

**THE INFLUENCE OF AGRICULTURAL INSURANCE AS A RISK MANAGEMENT  
TOOL ON LARGE SCALE MAIZE FARMERS' PERFORMANCE IN KESSES SUB-  
COUNTY, UASIN GISHU COUNTY, KENYA**

**BY**

**LUCY JEPCHUMBA**

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## **DECLARATION**

I declare that this research project is my original work and has never been presented for an award of degree or other certificate to any University or examining body.

Signature \_\_\_\_\_ Date \_\_\_\_\_

**Lucy Jepchumba**

**Registration: D61/69013/2013**

The research project has been submitted for examination with my approval as the student's supervisor

Signature \_\_\_\_\_ Date \_\_\_\_\_

**Mr. Midikira Churchill Kibisu**

**Lecturer, University of Nairobi.**

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## **DEDICATION**

This project is dedicated to my family. Thank you for your prayers, encouragement, understanding, patience and moral support throughout my study.

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## **ABSTRACT**

In spite of agriculture being an important source of income growth and a potential source of investment opportunities in Kenya, farmers face numerous production risks including climate variability and change. Whilst traditionally farmers have historically devised a diverse portfolio of risk avoidance and reduction mechanisms such as reduced input application, use of drought resistant varieties and diversification of crop or income portfolio to self-insure against agricultural risks, a pool of research show that traditional risk minimization strategies are unfavorable to some extent and that cannot adequately absorb the resultant economic shocks hence this can lead to poverty trap. Literature suggests that crop insurance as a risk management tool has the potential to unlock other key services in the agricultural sector that are important in enhancing productivity. This study sought to assess effectiveness of agriculture insurance among large scale farmers in Kenya with view of linking to performance as opposed to non-insurance. This paper analyzed the actual impact of insurance products on the economic performance of maize farmers by linking the economic performance model with the insurance demand model. For this analysis, a simultaneous equation system is solved. Agricultural insurance schemes are a potential tool to cope with income losses through indemnity payments and therefore stabilize income and economic performance of farms. Data was collected from 30 maize-producing farmers in Kesses county where maize is cash crop to many farmers among other counties in Kenya. Purposive statistics results show that agriculture insurance uptake is very low but the few farmers who have insured gain more than those who have not insured. Agriculture insurance is also not well understood by farmers and therefore the uptake is low. The insured farmers have indeed gained and maintain their income in spite of loss occurrences as opposed to uninsured farmers. The finding therefore shows that farmers with insurance in place as risk mitigation tool perform better than those with other forms of loss mitigation tools. Farmers are therefore encouraged to take up agriculture insurance to maintain their production for consistency of income.

# **CHAPTER ONE**

## **INTRODUCTION**

### **1.1 Background of the Study**

Risk management is described as the process of planning, organizing and controlling the organization/ individual activities to minimize the possibility that the organization, and member or customer of the organization, or even the wider community will suffer any harm or detriment. The origins of risk management can be traced to the Frenchman Henri Fayol, in 1916, which identified risk as one of the six basic activities of an industrial undertaking. Fayol stated that the goal of the Security activity was to safeguard property and persons against theft, fire and flood; to ward off strikes and felonies and broadly all social or natural disturbances liable to endanger the progress and even the life of the business. There are various ways of managing risk including risk avoidance, risk transfer, risk control and risk retention.

Insurance is just one of the concepts that are under the wider discipline of risk Management. It involves a risk transfer mechanism. For an individual farmer, risk management involves finding the preferred combination of activities with uncertain outcomes and varying levels of expected return. The World Trade Organization regulations (1998) discourage government from subsidizing agriculture directly but rather promote income protection mechanisms through subsidization of insurance premium which promoted adoption of crop insurance as risk management strategies in the developing countries.

The theories applied in the study are resource-based theory, competitive advantage theory and decision theory. The Resource based theory is necessary as it analyses and interprets internal resources of the farmers and emphasizes resources and capabilities in formulating strategy to

achieve innovative farming techniques. Contingency theory reflects on the difficulties and exposures facing the agriculture sector and possible ways of managing risks while employing suitable risk management strategies. Decision theory is the part of probability theory that is concerned with calculating the consequences of uncertain decisions. This can be applied to state the objectivity of a choice and to optimize decisions.

