging. These pests and diseases are insurable under agriculture insurance as well as drought and floods.

Therefore agriculture insurance if customized to specific needs of Kenyan farmers, maybe an effective instrument to deal with the risks that are beyond the farmers' means to cope with, hence this study will be of significant and relevance in that agriculture insurance is important in promoting food security.

### **1.7 Delimitation of the study**

Kiambu County has been selected for the purposes of this study. The County has 11 Sub-Counties including Gatundu, Githunguri, Kiambu, Kiambaa, Kiambu West, Kikuyu, Lari, Ruiru, Limuru, Thika East and Thika West. The County covers an area of 2,543.42 km<sup>2</sup> with a population density of 562 per square kilometer and has a population of 1,623,282 persons (Population Census, 2009). More than 80 percent of this population is involved in farming majority of them being small scale farmers.

### **1.8 Limitations of the study**

During process of research, some challenges encountered included:

- a) Security in the study area- there has been rumours of regroupings of terror gangs like mungiki. This might have influenced the potential respondents in receiving the enumerators considering they were strangers to them. To mitigate this, the researcher enrolled, where appropriate, local leaders like church elders, and councilors to introduce the researcher and his enumerators to the targeted respondents.



- b) Suspicion on the motive of the study was another limitation in that some of the questions touched on the personal information like income, land ownership and age, to mitigate this, the researcher explained clearly to the respondent why the information is needed and its importance.

### **1.9 Assumptions of the Study**

To achieve the above objective, some of the assumptions that the study was based on were:

- That most of the respondents in the area of study were farmers
- That the respondents were willing to provide the information requested for.
- The respondents would answer the questions correctly and truthfully

### **1.10. Definition of Significant terms**

**Adverse selection:** The tendency of individuals with poorer-than-average risks to buy and maintain insurance. Adverse selection arises when insurers select only those coverages which are most likely to result in losses. In agriculture insurance, this can arise when:

- High-risk farmers or farmers using backward practices participate, while other farmers, with more certain production expectations, do not;
- Farmers apply for insurance only on their own high-risk crops or plots, withholding other units.

**Agriculture Insurance:** Insurance applied to Agricultural enterprises, it includes crop insurance, livestock insurance, aquaculture insurance and forestry, but normally excludes building and equipment insurance although these may be insured by the same insurer under a different policy.

**Claim:** The application for indemnity (payment) after an insured event has occurred

**Crop Insurance:** Provides protection against loss or damage to growing crops including perennial crops such as tree crops against specified or multiple perils, e.g. hail, windstorm, fire, flood. Measurement of loss could be by yield basis, production costs basis, agreed value basis or rehabilitation costs basis. While most crop insurance is

geared towards loss of physical production or yield, cover may also be provided to loss of the productive asset such as tree crops.

**Food security:** the state in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life (FAO). Food security for a household means access by all members at all times to enough food for an active, healthy life. Food security includes at a minimum (1) the ready availability of nutritionally adequate and safe foods, and (2) an assured ability to acquire acceptable foods in socially acceptable ways (that is, without resorting to emergency food supplies, scavenging, stealing, or other coping strategies)

**Guaranteed Yield:** The expected physical yield of a crop stated in the insurance policy against which actual yields will be compared when adjusting any losses.

**Hazard:** A physical or moral feature that increases the potential for a loss arising from an insured peril or that may influence the degree of damage.

**Insurer:** The Company which issues an insurance policy and is named in the policy as being responsible for paying a claim should a loss event result in damage to the insured property.

**Livestock Insurance:** This class of agriculture insurance generally centers on the provision of mortality cover for livestock due to named disease(s), and accidental injury. Insurance cover is normally restricted to adult animals and may be taken out on an individual animal or herd basis. Major classes of insured livestock include beef and dairy cattle, sheep, goats and pigs and domestic fowl.

**Moral Hazard:** The risk or danger to be looked for from human nature, both individual and collective. Moral hazard depends mainly on the character of the society, the character of the insured, and on the character of his employees and the manner in which they work and behave at work. Examples of poor moral hazards are carelessness, fraudulent claims, crime or arson, irresponsibility, gross over insurance, general moral climate due to period

of depression and recession and unreasonable demand of high amount of claims settlement.

**Peril:** A potential cause of loss or damage to the property. Perils can be insured or uninsured; both are usually named on the insurance policy. It is therefore important that loss adjustment procedures enable distinction to be made between damage caused by insured and uninsured perils. This main natural perils covered in agriculture insurance include fire, flood, freeze, hail, wind, excess rain, drought.

**Premium:** The monetary consideration payable by the insured to the insurers for the period (or term) of insurance granted by the policy.

**Risk:** 1) The subject matter of insurance; the insured property. 2) Uncertainty attached to the outcome of an event. 3) The probability of a loss. 4) The insured peril. 5) Danger.

**Risk Management:** Care of risk to maintain income and avoid/ reduce loss or damage to a property resulting from undesirable events, risk management therefore involves identifying, analyzing and quantifying risks and taking appropriate measures to prevent or minimize losses. Risk management may involve physical treatment, such as spraying a crop against aphids or planting windbreaks and/or financial treatment, e.g. hedging, insurance and self insurance.

**Sum Insured:** The amount specified in the policy up to which the insurer will pay indemnities should the insured peril(s) occur and result in a loss to the insured property.

**Uncertainty:** Not knowing whether an event is going to occur and being unable to measure the likelihood of occurrence of the event.

### **1.11 Organization of the Study**

This Report is made up of five chapters plus the instruments of the study. In chapter one, the researcher has presented information on the background to the study, statement of the problem, the research objectives, research questions, significance of the study, limitations and delimitations of the study, basic assumptions of the study and the definition of significant terms.

Chapter Two of this study will review related literature background of agriculture insurance and the factors influencing usage of agriculture insurance in Kenya. The chapter also provides a theoretical and conceptual framework.

Chapter Three describes the research design, target population of study, sample and sampling procedures, research instrument, Research instruments validity, research instruments reliability, data analysis and operationalization of variables.

Chapter four presents data analysis, presentation and interpretation of findings.

Chapter five presents the summary of findings, conclusions and recommendations

## CHAPTER TWO:

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter presents literature pertaining to the study. Gaps and works already done by others in this field are reviewed. The chapter culminates into a conceptual framework that guided the study.

##### 2.1.1 Background on Agriculture Insurance Usage

Agriculture insurance has been used for a long time and was developed over 200 years ago. It started as private insurance funds, which offered protection for livestock and perils, such as hail insurances. Though crop insurance has been available for a long time, it has primarily been used in developed countries. However, during the last 50 years the supply and the design of the insurance products have been subjected to vigorous extensions. A major reason for the change is government intervention in terms of premium subsidies and support programs. The US is the largest market for crop insurance and has among all countries the biggest impact of government support. Nowadays, many countries in Europe have similar programs with government support and proposals within EU suggest expanded risk management programs (Smith & Glauber, 2012).

In October 2005 Annan said *“We cannot stop natural calamities, but we can and must better equip individuals and communities to withstand them. Those most vulnerable to nature’s wrath are usually the poorest, which means that when we reduce poverty, we also reduce vulnerability.”* (Annan, 2005)

Kofi Annan’s 2005 International Day for Disaster Reduction message followed a year of natural catastrophes including, among others, the 2004 Indian Ocean tsunami that claimed over 280,000 lives, drought and locust plagues across Africa, devastating hurricanes and cyclones in the United States and Caribbean (including Hurricane Katrina), and heavy flooding across Europe and Asia. Annan’s message focused on

recognizing the potential of micro-finance to reduce disaster risk and to improve disaster management; he promoted disaster micro-insurance as an innovative approach in this field (Boudreau, 2010).

This message reflects the shifting focus from *ex poste* disaster aid to *ex ante* assistance in risk mitigation and risk financing. Stronger focus on preemptive mitigation and financing strategies is increasingly important in what experts are calling a new era of large-scale catastrophes; in recent years, extreme weather events have been occurring at an accelerating pace (Kunreuther and Michel-Kerjan, 2008). Over the past fifty years there have been significantly increasing trends in economic losses, insured losses, and fatalities from natural catastrophes around the world. The primary drivers of these trends are changes in land use and increasing concentration of people and capital in vulnerable areas (Mechler, 2005). The Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment Report also concludes that climate change has likely contributed to increasing incidences of natural catastrophes (IPCC 2007).

The impacts of these natural catastrophes are most devastating and enduring in developing countries. 90% of the most devastating disasters between 1970 and 2007, ranked by number of victims, occurred in developing countries (Hochrainer et al, 2009). In absolute terms, economic losses due to natural catastrophes are greatest in developed countries, as a percentage of Gross Domestic Product (GDP), however, catastrophes inflict higher proportional losses in developing countries. A major natural catastrophe in an industrialized country will have a minor impact on GDP (e.g. Hurricane Katrina in 2005 resulted in a 1.1% GDP loss in the United States); at the other extreme, small island nations can incur damages representing several times their annual GDP (Kunreuther and Michel-Kerjan, 2008).

High fatality rates and high proportional GDP losses are two indicators of the destruction caused by natural catastrophes in developing countries. The impact of natural catastrophes in these countries, however, is much greater and enduring than these

measures may imply. Natural catastrophes prohibit economic development and exacerbate cyclical poverty; in the event of a natural catastrophe, the poor may have to sell assets (e.g. livestock), spend savings or default on loans, and cope with concurrent shocks such as illness (Mechler et al, 2006). Many rely on family networks for support, but families are often geographically concentrated and have highly covariant exposures to natural catastrophes. Furthermore, foreign investment in developing countries remains low partially because investors are averse to taking on the risk of losing infrastructure investments, and small firms and farms are unable to access credit to invest in higher risk, higher-yield activities (Mechler et al, 2006).

The closer that a community's livelihood is tied to the weather, the greater its exposure to risk of climatic variability and extremes; for example, many rural communities in sub-Saharan Africa rely largely on rain-fed agriculture or pastoralism and struggle to cope with climatic variability (Cooper et al, 2008). These vulnerable populations face immense challenges to adapting to climate change. This then means there is a need for an instrument that focuses on developing flexible, long-term strategies for reducing vulnerability, improving resilience, and enabling adaptation to natural catastrophes and climate change of such farmers if food security in this case is defined as "a situation in which all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life" (Kenya Food Security Steering Group, 2008) is to be achieved—and with no doubt agriculture insurance is that instrument.

### **2.1.2 International Experience with Agriculture Insurance**

In recent years, index-based agriculture insurance programs have been growing in popularity among non-profit and international organizations as well as developing country governments seeking to reduce farmers' vulnerability to weather extremes. These products are also being used to enable farmers to access Agriculture credit (Mapfumo, 2008). Index-based agriculture insurance is distinct from traditional agriculture insurance,

which has a long history in industrialized countries (e.g. United States and Canada) as well as some developing countries (e.g. India and Mexico).

Traditional agriculture insurance is often sold to individual farmers in named peril or multiple peril crop insurance (MPCI) forms. Named-peril insurance products, such as hail insurance, have successfully been sold through the private market. MPCI, however, is very costly to administer because the multitude of risks covered requires farm visits to determine the level of loss (Mahul et al 2009). The dilemma with MPCI programs is that adequate monitoring to control adverse selection and moral hazard is very costly, but if these problems are not addressed, indemnities will likely exceed collected premiums. In both cases, these programs require high levels of government subsidization to ensure availability of MPCI and to encourage farmer participation, (Mahul et al 2009).

The high cost of traditional agriculture insurance programs spurred the development of index-based products that are more affordably administered in developing countries. An index-based insurance product is based on a measurable parameter, such as yield or rainfall, and farmers receive a payout when the index is below a specified trigger, regardless of actual losses in their fields. Benefits of this product includes less moral hazard and adverse selection, lower administrative costs, standardized and transparent structure, availability and negotiability, reinsurance capability, and versatility. The primary challenge of this product is basis risk, or lack of correlation between the index and actual losses. Other challenges to developing index-based insurance in developing countries include precise actuarial modeling, education, market size, weather cycles, microclimates, and forecasts (Mahul et al 2009). Index-based agriculture insurance is just beginning to develop in Africa; in the past decade, there have been a number of pilot programs in African countries supported by organizations such as the World Bank, the United Nations Development Program, and large non-profit organizations (e.g. Oxfam). A 2009 study by the Micro-insurance Innovation Facility found that less than 80,000 people in Africa are covered by agriculture insurance products (including livestock, crop, and agriculture-related index products); this number represents less than 0.1% of the



potential market for these products. The study concludes, however, that index-based products, "offer the potential of a major breakthrough for agriculture" (Matul et al 2009).

Recent notable index-based insurance pilot programs include a small 2006 pilot program by the World Bank Commodities Risk Management Group (CRMG) in Ethiopia that had some success and highlighted challenges to establishing agriculture insurance programs (Bryla 2009). A more relevant and very successful pilot program in Malawi in 2005/2006 also employed a weather-index product in a bundled package with a loan for agriculture inputs (Suarez et al 2007). In 2009 the United Nations Development Program began a partnership with multiple organizations in Mali to establish an agriculture insurance program with the goal of improving food security.

Index-based agriculture insurance products take many forms. The product offered depends on the risks confronting farmers as well as the goals of the program offering the insurance. Malawi has a large rural population that is dependent on rain-fed farming. Since 1970, increasingly frequent floods and droughts are blamed for exacerbating poverty levels and trapping many rural farmers in a cycle of poverty and vulnerability. The removal of subsidies and privatization of seed companies have also blocked smallholder farmers' access to quality inputs. For these and other reasons, Malawi was one of the most food-insecure countries in Southern Africa (Suarez et al 2007). Recognizing the challenging weather conditions and market failures facing smallholder farmers, the World Bank CRMG, in collaboration with local stakeholders and assisted by the International Research Institute for Climate and Society (IRI) piloted a weather insurance scheme to enhance groundnut farmers' ability to manage drought risk and to access credit (Suarez et al 2007). Farmers in four villages were offered bundled loan and insurance contracts designed to transfer the risk of rainfall deficit during the growing season to the insurer; 982 farmers decided to participate.

There are a few notable features of in this pilot program. First, farmers do not handle money unless they receive additional revenue from the sale of their crops at the end of the growing season. National Smallholder Farmers Association of Malawi (NASFAM) repays the entire loan balance unless the index is triggered, in which case the insurer repays part of the loan. Second, the insurance contract in this scheme is a vehicle for farmers to access credit for seed inputs; without this insurance contract, local banks are not willing to lend to farmers because of the risk of default in the case of drought. Thus, the insurance contract assures that the bank will receive repayment as well as interest on its loan while protecting farmers from defaulting in the case of drought. Third, although the bundled loan contract is signed by individual farmers, farmers' clubs are collectively liable to cover the deficit of any member farmers who do not deliver their crops to NASFAM; using social collateral to ensure repayment of loans is a core concept of micro-finance (Suarez et al 2007).

Contracts in the pilot were sold in units of 32 kilograms of hybrid groundnuts (worth about \$28.80 US), which plants 0.5 acres, a small part of the farmer's total cultivated land. Although the insurance premium and the interest on the loan constitute approximately 10% of farmer's expected revenue (without drought), the farmer could still expect a significantly higher net profit than with traditional seeds (Suarez et al 2007). In the case of no drought, farmers could expect a net gain of \$63.78 on the package, compared to \$30.72 with traditional seeds. In the case of drought, farmers would not lose with the hybrid seed package, but would lose \$10.24 with traditional seeds (Suarez et al 2007). In the context of farmers with little to no accumulated wealth, this difference could significantly impact their families' well-being.

Another major benefit to this program is that it does not rely on direct subsidization. Although the World Bank covered a substantial amount of start-up and administrative expenditures, the program did not require any direct premium subsidization. In light of the high costs that governments typically incur to subsidize Agriculture insurance programs, this advantage could be very beneficial for the up-scaling and the sustainability

of similar agriculture insurance programs. As the economics of this program clearly highlight, it is a major advancement for index-based insurance in Africa.

Despite its success, the Malawi program highlighted some challenges to establishing agriculture insurance programs in developing countries. The system depends on higher quality seeds being made available to farmers; if seeds are defective, then the high costs of the loan interest and insurance premium will hurt farmers. The scheme actually experienced this problem, but it was quickly remedied by NASFAM (Suarez et al 2007). Another important issue is price volatility of agriculture products. If the market price for crops is higher at the end of the growing season than the pre-agreed contract price, then farmers will be reluctant to sell their crops to NASFAM. As a result, farmers may side-sell crops to other traders. Although market price was higher than contract price at the end of the 2005/2006 season, only a few farmers broke their contract with NASFAM; the incident revealed, however, that the system is vulnerable to this problem.

NASFAM played a central role in insuring the success of this program; although it had the institutional capacity to handle its responsibility, it is unique to Malawi, and it may be difficult finding comparable organizations in other developing countries. Furthermore, because NASFAM is the essential bridge between the banks and insurers and the farmers, it must be trusted by both groups. If this trust erodes, the whole system is at risk. Finally, some farmers were disappointed when the insurance did not pay out, which demonstrated their incomplete understanding of the function of insurance. This problem may also reflect basis risk in the insurance system. Measurements of rainfall at two farms seven kilometers away from each other within 20 km of a weather station were much lower than the rainfall measured at the weather station (Suarez et al 2007).

The Malawi experience and these insights highlight that there are both benefits and challenges to developing Agriculture insurance programs. As noted by Mahul and Stutley (2010) agriculture insurance is part of a comprehensive risk management framework; it

can contribute to the modernization of agriculture. Agriculture insurance cannot, however, operate in isolation.

A recent report by the Economics of Climate Adaption (ECA) Working Group proposes systematic, risk-management based approaches for policy-makers to minimize the impacts of climate change on society. The report utilizes Agriculture insurance in cost-effective adaptation portfolios for its Agriculturally-focused case studies. In a case study on Maharashtra, India, for example, the ECA Working Group recommends a portfolio of strategies to adapt Maharashtra's Agriculture sector, including irrigation systems, farming techniques, crop engineering, and insurance (2009). It is clear that this approach to Agriculture insurance, including agriculture insurance as part of a portfolio of strategies to improve farmers' resilience to climatic variability and change, is necessary for it to be sustainable and to have a long-term impact.

Based on the discussion of agriculture insurance above, four criteria can be enumerated that a sustainable agriculture insurance program that can be scaled up must meet: location-specific, integrative, goal-oriented, and long-term, but flexible:

Location-specific encompasses multiple factors; the climatic risks of a region must be well-understood and well-modeled and used to create appropriate products. The local culture must be considered when assessing the demand for the product; furthermore, studies show that trust can be enhanced by stakeholder participation in the design and implementation of insurance systems and products (Mechler, Linnerooth-Bayer, and Peppiatt 2006). Community partnership should be sought from the initial stages of program design. Working with an organization that is well-regarded and established in the community will help to obtain local trust and participation in the program.

Agriculture insurance must be integrated at two levels. At the local level, it must be used with other strategies to improve farmers' resilience to climate variability and change. This point may be the single-most important component of improving

farmers' livelihoods in the long-run. As stated by agro-climatologist Bertrand Muller (2010) Agriculture insurance must be paired with access to improved inputs and well-managed farms for it to be effective. At a higher level, the risk from agriculture insurance programs should be pooled in the international reinsurance market. The second integration mentioned above, pooling of risk at the international level, will reduce risk to local insurers who are reticent to offer agriculture insurance because of the high risk that it carries.

Goal-orientation must also occur on multiple levels. Core goals of the program must be defined (e.g. short-term to enable farmers to access credit, long-term to increase yields and to improve food security), as well as operational goals (e.g. *x* groundnut farmers purchase insurance in year 1), and finally, farmers' goals. This third set of goals could be elicited from farmers by having them participate in educational programs that will help them to improve farming techniques and to gradually increase their yields and production.

A long-term strategy is essential for the development of agriculture insurance and Agriculture markets. Furthermore, without a long-term approach, the impacts of climate change may not be considered in the design of the program, and it may fail to enable farmers' adaptation to climate change. A long-term approach will facilitate the development of products that meet the needs of farmers with varying levels of experience with Agriculture insurance and will enable innovation in product design, delivery channels, etc. This long-term strategy must be flexible however, given the changing climate and often unstable social and political environment of developing countries. Flexibility may take many forms; for example, the program could offer incentives to farmers to grow crops that are more suitable for the changing climate.

### **2.1.3 Agriculture Insurance in Kenya**

In the 1970s the government of Kenya through the ministry of agriculture introduced agriculture insurance through the program known as minimum guaranteed returns (MGRs), it mainly was a crop insurance which at the very least was meant to ensure that farmers were cautioned against making lose. It was implemented through Agriculture Finance Corporation (AFC) unfortunately it didn't succeed instead it was misused, even those without farms and had not even attempted growing wheat pretended that the wheat failed, this lead to the government losing money and eventually abandoning the program and agriculture insurance as a whole (KARI, 2012). In the late 1980s the insurance companies came up with the conventional insurance schemes which utilized physical assessment. This led to the discrimination against the small scale farmers for it wasn't cost effective.

After the failure of the MGRs program it is till 2006, that agriculture insurance got momentum through Swiss Re (which is a re-insurance company) which instituted an Agriculture insurance market potential study in Kenya. The outcome of this study two years later marked the entry point for Swiss Re into the East African Market. In collaboration with local insurance partners, Swiss Re developed a traditional indemnity-based, multi-peril crop insurance product targeting the medium-scale to large-scale commercial farming segment in 2008. Banks, micro-financiers, cooperatives and commodity associations acted as aggregators.