In Kenya major insurance companies have ventured to agriculture insurance to expand their portfolio and help mitigate risk faced by farmers especially the large scale farmers. UAP Insurance Limited is the main provider of crop insurance in tobacco farming in Migori County through Kilimo Salama initiative. This is a joint project between UAP Insurance and Syngenta Foundation for sustainable agriculture other partners including MEA Limited and mobile phone provider Safaricom.

### **1.1.1 Risk Management Strategy**

Having first become aware of a risk and then having assessed it, the next concern is how the party (or parties) at risk can seek to manage that risk. It should first be noted that risk management should be planned before realization of an event. To take a risk is to expose oneself to a chance of injury or loss. For many decisions risk is unimportant since the scope of a possible loss is small and/or the probability of suffering that loss is judged to be low. However, in order to withstand adverse outcome and to avoid jeopardizing the existence of an enterprise as the base for income generation, risk has to be managed effectively within the capacity of the individual business or group (Hardaker, Huirne and Anderson 1997).

Agriculture is the major component of the economic pillar of Kenya Vision 2030 ([www.vision2030.go.ke](http://www.vision2030.go.ke), last viewed on 10th February 2014), which aims to achieve an economic growth of 10 per cent per annum. This is due to the fact that agriculture continues to dominate Kenya's economy because it's largest contributor of Gross Domestic product. Agriculture generates employment to the population through farming, research and business activities therefore raising the standards of living and alleviating poverty. In addition, agriculture plays a role in food security to the population maize being the staple food.

To spur growth in the sector, the government will expedite establishment of fertilizer factories to reduce the cost of agricultural inputs to farmers, increase investment in irrigation to reduce dependency of rain fed agriculture and increase amount of land under crop production, In collaboration with county governments, ensure that each county has at least one agricultural value addition processing plant. Despite all these determinations, the agricultural sector is characterized by a strong exposure to risks such as: Price is likely to rise because of agricultural trade liberalization and production needs is expected to increase due to rising quality requirements for some products and stricter rules as regards the use of inputs. Climate change will have an impact on production risk as well.

### **1.1.2 Agriculture Insurance**

Some of the risk management tools employed by farmers include diversification, contracts and vertical integration, hedging in futures and options, insurance etc. The idea behind insurance is that of risk pooling. Risk pooling involves combining the risks faced by a large number of individuals who contribute through premium to a common fund which is used to cover the losses incurred by any individual in the pool. This has been widely used in westernized countries such as Europe, America and India among others and has grown to be a success. Insurance is one of

the tools that farmers and other stakeholders can use to manage risks that are too large to manage on their own. Part of that risk is transferred to another party, who takes it in return for a fee and/or premium, (Vaughan, 2010).

Where available and affordable, agricultural insurance (crop or livestock) can provide great benefits to farm households: first, Insurance can be used to complement other risk management approaches. Farmers can rely on informal household and community level strategies such as crop and labor diversification to manage and moderate risks. In the event of a major weather shock, insurance can be designed to protect against revenue or consumption losses. This enables households to avoid selling livelihood assets or drawing on savings. Secondly, Insurance can assist farmers in accessing new opportunities by improving their ability to access credits. In doing so, farm households may potentially experience safer and possibly higher returns. The National Food and Nutrition Policy 2012 argued that government should adopt risk management approaches to deal with uncertainties facing agriculture. Crop insurance is a major component of risk management strategies that a farmer can settle for (Changnon et al).

### **1.1.3 Farming in Kenya**

Agriculture in Kenya dominates Kenya's economy, 15 to 17 percent of Kenya's total land area has sufficient fertility and rainfall to be farmed and 7 to 8 percent can be classified as first-class land. (Library of congress, 2007). In 2006, almost 75 percent of working Kenyans made their living by farming, compared with 80 percent in 1980. About one-half of Kenya's total agricultural output is non-marketed subsistence production (Ministry of Agriculture, 2000). Agriculture is also the largest contributor to Kenya's gross domestic product (GDP). In 2005, agriculture including forestry and fishing, accounted for about 24 percent of the GDP, as well as for 18 percent of wage employment and 50 percent of revenue from exports.

In Kenya, maize is a staple food for a large proportion of the population in both urban and rural areas. By 2001, maize accounted for roughly 28% of the gross farm output from the small scale farming sector (Jayne et al., 2001) of Kenya's crop production. The sector accounts for 65% of country's total exports and supports 18% of formal employment and more than 60% of informal employment in the country (Vision 2030; October 2007). Therefore, the sector is not only the driver of Kenya's economy, but is also the means of livelihood for the majority of the Kenyan people. It provides daily food calorie uptake to over 30% of Kenyans and is the country's most frequently produced and marketed crop. Kenya's low income earners spend about 28% of their revenue on maize (Nation Newspaper 25th August 2009).