By 2011, over 1,000 farmers in 15 districts of Kenya were insured, bringing in a total premium income of about US\$ 2 million. Over 50,000 hectares of barley, wheat, tobacco, sugarcane and maize were covered, representing about 0.6% of all arable land in Kenya. When excessive rainfall and drought hit the country in 2008 and 2010, farmers were compensated for their losses from the insurance product without receiving any subsidies, (Swiss Re, 2011).

In it for the long haul, Swiss Re continues to develop tailor-made insurance and reinsurance solutions for the East African Agriculture sector by deploying capital,

offering innovative solutions, imparting underwriting and marketing skills to the market, as well as hosting various workshops aimed at increasing business in this market.

Lovemore Forichi, Senior Underwriter for Agriculture Business in Africa argues that successful product offering hinges on the provision of home grown solutions that are demand driven. Through cooperation with local partners, Swiss Re has been able to unlock the Kenyan Agriculture insurance potential and will continue to build on this initial success to help develop local underwriting and loss adjustment skills that are pivotal to the long term sustainability of the product and are still needed in this new market. Exploration of risk management solutions for the lower tier of the value chain is also in progress. (Swiss Re, 2011)

Reto J Schneider, Head of Agriculture business in Africa, Europe and America adds that Swiss Re has been highly committed to this market for years now and sees great opportunities to contribute to the further development of the Agriculture sector in Africa, using appropriate risk transfer solutions in cooperation with its local partners. (Swiss Re, 2012) A third Agriculture workshop was held in the beginning of June 2013 in Nairobi, Kenya where stakeholders from the Agriculture value chain shared experiences and explored opportunities aimed at enhancing prudent Agriculture risk management solutions and practices, with the ultimate goal of contributing to global food security.

There has been other initiatives on agriculture insurance in Kenya by different stakeholders, for instance kilimo salama and kilimo salama plus which aims at protecting farmers' investment in farm inputs (seed, fertilizer and chemicals) against extreme weather risk (drought or excess rainfall) using solar powered weather stations to monitor rainfall and mobile payment technology to collect premiums and payout to farmers. It is an initiative of Sygenta Foundation for Sustainable Agriculture in cooperation with Kenyan Insurer UAP insurance and mobile telecom operator Safaricom. Whose main target are small scale farmers. It has gone further to ensure insured farmers receive tailored extension messages using the local weather information from the nearby automated weather stations. This has enabled farmers to improve their productivity and

make the best of the rains in years when these are sufficient to grow a crop. It was piloted in Nanyuki in 2009 where it insured 200 farmers all of whom received payouts for the worst drought was experienced, by 2010 it had insured 11,000 farmers in the 5 areas of Kenya it has been implemented, that is Western Kenya, Southern Nyanza, Uashin Gishu, Embu and Laikipia and 136 farmers are recorded to having received payouts for failed crops. So far it only covers Maize and wheat, and this year it has been extended to beans and sorghum. . (Sygenta, 2011)

After four years of research by International Livestock Research Institute (ILRI), ILRI in partnership with a Kenyan bank and a local insurance firm have launched a new insurance scheme in Marsabit in the northern Kenya which offers herdsmen a chance to protect their livestock against drought it aims at covering 1,000 families to insure their cows, goats, sheep and camels. The initiative uses satellite technology to check the pasture available for the herders. Arid northern Kenya suffers severe drought perennially and hundreds of thousands of animals die. The scheme uses satellite imagery to monitor the landscape - if the images show a lack of pasture then it will be assumed the animals are likely to die and the owners can receive a pay-out. The program has not been successful, but it is hoped it will pick up with farmer education in future. (ILRI, 2011)

A consortium of development partners working with private and public sector players is piloting index based weather insurance (IBWI) products in Kenya. The consortium is made up of Financial Sector Deepening (FSD) Kenya, the Rockefeller Foundation and the World Bank. The project's primary objective is to develop and test the market viability of IBWI products to reduce the impact of weather risk on smallholder farmers and pastoralists in Kenya. To achieve this objective, IBWI products have been piloted across a range of Agriculture activities. The emerging lessons from the Kenyan and other international IBWI pilots will be shared with the sector. The project also seeks to contribute to the creation of an enabling environment for the development of IBWI products in Kenya. It is targeting a wider range of farmers, from small- to large-scale, across the country. Various Agriculture sub-sectors are being assessed for suitability,



including livestock, cereals (notably maize and wheat), and industrial crops including tea, coffee and sugar cane. (Index-Based Weather Insurance, 2010)

The key private sector partners include financial institutions (banks, micro-finance institutions, insurers, reinsurers); Agriculture input suppliers; output market players, such as exporters and processors; and other business development service providers along the various Agriculture value chains. While the aim is to achieve a sustainable private sector-led approach, success also depends strongly on support from the government's Kenya Meteorological Department (KMD), which has an invaluable historical record of climate data in Kenya and operates an extensive system of weather monitoring. (KARI,2012)

Appropriate mitigation of production risks through IBWI can help increase the ability of financial service providers to finance agriculture, especially at the small-scale level. Given the relatively low utilization of insurance products in Kenya, however, and the relative complexity of the product, IBWI may prove a difficult concept to sell as a standalone entity. Therefore, among the most promising applications is the bundling of an appropriate IBWI contract with credit. Many farmers see the benefits of investing in increasing production through input credit but are constrained by the potential threat to repayment ability from adverse weather. Index-based weather insurance offers a potential solution. (Index-Based Weather Insurance, 2010)

The major role played by insurance programs is the indemnification of risk-averse individuals who might be adversely affected by natural probabilistic phenomenon. The philosophy of insurance market is based on large numbers where the incidence of risk is distributed over individual. Insurance, by offering the possibility of shifting risks, enables individuals to engage in risky activities which they would not undertake otherwise (Ahsan *et al.*, 1982).

Efficient risk reducing and loss management strategies such as crop insurance would enable the farmers to take substantial risks without being exposed to hardship. Access to formal risk diffusing mechanisms will induce farmers to maximize returns through

adoption of riskier options. Investment in development of groundwater, purchase of exotic breeds for dairy will be encouraged due to insurability of the investment. This will help the individual to augment and increase the farm income (micro perspective) and also help to augment aggregate production in the country (macro perspective). The benefits of crop insurance vary depending on the nature and extent of protection provided by the scheme. (Ahsan *et al.*, 1982).

Crop insurance is based on the principle of large number. The risk is distributed across space and time (Swiss Re, 2012). The losses suffered by farmers in a particular locality are borne by farmers in other areas or the reserves accumulated through premiums in good years can be used to pay the indemnities. Thus, a good crop insurance program combines both self as well as mutual help principle. Crop insurance brings in security and stability in farm income. Crop insurance protects farmers' investment in crop production and thus improves their risk bearing capacity. Crop insurance facilitates adoption of improved technologies, encourages higher investment resulting in higher Agriculture production.

Crop credit insurance also reduces the risk of becoming defaulter of institutional credit. The reimbursement of indemnities in the case of crop failure enables the farmer to repay his debts and thus, his credit line with the formal financial institutions is maintained intact (Hazell *et al.*, 1986; Pomareda 1986; Mishra 1996 ;). The farmers do not have to seek loans from private moneylenders. The farmer does not have to go for distress sale of his produce to repay private debts. Credit insurance ensures repayment of credit, which helps in maintaining the viability of formal credit institutions. The government is relieved from large expenditures incurred for writing-off Agriculture loans, providing relief and distress loans etc., in the case of crop failure. A properly designed and implemented crop insurance programme will protect the numerous vulnerable small and marginal farmers from hardship, bring in stability in the farm incomes and increase the farm production (Bhende 2002). This is true as in the case of Malawi discussed above.

The farmer is likely to allocate resources in profit maximizing way if he is sure that he will be compensated when his income is catastrophically low for reasons beyond his control. A farmer may grow more profitable crops even though they are risky. Similarly, farmer may adopt improved but uncertain technology when he is assured of compensation in case of failure (Hazell 1992). This will increase value added from agriculture, and income of the farm family. Access and availability of insurance, changes the attitude of the farmer and induces him to take decisions which, otherwise, would not have taken due to aversion to risk. For example, rain-fed paddy was cultivated in one of the riskiest districts i.e., Anuradhapur district, of Sri Lanka, for the first time in 1962, as insurance facility was available to the farmers (Ray 1971).

Bhende (2005) found that income of the farm households from semi-arid tropics engaged predominantly in rain-fed farming was positively associated with the level of risk. Hence, the availability of formal instrument for diffusion of risk like crop insurance will facilitate farmers to adopt risky but remunerative technology and farm activities, resulting in increased income.

Some of the studies confirm the conventional view that moral hazard incentive lead insured farmers to use fewer chemical inputs (Smith and Goodwin, 1996). Babcock and Hennessy (1996) found that at reasonable levels of risk aversion, nitrogen fertilizer and insurance are substitutes, suggesting that those who purchase insurance are likely to decrease nitrogen fertilizer applications. An analysis of data from US agriculture indicates that the producer's first response to risk is to restrict the use of debt. Price support programmes and agriculture insurance are substitutes in reducing producer risk. The availability of crop insurance in a setting with price supports allows producers to service higher levels of debt with no increase in risk (Atwood et al., 1996).

Agriculture insurance has been used in a variety of forms and purposes in more than 70 countries, according to an FAO survey published in 1991. In particular, developing countries have established crop insurance programs not only to provide farmers with

another risk management tool, but also to promote other goals, such as improving farmers' access to credit, promoting production of high value crops that might also have higher yield risk and providing more stability to agriculture and related industries (Vandever, 2001). There have been quite some varying degrees of success over the years, across countries and several types of insurance programs (Hazell et al., 1986; Hueth and Furtan, 1994; Mishra, 1996).

One of the main benefits of the insurance is the fact that it allows the insured to balance their income whenever an adverse event occurs, or on the condition in which such event does not take place and this is done through the payment of premium and the receiving of compensation (indemnity), in case of misfortune (Arrow, 1971; Rothschild and Stylists, 1976).

#### **2.1.4 Factors Influencing the Usage of Agriculture Insurance in enhancing food security**

It is argued that farmers' own measures to reduce the risk in farming, however in semi-arid tropical India it was found that it were costly and relatively ineffective in reducing risk in farming and to adjust to drought and scarcity conditions. Jodha finds that the riskiness of farming impinges upon the investment in agriculture leading to suboptimal allocation of resources. He also finds that official credit institutions are ill equipped to reduce the exposure of farmers to risks because they cannot or do not provide consumption loans to drought-affected farmers (Jodha 1981).

In developing countries, markets for formal insurance and reinsurance are either underdeveloped or non-existent. Apart from the standard reasons for insurance market failure (asymmetric information problems, which is most likely to be a larger problem in rural areas of developing countries and covariance of risk), a common reason for its failure in developing countries is the lack of effective legal systems to enforce insurance contracts (Barnett et al., 2006).

Farming or crop production being a biological process, converting input into output carries the greatest risk in farming. This, coupled with market risk, impinges on the profits expected from farming. However, due to the increased complexity and variation in agriculture risk, farmers find it very difficult in making rational decisions when faced with risks. Agriculture insurance is one of the solutions that farmers can use when faced with risks. On the other hand, farmers that are faced with many problems adopt the innovation of agriculture insurance. This decision-making process consists of a series of actions and choices over time, through which a farmer evaluates an innovation and decides whether to incorporate it into his ongoing practices. Due to the diversity of social, economic and natural factors influencing the adoption of an innovation, making such a decision is not a simple process. Interference by the private sector and government policies (subsidized prices, low interest loans and extension campaigns) add to the complexity of the decision process, the decision to classify as to whether the technology is appropriate or not, is sometimes made by an expert. Nevertheless, through lack of knowledge or inaccurate perceptions, an individual's evaluation of an innovation may not agree with that of the expert. Most individuals perceive their actions to be appropriate. (Bryla, 2009; Mapfumo, 2008)

The size composition of farm households sector also has major consequences for agricultural credit and crop insurance (Hazell, 1992). Baker (1990) found that crop insurance is a kind of technique that probably in the beginning of entering rural community meets several problems. Ghadirian and Ahmadi (2002) have obtained in their study on efficient factors, the tendency for Soya's insurance from Golestan province in Iran to work. They have recommended a study to be done on whether factors such as age of beneficiaries, farm size, diversity of products, level of insurance of other crops and previous records of risk in Soya's farms have negative influence on the propensity and elasticity of farmers related to Soya insurance. They further found that the amount of credits which have been received by farmers had positive effect on the propensity of farmers to purchase insurance.

Survey of effective factors on demand for agriculture insurance in Fars province in Iran showed that land ownership, wheat production of previous year, age, level of education, farmer's capital, risk taking and previous record for facing risk, have positive correlation in adoption of wheat insurance; but other factors like land value, crop rotation and land diversity have negative correlation with adoption of wheat insurance (Torkamani, 2002).

A high degree of adoption of agriculture insurance in central Illinois, U.S.A depends on existence of probable hazards in agriculture, insurance expenditures which farmers should pay, feeling of satisfaction from getting insurance and other factors like: psychological and social impacts (Tirae, 2002). Agriculture insurance education, history of risk, the amount of debt to credit institutions and banks, manufacturing and product rate fluctuations and rate insurance, affect in the participation of farmers in insurance scheme (Baquet and Smith, 1996). Farmers' awareness of the importance of insurance and its effects on their income supports the insurance (Baker, 1990). The study demonstrated that changing the amount of insurance could persuade exploiter with different degrees of risk aversion crops amenable to accepting insurance (William et al., 1993). Background exposure risk is one of the most important factors in accepting agriculture insurance. Voluntary insurance of Agricultural products may be more attractive to farmers that are faced with greater danger (Ahsan et al., 1987).

## **2.2 Theoretical Framework**

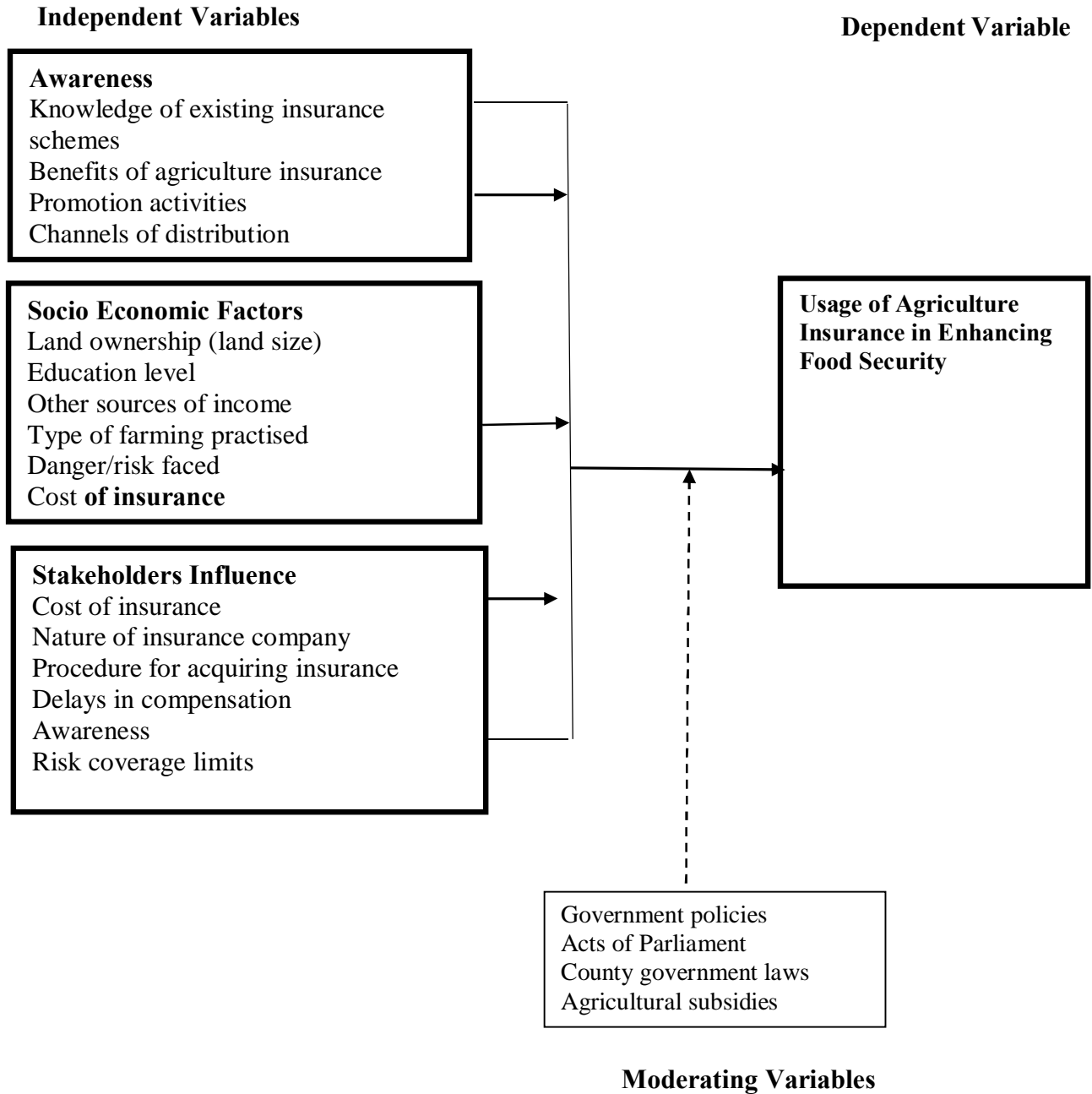
The forgoing literature review has reviewed a number of bodies of scholarship which contribute to our understanding of the factors influencing the use of agriculture insurance in enhancing food security international and more specifically in Kenya. The review has revealed that agriculture insurance with no doubt is a good risk mitigation strategy considering the ever changing climate and weather conditions in Kenya and more specifically considering Kenya's agriculture is rain fed. Furthermore the pests and diseases are not making the food security condition any better. Therefore it is important that agriculture insurance be considered and all measures taken to ensure that it is adopted. To increase the adoption of agriculture insurance it is conceptualized that factors such as the level of awareness, the socio economic factors and the roles of the different

stakeholders in agriculture insurance and food security need to be re-looked with an aim of striking a balance.

The factors and relationships which may be expected to occur are explained through the conceptual model below. This model demonstrates how various factors influence the usage of agriculture insurance in enhancing food security, as well as guiding our understanding of the relationship between awareness, socio-economic factors and stakeholders' role in agriculture insurance usage. The interaction of these factors does influence the use of agriculture insurance in enhancing food security.

The model shows that awareness of the existing insurance schemes, its benefits distribution channels and promotional activities might influence the usage of agriculture insurance. It has also demonstrated that land ownership (land size), education level, financing, type of farming practised, Danger/risk faced, cost (the insurance premium cost, credit financing cost and cost of accessing information) might also influence the usage of agriculture insurance in enhancing food security. It has gone further to show that stakeholders might also influence the adoption of agriculture insurance and hence their approach and activities have to be strategically implemented in a participatory manner.

## 2.3 Conceptual Framework





## **2.4 Summary of Literature Review**

There are numerous benefits that are tight with agriculture insurance. A practical example being the case of Malawi which has been able to utilize agriculture insurance and other strategy to move the country from the most food insecure country in South Africa to a food secure country. For the usage to be adopted and work to the advantage of the Kenyan farmers and the poor Kenyans the factors influencing its usage have to be taken care of.

## **CHAPTER THREE**

### **STUDY METHODOLOGY**

#### **3.1 Introduction**

This chapter presents a description of the methodology used to carry out this study. The issues discussed include; research design, target population, sampling procedure, data collection methods or instrumentation, testing for validity and reliability of the instruments in addition to data analysis techniques to be used.

#### **3.2 Research design**

The study employed the use of descriptive research design which involves the collection of data using questionnaires in order to answer questions of awareness, people's perception on the cost of insurance premium and social-economic factors that determine the use of agriculture insurance in enhancing food security. The data collection tool was a questionnaire with both open-ended and closed ended questions with the aim of getting data that is cross sectional and comparative.

#### **3.3 Target Population**

Kiambu County's population relies on agriculture with majority of the population being farmers, and as such the target population for this study. The County has a number of stakeholders who are involved in agriculture insurance who have been selected and they include; the six insurance companies providing agriculture insurance (heritage Insurance Company, ICEA Lion Group, APA insurance company, UAP insurance Company, Jubilee insurance company and CIC), Swiss Re (the main agriculture reinsurance company), Sygenta foundation, Rockefeller foundation, ILRI, KARI, AFC, Ministry of agriculture, FSD, World bank, commercial banks involved in credit finance towards agriculture and where agriculture insurance is compulsory (CFC Stanbic bank, Cooperative bank, Equity bank and Kenya Commercial Bank) among other stakeholders that might be identified in the process of research. The target population will be farmers and stakeholders in agriculture insurance in the County.

### **3.5 Sample Design, Sample Size and Sampling Procedure**

The sample unit of the study was one household in case of the residential community. The sampling design of the study was prepared to ensure that all the units of observations are adequately represented without any bias. Kiplagat (1999) observes that stratified sampling, increases precision. The stratified sampling technique was used to ensure that an adequate number of individuals or entities are sampled so that comparisons of parameters of interest could be made between the two (strata) within a population that is those people with agriculture insurance and those farmers who have never taken up agriculture insurance.