#### **1.1.4 Maize Farming in Kesses Sub-County**

Since maize is adaptable to a whole range of climate conditions, it is the single most extensively grown crop. However, the chief growing areas are Trans Nzoia, Nakuru, Bungoma, Nandi and Uasin Gishu counties. Uasin Gishu County is basically agricultural, accounting for about a third of wheat and maize produced in Kenya. Maize, a staple food in Kenya, is also produced in large quantities (Lagat et al., 2007). The county is divided into six administrative divisions namely Ainabkoi, Soi, Kapseret, Moiben, Kesses and Turbo. Agriculture is the leading economic activity as the Kesses sub-county is considered one of the bread baskets of Kenya due to its large scale maize farms. The sub-county is considered to be one of the most foods secure in Kenya. Like many African countries, majority of the people in Kenya and particularly those in Kesses sub-county, rely on large scale farm enterprises for their livelihood.

Unfortunately there is an increase in diseases plagues crop-growing areas in Sub-Saharan Africa especially maize and beans (Ikisan, 2009). For maize, these include downy mildew, rust, leaf blight, stalk and ear rots, leaf spot, and maize streak virus (Burns, 2008). Insect pests, including stem and ear borers, armyworms, cutworms, grain moths, beetles, weevils, grain borers, rootworms, and white grubs are also a great threat to the survival of maize in Africa (Onyango et al., 2001). Periodic drought caused by irregular rainfall distribution reduces maize yields by an average of 15% each year. This is equivalent to at least US\$200 million in foregone grain (KARI, 2005). Kesses Sub-County was equally affected by prolonged drought and perhaps this partly explains the decline in production trends of the farm enterprises.

## **1.2 Research Problem**

Insurance as a risk management tool is common in many sectors such as health, property and social security. However agriculture insurance is not quite common in Kenya compared to Europe and America where agricultural insurance systems are aimed at offsetting the impact of weather variability on crop production, cover losses from specific natural events that farmers cannot influence such as: hail, drought, floods, fire and theft of farm assets, death and disability of farmers or farm workers. These uncertainties have contributed to relatively low income to the rural population, loss of productive assets and defaults in their debts (Hezell, 2001).

This study justified the relationship between using agriculture insurance as a risk management tool and the outcome of the farmers in terms of performance more so in event of risk within the planting season. In western countries agricultural insurance has been the core pillar of the agriculture sector to improve farming security thereby reflecting on production and economic stability of the countries.



A Comparative Study of Risk Management in Agriculture under Climate Change by OECD Food, Agriculture and Fisheries in 2012, examined agricultural risk management policies and how these respond under conditions of climate change. It investigates the demand and effectiveness of different risk management policy tools using a microeconomic simulation model that is calibrated on different types of individual crop farms in three samples from Australia, Canada and Spain, which are affected in different ways by climate change. Another study conducted by Makii and Somwaro in 2007 who were analyzing data from producer decision over a period from 1995 to 1997 and identifying factors influencing crop insurance in Iran, found that price of insurance premium affected crop insurance decisions.

V. Versluis studied the relations between risk management and decision concluded that, decision theory can act as counsel in the reaction to these uncertainties by calculating which course of action should be preferred, with the risk taking behavior of the decision maker taken into account. Dublin in 2012 studied the impact of crop insurance on the economic performance of Hungarian cropping farms which he concludes that, the economic performance of farms is assumed to be influenced by explanatory variables such as farm management characteristics, production-related characteristics and farm characteristics.

In 2007, the Kenya Fina Access survey found that 69% of Kenyans find insurance generally unaffordable (Fina Access, 2007). While the cost of general insurance is perceived to be high, the actual cost of agricultural insurance premium is indeed high. Olila in 2014 studied the determinants of farmers' awareness about crop insurance and found out that gender, education and income of the farmer significantly affected awareness. Ndung'u in 2010 focused his study on the challenges facing the performance of agriculture insurance in Kenya and found out that, agriculture risks are systemic in nature and therefore affect a large number of farmers in the same

geographical area therefore posing a major challenge to local insurance companies since such risks can seriously affect the financial solvency of a company.