In line with the above and to ensure good representation in both categories, the researcher applied both probability and non-probability sampling technique. The researcher used the stratified sampling method. The reason for using this method was because the study aimed at capturing information from all the diverse group of people; those who have or have ever used agriculture insurance and those who have never, different age groups, different incomes, gender and levels of education, as well as those involved in the provision of agriculture insurance. The study cross related these different aspects to see if there is any influence of them in the use of agriculture insurance as a means of enhancing food security. In order to achieve this, the population was divided into two sub population that is individually more homogeneous than the total population, each sub-population was called a strata. Items from each stratum constituted a sample. A simple random sampling technique was adopted for the strata of those without agriculture insurance, also known as, category two respondents. However for the strata of those with agriculture insurance, also known as category one respondents, the snowballing sampling method was used. This is because the subjects in this category are unknown as there was no sampling frame or available data to show where they are located. These sampling methods gave the desired representation for the two subgroups. For the stakeholders involved in the provision and funding of agriculture insurance belonged to one stratum.

The size of the sample was selected as representatively as possible to minimize sampling error. Lindsey (1985) observes that the minimum permissible sample size is 30 sample units and argues that the error in basing a conclusion about an entire population on a small sample is likely to be very small. The researcher used Lindsey's observational idea in sampling farmers. To ensure that the entire County is represented 30 respondents were sampled in each of the division in the 8 sampled Sub-Counties. Three Sub-Counties (Gatundu, Lari and Thika East) were used for pre-testing the Instruments while the remaining 8 Sub-Counties were included in the actual study. A total sample size of 240 farmers were therefore targeted by the study. Sampling of Farmers was done as presented in table 3.1.

**Table 3.1 Sample Size for Farmers**

County	Sample Per Sub- County
1. Githunguri	30
2. Kiambu	30
3. Kiambaa	30
4. Kikuyu	30
5. Ruiru	30
6. Thika West	30
7. Limuru	30
8. Juja	30
<b>Total</b>	<b>240</b>

The sample size for stakeholder in agriculture insurance included one respondent from each of the 6 insurance firms (Heritage, APA, CIC, Jubilee, ICEA Lion Group and UAP) currently providing agriculture insurance in Kenya, one respondent from Swiss Re, one from each of the 4 Banks (CFC Stanbic bank, Equity Bank, Cooperative Bank and Kenya Commercial Bank) involved in credit financing for farmers. In addition one respondent was selected from each of the various organizations involved in agriculture insurance in Kenya which will included KARI, ILRI, AFC, ministry of Agriculture, Sygenta

foundation, FSD, Rockefeller foundation and the World Bank. A total of 19 key informants were targeted by the study. Table 3.2 presents the sample size for Key informants.

**Table 3.2 Sample Size for Key Informants**

<b>Key Informants</b>	<b>Sample</b>
Insurance companies	6
Reinsurer	1
Banks	4
KARI	1
AFC	1
ILRI	1
Sygenta Foundation	1
Rockefeller foundation	1
FSD	1
World bank	1
Ministry of Agriculture	1
<b>Total</b>	<b>19</b>

### **3.6 Research Instruments**

Primary data was used for the study where questionnaires and interview schedules were used as instruments for data collection. The questions were structured (closed-ended questions) as well as unstructured (open-ended). In some questions, the researcher used a Likert type scale to measure perception and attitude of the respondents to some issues. Each questionnaire had identification number for tracking purpose. In that the respondents needed to be aware of the research for them to cooperate, the researcher prepared a letter of transmittal that accompanied the questionnaire. The letter briefly described the purpose, the importance and the significance of the study and was also to assure confidentiality. Questionnaires were used to collect data from farmers.

The questionnaires had predetermined questions grouped together to address particular objective of the study. Majority of the questions were unstructured; this is because the researcher wanted to gather as much information as possible about perception, the use, the challenges and benefits derived in insuring crops and livestock. Questions on personal information such as gender, age, and marital status were structured. Questionnaires were filled through interviewing and filling the responses. The main reasons for using interview method of collecting data were; to ensure that the questions would not be misunderstood, to assist illiterate respondents and to minimize the risk of collecting incomplete information as it is with questionnaires particularly when people are unable to understand the questions properly. This data collection method was considered by the researcher as the most appropriate in providing a safe basis for generalization and high accuracy.

Interview schedules were used to collect data from key informants. The researcher use both phone and face to face interview. Structured and semi-structured as well as in-depth interviews were employed in this study.

In case of need, supplementary questions were be asked and at times omitted or change the sequence should the situation require. This method allowed more freedom in recording responses and includes some aspects and excludes others.

To guarantee accuracy of the interview the researcher ensured that:

- a) The interviewers were carefully selected, trained and briefed.
- b) The researcher made occasional field checks to ensure that interviewers were neither cheating nor deviating from instructions given to them.
- c) Effort was made to create friendly atmosphere of trust and confidence so that the respondents felt at ease.
- d) The researcher participated in interviewing.

### **3.7 Research Instrument Validity**

Piloting was done to test on the validity and reliability of the instruments of the study. The instruments of the study were tested among 20 farmers who were not included in the actual study. The piloting was done to ensure clarity of the final instruments for the actual data collection. The purpose of this pre-testing was to assist in finding out any weakness that might be contained in the instruments of the study before the actual data collection.

According to Mugenda & Mugenda (2003), validity is the degree to which results obtained from the analysis of data actually represent the phenomena under study. A valid instrument should accurately measure what it is supposed to measure. The validity of the research instruments were tested in a number of ways. The researcher reviewed the literature evidence of content validation studies and reported reliability statistics from published studies that have used the instrument. This assisted in assessing how suitable the instrument was for the study. The researcher also sought opinion from supervisor to review the instrument for relevance and clarity. Upon receiving feedback, the researcher evaluated the returned survey review tools and eliminated items, or modified the research instrument based on the feedback.

### **3.8 Research Instrument Reliability**

While content validity rarely changes, Polit & Beck (2004) cautions that the reliability of an instrument is a property not of the instrument but of the instrument when administered to a certain sample under certain conditions. They call for a re-estimate of reliability with each population surveyed. This should be done each time a research instrument is used (Knapp, 1985). Determining reliability requires reliability testing to ascertain both stability and internal consistency of the research instrument. Split-half method was used to test on the reliability of the instrument.

Spearman Brown Prophecy Formula below was used to test on the reliability of the instruments:

$$\frac{2 \times \text{Corr. Between the Halves}}{1 + \text{Corr. Between the Halves}}$$

$$r = \frac{2r}{r+1}$$

Where  $r$  = reliability of the coefficient resulting from correlating the scores of the odd items with the scores of the even items. According to Orodho (2004), a reliability coefficient of about 0.8 will be judged high enough for the instruments to be accepted as reliable for the study. The researcher got a reliability coefficient of 0.77 for the farmers' questionnaires. The instruments were therefore considered reliable for the study.

### **3.9 Data Analysis**

The data collected was edited and coded. The following were the procedures in processing the data: All the questionnaires (100%) were edited first using routing rules to ensure that the answers provided are in relation to the question asked. This was necessary because some questions were posed to different kinds of respondents. This was aimed at ensuring that each respondent is asked questions that are applicable to that kind of respondents.

The second step was to verify or validate the interview, by re-contacting the respondents, and asking some of the same questions again, a process known as back checking. Ten percent of the respondents were called back to check whether the original interview had in fact taken place, and that they had recorded their answers accurately. Another method of validation was based on questions in the questionnaire. In some instances, more than one question was asked where the answers expected were the same.

The next step involved converting the observations and the answers provided in the questionnaire into codes. A data coding sheet with explanation of each code was prepared. Data from the questionnaires were then entered into a computer using SPSS program.

Next, all the data were analyzed using SPSS program. This program has a data editor that provides a convenient, spreadsheet-like method for creating and editing data files. Each code was then given a value and analysis done using SPSS syntax. The analyzed data were presented in the form of frequency tables.



### 3.10 Operationalization of Variables

An operational definition is a definition that defines the exact manner in which a variable is measured (Tuckman 1978). Table 3.2 indicates the types of variables and how these variables were measured in the course of research.

**Table 3.3 Operationalization of Variables**

<b>Variable</b>	<b>Description of Variable</b>	<b>Measure(S)</b>	<b>Scale</b>
Awareness	Independent	Knowledge of existing insurance schemes Promotion activities Benefits of agriculture insurance Channels of distribution	Nominal Nominal Nominal Nominal
Cost		The Insurance premium cost Credit financing cost Cost of accessing information	Ordinal Ordinal Ordinal
Agriculture insurance use	Dependent		Ordinal
Socio-economic factors	Independent	Actual amount Land ownership Education level Financing Family income level Type of farming practiced Previous experience/risk faced	Nominal Nominal Nominal Ordinal Nominal Nominal
Stakeholders	Independent	ILRI KARI AFC KFSSG World Bank FSD Rockefeller Foundation Sygenta Foundation Insurance Companies Reinsurance Company (Swiss Re)	Nominal Nominal Nominal Nominal Nominal Nominal Nominal Nominal Nominal Nominal

## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION OF FINDINGS

#### 4.1 Introduction

This chapter presents the findings of the study. It begins with the presentation of the demographic information of the respondents followed by presentation of the findings as per the objectives of the study.

#### 4.2 Response rate

This study analyzed 199 responses out of the 259 questionnaires administered which is 77 percent. Out of the 199 respondent 180 of them were farmers and 19 were the stakeholders.

#### 4.3 Demographic Data Analysis

In this section, the researcher sought to get information on the respondents' age, gender, marital status, highest academic qualification, members of the household and farming experience.

##### 4.3.1 Distribution of Respondents by Age

To establish the ages of the respondents, they were asked to indicate their age brackets. The findings of the study were as presented in Table 4.12

**Table 4.1 Percentage Distributions of Respondents by Age**

Age Bracket	Frequency	Percent
18-25	18	10.0
26-35	36	20.0
36-45	45	25.0
46-55	36	20.0
56-65	36	20.0
66 and Above	9	5.0
<b>Total</b>	<b>180</b>	<b>100.0</b>

The findings on Table 4.1 show that 25% of the respondents were aged between 36-45 years. It was also found that 20% of the respondents were aged between 26-35 years, 46-55 years and 56-65 years. The findings further revealed that 10% of the respondents interviewed were between 18-25 years while 5% were above 65 years. According to Torkamin (2002) age has an influence in adoption of agriculture insurance.

#### 4.2.2 Distribution of Respondents by Gender

To establish the gender of the respondents, they were asked to indicate their gender. These were presented in Table 4.2

**Table 4.2 Distribution of Respondents by Gender**

<b>Gender</b>	<b>Frequency</b>	<b>Percentage</b>
Male	80	44
Female	100	56
<b>Total</b>	<b>180</b>	<b>100.0</b>

Table 4.2 shows that 100(56%) of the respondents were female while 80(44%) were male. This is an indication that most of the farmers interviewed were females.

#### 4.2.3 Distribution of the Respondents by Marital Status

Respondents were asked to indicate their marital status. These were presented in Table 4.3

**Table 4.3 Distribution of the Respondents by Marital Status**

<b>Marital status</b>	<b>Frequency</b>	<b>Percent</b>
Single	47	26
Married	127	71
Separated	6	3
<b>Total</b>	<b>180</b>	<b>100.0</b>

Table 4.3 shows that 127 (71%) of the respondents were married, 47 (26%) were single and 6 (3%) were separated. This implies that most of the respondents were married, which could be contributed to the fact that the married tend to be more responsible and will tend to worry about food security more compared to those who are single or separated. Also it is in agreement with Tirae (2002) who confirmed that marital status does have an influence in the uptake of agriculture insurance

#### 4.2.4 Distribution of the Respondents by Level of Education

The respondents were asked to indicate their level of education. These were presented in Table 4.4.

**Table 4.4 Distribution of the Respondents by Level of Education**

<b>Highest Level of Education</b>	<b>Frequency</b>	<b>Percent</b>
Primary School	51	28
Secondary School	111	61
Certificate	12	7
Diploma	3	2
Undergraduate	3	2
<b>Total</b>	<b>180</b>	<b>100.0</b>

Table 4.4 shows that 61% had secondary education. The study further revealed that 28% reached primary level, 7.0% certificate level while 1.6% represented both diploma and undergraduate qualifications. The findings thus reveal that most of the respondents were high school graduates. According to Torkamani (2002) the level of education has a positive correlation in the adoption of insurance. Therefore considering that most of the farmers haven't proceeded past secondary education this will have an influence in the use of agriculture insurance.

#### 4.2.5 Distribution of the Respondents by Households Members

In determining the members in the respondents' households, farmers were asked to indicate the numbers of members of their households. These were presented in Table 4.5.

**Table 4.5 Distribution of the Respondents by Households Members**

<b>Members of the Household</b>	<b>Frequency</b>	<b>Percent</b>
1-5	111	61
6-10	57	32
11-15	12	7
<b>Total</b>	<b>180</b>	<b>100.0</b>

Table 4.5 shows that 111 (61%) had between 1-5 members of the household. The findings also revealed that 57 (32%) had household membership of between 6-10 and 12 (7%) had household membership of 11-15. From the study it can be concluded that most of the respondents interviewed had households consisting of 1-5 members.

#### **4.2.6 Distribution of the Respondents by Farming Experience**

The respondents were asked to indicate their farming experience in years. These were presented in Table 4.6.

**Table 4.6 Distribution of the Respondents by Farming Experience**

<b>Age Bracket</b>	<b>Frequency</b>	<b>Percent</b>
5 Years and below	18	10
6-10 Years	31	17
11 -20 Years	45	25
21-30 Years	36	20
31-40 Years	26	15
41-50 years	16	9
Over 50 years	8	4
<b>Total</b>	<b>180</b>	<b>100</b>

Table 4.6 shows that 25% of the respondents had been farmers for a period between 11-20 years. The findings also revealed that 20% of the respondents had been farmers for a

period between 21-30 years and that only 4% of the respondents interviewed had been farmers for a period of over 50 years.

### 4.3 Influence of Awareness on the use of Agriculture Insurance

To find out the influence of awareness of the use of agriculture insurance, the study assessed whether the respondents had heard of Agriculture insurance, source of information on agriculture insurance, organizations offering agriculture insurance, having insured crops or livestock, motivation for insurance and the benefits of agriculture insurance.

#### 4.3.1 Having Heard of Agriculture Insurance

On whether the respondents had heard of agriculture insurance, the respondents were asked to indicate whether they had heard of insurance or not. These were presented in Table 4.7.

**Table 4.7 Having Heard of Agriculture Insurance**

Hearing of Agriculture Insurance	Frequency	Percent
Yes	126	70.0
No	54	30.0
<b>Total</b>	<b>180</b>	<b>100.0</b>

Table 4.7 shows that 70% of the respondents interviewed had heard of agriculture insurance while 30% had never heard of it. The finding is an indication that most of the respondents had heard of agriculture insurance though most of them had not taken it up. According to Baker (2000), farmers' awareness of the importance of insurance and its influences on their income supports the uptake of agriculture insurance,

#### 4.3.2 Crop/Livestock Insurance

The respondents were asked to indicate whether they had insured their crops or livestock. These were presented in Table 4.8.

**Table 4.8 Crop/Livestock Insurance**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Yes	18	10.0
No	162	90.0
<b>Total</b>	<b>180</b>	<b>100.0</b>

Table 4.8 shows that 90% of the respondents had not insured their crops while 10% had insured. It is clear from the findings that majority of the respondents had not insured their crops. Despite 70% as indicated in table 4.7 having heard about agriculture insurance it is only 10% who had insured their crop or livestock this implies that having heard about agriculture insurance does not automatically mean it has an influence. Which confirms Surez et al (2007) argument that by just having heard about insurance a farmer might consider it up but other factors do influence as well.

### **4.3.3 Motivation of Crop/Livestock Insurance**

Those who had insured their crops were asked to indicate their motivation for Agriculture insurance. These were presented in Table 4.9.

**Table 4.9 Motivation of Crop/Livestock Insurance**

<b>Motivation</b>	<b>Frequency</b>	<b>Percent</b>
Bank or financial institution compulsion	3	16.7
Financial Security	12	66.7
Heard of good experience of other farmers	3	16.7
<b>Total</b>	<b>18</b>	<b>100.0</b>

Table 4.9 shows that 66.7% indicated financial security, 16.7% indicated bank or financial institution compulsion and another 16.7% indicated having heard of the good experience of other farmers. This implies that most of the respondents took insurance because it was a means of offering financial security in the event of a loss. The percentage of those who took it because it was a requirement by the financial institution is equivalent to those who took because they heard of a good experience of other farmers. This then implies that one for farmers requiring a financial facility agriculture insurance should be compulsory and two that agriculture insurance success stories be shared and given more airtime when creating awareness as this will impact the financial security of the farmers.

In interviews with key informant on the reasons behind the slow intake of Agriculture insurance, the following were mentioned: high insurance premiums charged, low income among farmers, scale of production or farming, lack of awareness among farmers, negative attitude of the farmers towards agriculture insurance and delayed compensation in cases of loss. According to Mahul and Stutely (2009) agriculture Insurance cannot work in isolation therefore there is a need to equip farmers with proper farming techniques so as to increase the farmers' income, and to get the most from be it the small scale farming.

#### **4.4 Influence of socio economic factors on the use of Agriculture Insurance**

This section presents the findings on the type farming, other sources of income and the influence of different socio-economic factors on Agriculture insurance.

##### **4.4.1 Type of Farming**

The respondents were asked to indicate the type of farming they practiced. These were presented in Table 4.10.

**Table 4.10 Type of Farming**

<b>Type of Farming</b>	<b>Frequency</b>	<b>Percent</b>
------------------------	------------------	----------------



Crop Farming Only	18	10.0
Livestock Farming Only	39	21.7
Both Livestock and Farming	123	68.4
<b>Total</b>	<b>180</b>	<b>100.0</b>

Table 4.10 shows that 123 (68.4%) were both livestock and crop farmers. The study also found that 39 (21.7%) practiced livestock farming and 18 (10%) practiced crop farming.

#### 4.4.2 Other Sources of Income other than Farming

The respondents were asked to indicate whether they had other sources of income other than farming. These were presented in Table 4.11.

**Table 4.11 Other Sources of Income other than Farming**

<b>Response</b>	<b>Frequency</b>	<b>Percent</b>
Yes	96	53.3
No	84	46.7
<b>Total</b>	<b>180</b>	<b>100.0</b>

Table 4.11 shows that 53% of the respondents indicated that they had other sources of income besides farming while 47% indicated that they had no other sources of income other than farming. This could indicate that farmers are looking for other sources of income as a means to diversify risk in the event they experience a loss in farming. Jodha (1981) based on his findings in India argues that farmers' own measure to reduce risk in farming are costly and tend to impinge upon the investment in agriculture leading to suboptimal allocation of resources. This with no doubt will be the effect more farmers engaging in other activities to raise income.

#### 4.4.3 Influence of socio-economic Factors of Agriculture Insurance

To establish the influence of socio-economic factors on the use of agriculture insurance among farmers, the respondents were asked to indicate the extent to which each factor influenced subscription to agriculture insurance. These were presented in Table 4.12.

**Table 4.12 Influence of socio-economic Factors of Agriculture Insurance**

Statement	No extent at all		Small extent		Neutral extent		Large extent		Very large extent		Total (%)	
	F	%	F	%	F	%	F	%	F	%	F	%
The cost of insurance	9	5	21	11.7	42	23.3	33	18.3	75	41.7	180	100
Type of farming practiced(crop/livestock)	12	6.7	72	40	33	18.3	30	16.7	33	18.3	180	100
Education level among farmers	21	11.7	45	25	51	28.3	12	6.7	51	28.3	180	100
The risk surrounding crops and livestock farming	9	5	23	12.7	42	23.3	28	15.6	78	43.3	180	100
Income generated for farming	6	3.3	40	22.2	42	23.3	42	23.3	50	27.8	180	100

Table 4.12 shows that 43.3% of the respondents indicated that the risks surrounding crop and livestock influences the decision by farmers to go for agriculture insurance to a very large extent. The study also found that 41.7% of the respondents indicated that the cost of insurances influences the decision by farmers to go for ainsurance to a very large extent. The findings are in line with the findings of a study done by Baquet and Smith (2006) who found that agriculture education, history of risk, the amount of debt to credit institutions and banks, manufacturing and product rate fluctuations and rate insurance, affect in the participation of farmers in insurance scheme

The study further found that 28.3% of the respondents indicated that level of education neutrally affects the uptake of agriculture insurance and that income generated from farming affects the uptake of agriculture insurance to a very large extent as indicated by 27.8%. The findings finally revealed that the types of farming practiced affect the uptake of agriculture insurance among farmers to a small extent. These findings are in line with the findings of a study done by Torkamani (2002) on the effective factors on demand for agriculture insurance which showed that land ownership, production of previous year, age, level of education, farmer's capital, risk taking and previous record for facing risk, have positive correlation in adoption of insurance.

#### 4.5 Influence of Stakeholders on the Use of Agriculture Insurance among Farmers

On the influence of the stakeholder on the use of Agriculture insurance among farmers, the respondents were asked to indicate the level of their agreement with different statements. These were presented in Table 4.13.