However no study has been done to determine the influence of agriculture insurance as one of the strategy's in risk management. It is important to review the extent to which insurance has mitigated the risks exposure to farmers to further establish and ensure that farmers are protected against the uncertainties. Therefore, this study seeks to answer the following research question; what is the influence of agricultural insurance as a risk management tool on the performance of large scale maize farmers in Kesses Sub-county?

### **1.3 Research Objectives**

The research objective of the study was to determine the influence of agricultural insurance as a risk management tool on performance of large scale maize farmers in Kesses Sub-County, Uasin Gishu County.

### **1.4 Value of the Study**

The study will be of value to insurers to understand the importance of ensuring effective insurance products in the agricultural sector is designed to ensure that farmers are fully covered under all unforeseen perils hence reduce their losses and improve productivity. The recommendations of this study will form part of the action plans that will help in enhancing good service delivery by the insurance company. This is because management will be able to make informed decisions on issues of implementation of the strategic plans in place concerning agriculture insurance.

The regulators in the insurance sector will also find invaluable information on how to formulate their regulatory policies that will guide agricultural insurance as a product and encourage other firms within and without the industry in implementing agricultural insurance product. This is

more so on the basis of licensing insurance companies to distribute agricultural insurance products to farmers.

For academicians, this study will form the foundation upon which other related and replicated studies can be based on. Scholars will find it important as the study will increase to the body of knowledge in this area. The study will be quite enriching to researchers, academic institutions and scholars. This is because it will add to their knowledge and enable them to be more informed when exploring the role of insurance industry in the farming sector thus make informed decisions.

### **1.5 Summary**

This chapter provides an overview of risk management tools in agriculture. Insurance as one of the major risk management tool has been widely defined to enable the researcher bring out a clear understanding of the study. The researcher has also discussed the wide view of maize farming in Kenya and specifically in Kesses sub-county which is described as scope of study. The research problem and gap has also been captured here to give the readers an understanding of the study and the researcher to stick to the question he/she needs to answer. The value of study to insurance companies, farmers, regulator and other scholars has also been discussed in the chapter.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

#### **2.1 Introduction**

This chapter brings forth the theoretical foundation of the study, discussion and review of various literatures on role of insurance in mitigation of risks, nature of agricultural insurance in agricultural industry and risk management tools and strategies.

#### **2.2 Theoretical Foundations**

The theories upon which the study was anchored are resource-based theory and competitive advantage theory. The Resource based theory is necessary as it analyses and interprets internal resources of the farmers and emphasizes resources and capabilities in formulating strategy to achieve innovative farming techniques. On the other hand contingency theory reflects on the difficulties and exposures facing the agriculture sector and possible ways of managing risks while employing suitable risk management strategies.

##### **2.2.1 Resource Based Theory**

A resource-based approach explains the ability to deliver sustainable competitive advantage when resources are managed such that their outcomes cannot be imitated by competitors, which ultimately creates a competitive barrier (Mahoney & Pandian, 1992). Business groups in emerging economies result when entrepreneurs and firms accumulate the capability for repeated industry entry. Such a capability, however, can be maintained as a valuable, rare, and inimitable skill only as long as asymmetric foreign trade and investment conditions prevail. This theory explained by Karl in his paper postulates that a decision maker generally without being aware of it attaches a value to his wealth instead of just where is called his utility function.

Suppose an insured can choose between an insurance policy with a fixed deductible and another policy with the same expected payment by the insurer and the same premium it is better for the insured to choose the former policy.

The insurance industry exists because people are willing to pay a price for being insured. The credit factor such as loans for farming explains why insured's are willing to pay a premium larger than the net premium that is the mathematical expectation of the insured loss. This theory will enlighten the farmers on the right decision to make when choosing a nm insurance product it's also important for the knowledge on the appropriate premium to be paid in accordance with the type of risks they face and the losses incurred due to risks.

### **2.2.2 Contingency Theory**

Crop insurance is a contingent contract, an agreement in which a farmer pays a price, the premium, after which his crop output determines a payout or indemnity. The contingency is that only certain (low) yields result in indemnities, and yield is a random variable whose value is unknown when the insurance contract is purchased. Due to lack of information the insurer cannot separate farmers into risk classes leading to adverse selection. The lower risk within each group will always opt out, raising the loss ratio (Binswanger 1982) and there may be no equilibrium in the insurance market (Rothschild and Stiglitz 1975).