Statement	Strongly Disagree		Disagree		Neither Agree Nor Disagree		Agree		Strongly Agree		Total (%)	
	F	%	F	%	F	%	F	%	F	%	F	%
High cost of insurance premiums	9	5	30	16.7	6	3.3	39	21.7	96	53.3	180	100
The nature insurance company issuing the policy	6	3.3	18	10	60	33.3	51	28.3	45	25	180	100
Long procedures in the acquisition of the policy	21	11.7	24	13.3	36	20	21	11.7	78	43.3	180	100
Delays in compensation in case of loss	15	8.3	18	10	21	11.7	24	13.3	102	56.7	180	100

Inadequate creation of awareness on the available policies	15	8.3	24	13.3	30	16.7	57	41.7	36	20	<b>180</b>	<b>100</b>
Limited risk coverage by the insurance firms	3	1.7	30	16.7	24	13.3	75	41.7	48	26.7	<b>180</b>	<b>100</b>

**Table 4.13 Influence of Stakeholders on the Use of Agriculture Insurance among farmers**

Table 4.13 shows that 56.7 % strongly agreed that delays in compensation in case of loss influence the uptake of agriculture insurance. The study also found that 53.3% of the respondents strongly agreed that the high costs of insurance premiums affect their uptake. According to Makki and Somwaru (2001), the choice to purchase insurance depends on the premium level, expected indemnity, risk level and availability of alternative risk management tools. Moreover, a study done by Ginder and Aslihan (2006) shows that the cost of the insurance is the most influential factor determining the farmers decision to have insurance or not and what type of insurance product that is chosen.

The findings further revealed that 43.3% of the respondents strongly agreed that the long procedures in the acquisition of the policy affects the uptake of Agriculture insurance among farmers and another 41.7% agreed that inadequate creation of awareness on the availability policies affects their uptake. The findings further revealed that 41.7% of the respondents agreed that limited risk coverage by the insurance firms affect the uptake of the policies. The study finally found that 33.3% of the respondents neither agreed nor disagreed that nature of insurance company issuing the policy affects their uptake. The findings are in concur with the findings of a study done by Adinolfi *et al.* (2012) who evaluated crop insurance in France and Italy, and found that weather conditions has less influence on the farmers' insurance decisions. They find that business related factors such as farm size, the number of crops grown and the premium levels influence the farmers' insurance decisions.

## **4.6 Correlation Analysis**

A correlation analysis was done on the different factors and usage of agriculture insurance. The findings are as presented in Table 4.14.

**Table 4.14 Correlation Analysis**

<b>Correlations</b>					
		Usage of Agriculture Insurance	Awareness	Socio- economic factors	Stakeholders' influence
Usage of Agriculture Insurance	Pearson Correlation	1	.551**	.843**	.798**
	Sig. (2- tailed)		.000	.000	.000
	N	180	180	180	180
Awareness	Pearson Correlation	.551**	1	.807**	.881**
	Sig. (2- tailed)	.000		.000	.000
	N	180	180	180	180
Socio-economic factors	Pearson Correlation	.843**	.807**	1	.876**
	Sig. (2- tailed)	.000	.000		.000
	N	180	180	180	180
Stakeholders' influence	Pearson Correlation	.798**	.881**	.876**	1
	Sig. (2- tailed)	.000	.000	.000	
	N	180	180	180	180

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

The results of the correlation analysis on Table 4.14 shows usage of agriculture insurance is positively related with awareness with a Pearson's correlation coefficient of  $r = 0.551$  and that at a level of significance of 0.000, it is statistically significant at  $p$  value less than 0.05. The results also show that there is a positive correlation between usage of agriculture insurance and socio-economic factors with a Pearson's correlation coefficient of  $r = 0.843$  and a level of significance of 0.000 (statistically significant). The results finally show that there is a positive correlation between usage of agriculture insurance and stakeholders' influence with a Pearson's correlation coefficient of  $r = 0.798$  and a level of significance of 0.000 (statistically significant). The significance values tell us that the probability of the correlation being a fluke is very low; hence the study can have confidence that the relationship between the variables is genuine.

From the findings of the study, it can be said that socio-economic factors influences the usage of agriculture insurance the most (Pearson's correlation coefficient of  $r = 0.843$ ), followed by stakeholders (Pearson's correlation coefficient of  $r = 0.798$ ) and finally farmers' awareness (Pearson's correlation coefficient of  $r = 0.551$ ). These findings are in line with the findings by Ginder and Aslihan (2006) who found that the price of the insurance is the most influential factor determining the farmers decision to have insurance or not and what type of insurance product that is chosen. A study done by Adinolfi *et al.* (2012) on evaluation of crop insurance in France and Italy, and showed that business related factors such as farm size, the number of crops grown and the premium levels influence the farmers' insurance decisions.

## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSION AND RECOMMENDATION**

#### **5.1 Introduction**

This chapter presents the summary of the study, conclusion and recommendation.

#### **5.2 Summary of the Study**

The purpose of this study was to assess the factors influencing the use of Agriculture insurance as a means to promoting food security in Kenya and specifically in Kiambu County. The study was guided by the following objectives: to examine the level of awareness of the existing agriculture insurance schemes in Kiambu County, to examine how different socio-economic factors influence the acceptance and use of Agriculture insurance as a tool for promoting food security in Kiambu County and to assess the role of stakeholders on the use of agriculture insurance among farmers.

Literature review was presented on the major variables of the study such as awareness on agriculture insurance, socio-economic factors influencing the use of agriculture insurance and the influence of stakeholders on the uptake of agriculture Insurance.

Descriptive research design was used for the study. The population for the study was farmers and key informants from organizations offering agriculture insurance in Kenya. Stratified sampling technique was used to sample the respondents. A total of 259 respondents were targeted by the study (constituting 240 farmers and 19 key informants) out of which 199 responded (180 farmers and 19 key informants) giving a response rate of 77%. Questionnaires and Interview schedules were used as instruments for data collection. Piloting was done to test on the Validity and reliability of the instruments. Quantitative data were analyzed using descriptive statistics while content analysis technique was used to analyze qualitative data collected using interview schedules. Microsoft SPSS package was used to analyze the quantitative data. Descriptive statistics such as frequencies and percentages was used to analyze the data.



The study found that awareness affects the use of agriculture insurance among farmers in Kiambu County. This was evidenced by the fact that 30% of the respondents interviewed had not heard of agriculture insurance and the fact that only 10% of the respondents interviewed had agriculture insurance cover for their crops and livestock. The study also found that socio-economic factors such as the cost of insurance, type of farming practiced, risks surrounding crops and livestock and income generated from farming influences the use of agriculture Insurance. The study finally found that stakeholders influence the use of agriculture insurance in through offering insurance at high costs premiums, long procedures in the acquisition of the policy, delays in compensation in case of loss, inadequate creation of awareness on the available policies and limited risk coverage by the insurance firms.

### **5.3 Conclusion**

From the study, it was concluded that lack of awareness is one of the major factors influencing the use of agriculture insurance among farmers in Kiambu County.

It was also concluded from the study that socio-economic factors such cost of insurance, type of farming practiced, risks surrounding crops and livestock and income generated from farming influences the use of agriculture Insurance.

Finally it was concluded from the study that stakeholders influences the use of agriculture insurances among farmers in that they charge high premiums, have long procedures and delay compensation in cases of loss.

### **5.4 Recommendations**

The following were the recommendations of the study:

The study recommends that more awareness should be created among farmers. This can be done by holding agriculture meetings with farmers in order to educate them on the benefits and the importance of use of agriculture insurance. This will promote the uptake of agriculture insurance among farmers in Kiambu County.

The study also recommends that the insurance premiums charged on agriculture insurance policies should be reduced. This is based on the fact that farmers see the cost of insurance to be so high thus hindering their uptake.

The study finally recommends that the organizations selling the insurance policies to farmers should reduce the procedures and also compensate farmers immediately in cases of loss. This will help will help in building the confidence of the farmers in purchasing the policies thus promoting agriculture insurance.

### **5.5 Recommendations for Further Research**

The study was carried out in Kiambu County to establish on the factors influencing the use of agriculture insurance as a means to promoting food security in Kenya. The researcher therefore recommends that the same study should be carried out in other counties. The researcher further recommends that another study to be done on the benefits of use of agriculture insurance to farmers which was not the focus of this study

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## APPENDICES

### Appendix I: Letter of Intent

**Mamo Nyabochwa  
University Of Nairobi,  
P.O Box 30197-00100  
Nairobi-Kenya**

**February 2015**

**To whom it may Concern**

Dear Sir/madam

**RE: Request for Data**

My name is Mamo Nyabochwa and I am a Masters of Arts (MA) student in Project Management and Planning at University of Nairobi. I am writing to invite you to participate in research in the form of a questionnaire.

My research project focuses on factors influencing the use of Agriculture insurance as a means to promoting food security in Kenya and specifically in Kiambu County. An integral part of the research is to identify such factors as cost, awareness and socio-economic factors and how these factors influence the usage of agriculture insurance to caution farmers in the event of crop and livestock loss which impact the country's food security.

The questionnaire should take about 30 minutes to complete. The research findings will be submitted to the University of Nairobi in partial fulfillment for the degree of MA in Project Planning and Management.

I wish to assure you that the information you will provide will be treated as confidential and it will be kept in the faculty at the University of Nairobi. Access to the information provided in this questionnaire will be restricted to my supervisor and me.

I look forward for your support

Yours Sincerely

Mamo Nyabochwa





**Appendix II: Questionnaires for Farmers**

**Section A: Personal information / Household Particulars**

1. Your Name (optional): \_\_\_\_\_ Sub-County: \_\_\_\_\_

2. Age: 18-25yrs [ ] 26-35yrs [ ] 36-45 yrs [ ]  
46-55yrs [ ] 56-65yrs [ ] 66Yrs and above [ ]

3. Gender: Male [ ] Female [ ]

4. Marital Status: Single [ ] Married [ ]  
Widowed [ ] Separated [ ]

5. What is the highest level of education you have completed?

Primary school [ ] Secondary school [ ] Certificate [ ]

Diploma [ ] Undergraduate [ ] Post Graduate [ ]

Other (*specify*) \_\_\_\_\_

6. How many are your current members of your household?

1-5 Members [ ] 6-10 Members [ ] 11-15 members [ ]

16-12 Members [ ] Above 20 members [ ]

7. For how long have you practiced farming (Years) \_\_\_\_\_

**Section B: Influence of Awareness on the use of Agriculture Insurance**

8. Have you ever heard of agriculture insurance?

Yes [ ] No [ ]

a. If yes where did you first hear and learn about agriculture insurance?

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b. If yes, which organization(s) offering Agriculture insurance have you heard of?

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9. Have you insured of insuring your crops and/or livestock

Yes [ ] No [ ]

If **Yes** what was your motivation for going for agriculture insurance

- a. Banks/Financial institutions compulsion
- b. Financial Security
- c. Heard of good experience of other farmers
- d. Any others (specify) \_\_\_\_\_

If **No**, what are some of the reasons why you have not taken Agriculture insurance?

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9. What are some of the benefits of Agriculture insurance?\_\_\_\_\_

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**Section C: Influence of socio economic factors on the use of Agriculture Insurance**

10. Which of the following types of farming do you practice?

- i. Crop farming only [ ]
- ii. Livestock farmingonly [ ]
- iii. Both crop and livestock farming [ ]
- iv. Fish farming [ ]

Any other (Specify)\_\_\_\_\_

11. What is your average monthly income from farming?\_\_\_\_\_

12. Do you have other sources of income apart from farming? Yes [ ] No [ ]

If yes, please specify the source (s)?\_\_\_\_\_

13. Do you think socio-economic factors influences the use of Agriculture insurance among farmers? Yes [ ] No [ ]

Briefly explain your answer? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

14. The following are some of the factor influencing the use of Agriculture insurance among farmers. Please indicate the extent to which each factor influences the use of Agriculture insurance in your sub-county.

- 1-No extent at all                      2- Small extent                      3- Neutral extent**  
**4- Large extent                      5- Very large extent**

Statement	1	2	3	4	5
The cost of insurance					
Type of farming practiced (crop/livestock)					
Education level among farmers					
The risks surrounding crops and livestock farming					
Income generated for farming					

14. What are other socio-economic factors influencing the use of Agriculture insurance among farmers in your Sub-County? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Section E: Influence of Stakeholder on the use of Agriculture Insurance among Farmers**

15. The following are some statement on the influence of stakeholder on the use of Agriculture insurance among farmers. Please indicate your level of your agreement with each of the following statements.

**1-Strongly Disagree**

**2- Disagree**

**3- Neither agree nor disagree**

**4- Agree**

**5- Strongly Agree**

Statement	1	2	3	4	5
High costs of insurance premiums					
The nature insurance company issuing the policy					
Long procedures in the acquisition of the policy					
Delays in compensation in case of loss					
Inadequate creation of awareness on the available policies					
Limited risk coverage by the insurance firms					

16. What are other stakeholders related factors influencing the uptake of Agriculture insurance cover in your Sub-County?\_\_\_\_\_

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17. What would you recommend to be done to improve the intake of Agriculture insurance among farmers in Kiambu County?\_\_\_\_\_

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*Thanks for your time and cooperation*

**Appendix III: Interview Schedule for agencies, Personnel/stakeholders dealing with agriculture insurance**

1. Name of the Organization: \_\_\_\_\_

2. Designation/nature of business:\_\_\_\_\_

3. How are you involved in agriculture insurance?

Insurance provider [ ] Funding/financing [ ] Awareness/education [ ]

Other (specify)

4. What is the level of awareness of farmers on the available policies on Agriculture insurance?

\_\_\_\_\_  
\_\_\_\_\_

5. In your opinion, what are some of the socio-economic factors influencing the uptake of Agriculture insurance in Kiambu Country?

\_\_\_\_\_  
\_\_\_\_\_

6. What important role can you or your organization play in awareness & publicity of agriculture insurance?

a. Advertise agriculture insurance

b. Discuss agriculture insurance with farmers when you interact

c. Handouts on agriculture insurance like brochures & pamphlets to farmers

d. Include agriculture insurance as an agenda in various meetings with farmers

e. Others, if any \_\_\_\_\_

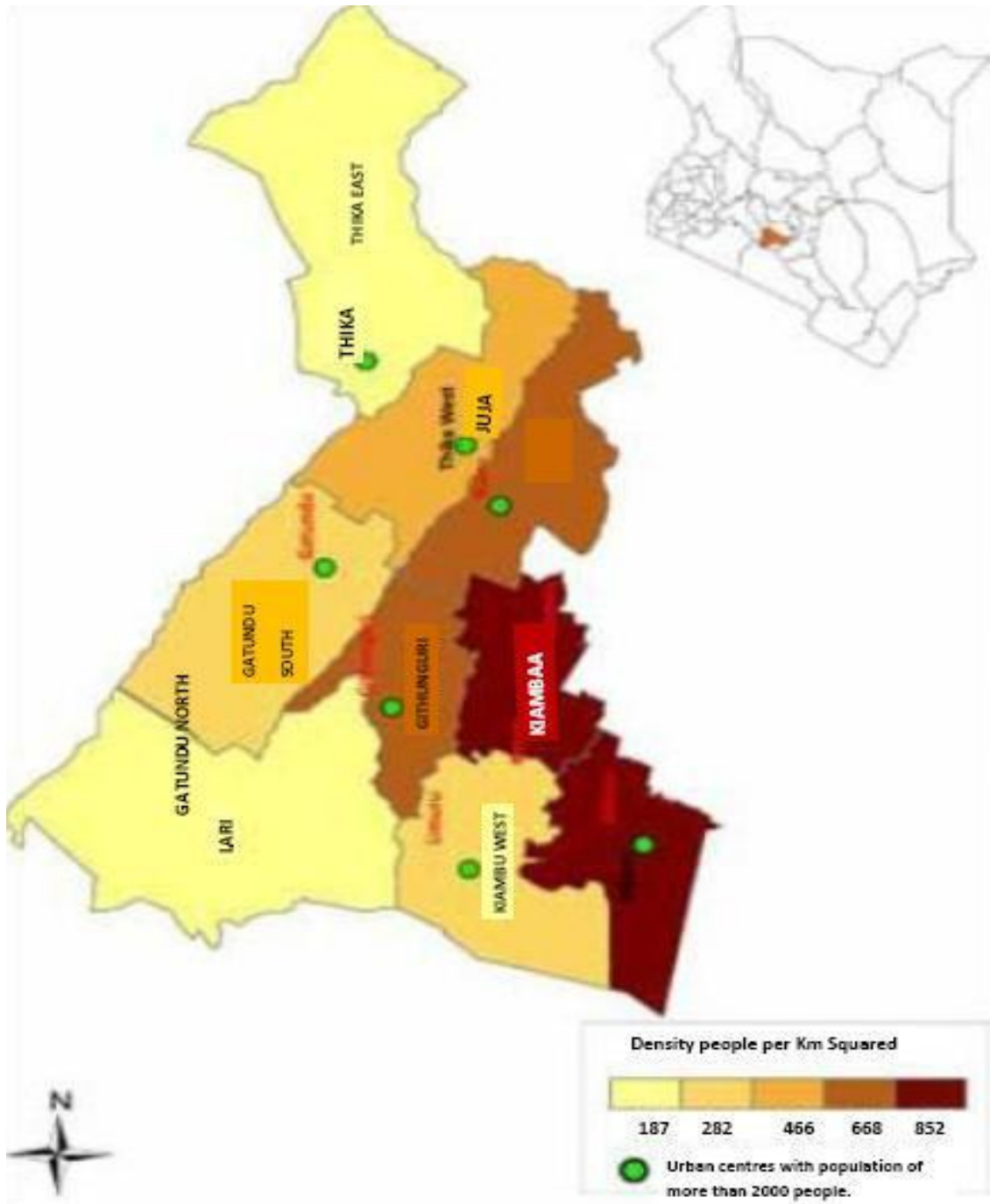
7. What would you recommend to be done to improve the intake of Agricultur einsurance among farmers in Kiambu County?\_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

8. Any other information that should be known in regards to agriculture insurance in the country?\_\_\_\_\_

*Thanks for your time and cooperation*

### Appendix IV: Map of Kiambu County



# Appendix V: National Commission for Science, Technology and Innovation Research Permit Copy

CONDITIONS

1. You must report to the County Commissioner and the County Education Officer of the area before embarking on your research. Failure to do that may lead to the cancellation of your permit.
2. Government Officers will not be interviewed without prior appointment.
3. No questionnaire will be used unless it has been approved.
4. Excavation, filming and collection of biological specimens are subject to further permission from the relevant Government Ministries.
5. You are required to submit at least two(2) hard copies and one(1) soft copy of your final report.
6. The Government of Kenya reserves the right to modify the conditions of this permit including its cancellation without notice.



**REPUBLIC OF KENYA**



**National Commission for Science,  
Technology and Innovation**

**RESEARCH CLEARANCE  
PERMIT**

**6134**

**Serial No. A**

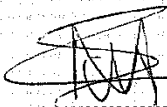
**CONDITIONS: see back page**

**THIS IS TO CERTIFY THAT:**  
**MS. MARY MAMO M. NYABOCHWA**  
**of UNIVERSITY OF NAIROBI, 0-100**  
**NAIROBI, has been permitted to conduct**  
**research in Kiambu County**

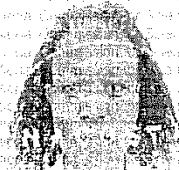
**Permit No : NACOSTI/P/15/2133/7514**  
**Date Of Issue : 11th August, 2015**  
**Fee Received : Ksh 1,000**

**on the topic: FACTORS INFLUENCING**  
**THE USE OF AGRICULTURE INSURANCE**  
**AS A MEANS FOR ENHANCING FOOD**  
**SECURITY IN KIAMBU COUNTY IN KENYA**

**for the period ending:**  
**4th September, 2015**



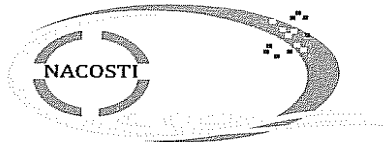
**Applicant's  
Signature**



**Director General**  
**National Commission for Science,  
Technology & Innovation**



**Appendix VI: National Commission for Science Technology and Innovation  
Research Authorization Letter**



**NATIONAL COMMISSION FOR SCIENCE,  
TECHNOLOGY AND INNOVATION**

Telephone: +254-20-2213471,  
2241349, 310571, 2219420  
Fax: +254-20-318245, 318249  
Email: secretary@nacosti.go.ke  
Website: www.nacosti.go.ke  
When replying please quote

9<sup>th</sup> Floor, Utalii House  
Uhuru Highway  
P.O. Box 30623-00100  
NAIROBI-KENYA

Ref: No.

Date:

**11<sup>th</sup> August, 2015**

**NACOSTI/P/15/2133/7514**

Mary Mamo M. Nyabochwa  
University of Nairobi  
P.O. Box 30197-00100  
**NAIROBI.**

**RE: RESEARCH AUTHORIZATION**

Following your application for authority to carry out research on *“Factors influencing the use of agriculture insurance as a means for enhancing food security in Kiambu County in Kenya,”* I am pleased to inform you that you have been authorized to undertake research in **Kiambu County** for a period ending **4<sup>th</sup> September, 2015.**

You are advised to report to **the County Commissioner and the County Director of Education, Kiambu County** before embarking on the research project.

On completion of the research, you are expected to submit **two hard copies and one soft copy in pdf** of the research report/thesis to our office.

  
**DR. S. K. LANGAT, OGW  
FOR:DIRECTOR-GENERAL/CEO**

Copy to:

The County Commissioner  
Kiambu County.

The County Director of Education  
Kiambu County.