Developing contingency plans for different possible events or business scenarios is one way for flexibility. For example, a strategic risk might be that consumers or processors decide that they no longer want to purchase some products such as grain produced with GMO inputs produced with some feed additives. One way to manage this risk is to develop contingency plans including the identification of alternative market outlets for these products if they are produced. Contingency plans and possibly even formalized adjustments in the rental contract might be part

of the bidding strategy in renting farmland to respond to the risk of changes in government policy (Bernstein, 2007).

Climate is a robust determinant of the performance of the agricultural sector and, in turn, the overall economic performance (Collier et al, 2005). According to Agribusiness Sector Development Strategy 2009-2020 (Government of Kenya 2009), with agriculture accounting for about 27 percent of Kenya's gross domestic product (GDP) and 60 percent of informal employment, the Kenyan economy is highly sensitive to variations in agricultural production.

### **2.2.3 Risk Management and Decision Theory**

The common ground of risk management and decision theory can be found in the primary issue where both attempt to deal with, which are uncertainties. When information on the decision maker's risk taking behavior is available, decision theory can prioritize risks and prescribe how to react to them numerically. This prioritization can be done by applying the calculations for various theories such as expected value, expected utility and prospect theory on the cells of the risk matrix. (Harinck, 2007)

Farmers can gather an adequate amount of information to make these mathematical approaches, indifferences for gains, losses and mixed prospects need to be sought and evaluated. It shows that risk management forms a husk, in which risks are acknowledged, assessed and dealt with on mostly a qualitative basis. By expanding risk management with decision theory, it is possible to suggest a course of action to deal with risks on a quantitative basis. Establishing part of the basis for this expansion of risk management can be done with the presented experiment.

#### **2.2.4 Performance Theory**

Agricultural insurance is one of the strategies for coping with risks in agricultural activities and to reduce the farmers' income fluctuations. Crop insurance products can improve and stabilize economic performance. However, due to insurance market imperfections, the use of insurance products often requires governmental support. This paper analyses the actual impact of insurance products on the economic performance of maize farmers by linking the economic performance model with the insurance demand model. Agricultural insurance schemes are a potential tool to cope with income losses through indemnity payments and therefore stabilize income and economic performance of farms.

#### **2.3 Role of Insurance in Mitigation of Risks**

Mitigation is the lessening or limitation of the adverse impacts or hazards and related disasters risk mitigation options are numerous and varied for instance crop and livestock diversification income diversification, soil drainage. Agricultural insurance is an effective mechanism for reducing the losses farmers suffer due to natural calamities such as floods, droughts, and outbreaks of pests and diseases. It enables farmers to obtain credit and financing for investment in new technologies, tools, and equipment to enhance and sustain their productive capacity. It also assists farmers in regulating cash flows and provides a financial buffer with which to rehabilitate damaged enterprises and enhance the knowledge of those involved in agricultural business.

Agricultural producers are subject to many uncertainties. Various studies have analyzed the reasons for farm revenue variability. Astover&Mötte (2003) assessed changes in producer prices of main agricultural products as well as possibilities of diversification of price risks. A research conducted on the basis of the producer prices of food and fodder crops for instance barley,

wheat, rye, oat, milk, pork and beef as well as the retail prices of potato and cabbage in 1995–2002. Meuwissen et al. (1999) showed that based that the price risk was identified as the highest source of risks, followed by institutional and personal risk. Purdy et al. (1997) explored how specialization, size and other farm characteristics were associated with level and variability of farm return on equity. They found out that the variance in the return on equity corresponded significantly to the degree of enterprise diversification, farm size, and age of the operator. Mishra & Goodwin (1997) showed that an increase in farm income variability was associated with an increase in off-farm incomes.

Natural disasters or epidemic diseases cause special problems for insurance. Natural disaster risk within a certain region is a highly correlated risk between the farmers of that region, and also it has a low probability of very high losses. There are several reasons why it is difficult to develop insurance products to cover such risks (Skees, 1997). If re-insurance or state guarantees are not available, the nature of the systemic risks makes it necessary for an insurance company to charge high premiums which can be unaffordable for many farmers and to build up substantial capital reserves. Insurance given the sensitivity of crop yields and livestock production to weather conditions and other hazards, there is a potential demand for crop insurance. While crop insurance exists in several countries, it seems to depend crucially on government support. The high costs of offering insurance contracts are associated, at least in part, with information asymmetries.

Moral hazard in this context occurs when it is impossible or excessively costly to write a contract based upon everything a farmer might do that would affect his yields. Adverse selection occurs when contracts based on all the relevant environmental parameters are unfeasible. Both adverse selection and moral hazard have been widely reported and analyzed in the literature on multiple



peril insurance for many years (Knight and Coble, 1997). However this is done at the cost of adding basis risk to be borne by the farmer. Revenue insurance is a popular concept because it directly addresses the combined price and production risk that is actually faced by farmers. Unlike any combination of futures and crop insurance contracts, revenue insurance could fully stabilize revenue. This can increase the welfare impact of a given expenditure on price or production risk management (Hennessy et al., 1997).

Yield insurance guarantees the main risks affecting production. So, in the case of crops, the main risks affecting the yield for instance drought are comprised. Premiums can be calculated from individual historic yield or from regional average yield when individual yield records are not available. Losses and premiums can be calculated either by quantifying the losses due to each individual risk separately, either as the difference between the guaranteed yield and the insured yield.

Price insurance covers an insured amount of production against price decreases below a certain threshold. Price should be transparent and to avoid moral hazard and adverse selection problems, loss assessment should be based on a price that cannot be influenced by the insured. If losses resulting from a loss of quality are excluded from coverage, then price insurance provides less protection for the farmer. However, including loss of quality may involve significant moral hazard problems, as quality depends to a certain extent on management decisions (Meuwissen et al. 1999b).

Income insurance covers the income, yield and price risks, as well as the costs of production. Usually this type of insurance is whole-farm income. Income insurance is potentially more attractive to farmers than other forms of insurance because it deals with losses affecting farmer's welfare more directly (Meuwissen, 2000). It could be based for instance on net farm income of

family, workers farm revenue, including subsidies, minus variable costs, taxes, depreciation, rent, interest and compensation of employees. Insurance of individual income risks poses considerable problems of moral hazard and adverse selection. Potential losses do not only occur by accident but depend to a large extent on how well a farmer manages his business. A farmer in fact can easily manipulate certain elements influencing his income for instance compensation of employees, operating costs, inventories. Due to these two factors it's quite hard for an insurance company to have access to trust-worthy data to calculate the right premium.

Information is costly, not only because of information asymmetries, but also because of potential discovery costs for all agents. Information is crucial to develop efficient insurance contracts and risk related markets. The transaction costs of information can be large in agricultural insurance markets. They represent frictions in the functioning of the markets and can explain the existence of incomplete markets or incomplete contracts (Chavas and Bouamra Mechemache, 2002). It can be shown that reducing transaction costs expands the feasible set of outcomes and, thus can enhance efficiency with Pareto gains. When transaction costs associated with developing or using market instruments are significant, more efficient solutions can be found within appropriate institutional frameworks. This is the main idea behind the new institutional economics (Menard and Shirley, 2005; Coase, 1937). Risk management in agriculture provides the basis for on-farm strategies, intra farm-household arrangements and decisions and for specific agricultural contracts like sharecropping. However, it has come out clearly that actually premium cost is one of the major determinants (Coble and Knight, 2005). High premium discourage farmers from participating in insurance.

## **2.4 Risk Management Strategies Interventions**

Risk management involves choosing among alternatives to reduce the impact of various types of risk. It typically requires the evaluation of tradeoffs between changes in variability and changes in expected income (Harwood et al., 1999). Risks in agriculture can be divided into two types: business and financial that is deviations in price and currency exchange rates, and market demands (Barry et al., 2000). Financial risk depends on the chosen method of farm financing for instance credit constraints, leverages, leasing, and interest rate variability, as well as from insufficient liquidity and loss of equity (Hardaker et al., 2004).

Re-insurance is important for insurance companies which cover correlated risks and are thus running the risk of having to cover big losses. Without re-insurance, premiums would have to be set at a very high level to build up enough reserves in order to cover potentially high losses. Two basic schemes for re-insurance dominate: Proportional re-insurance; Insurer and reinsurer share premiums and risk. The re-insurer assumes by mutual consent, fixed percentage of all the insurance policies written by a direct insurer. The quota determines how premiums and losses are distributed between direct insurer and re-insurer. Non-proportional re-insurance; Excess of loss, re-insurer covers up to a certain amount any part of a loss resulting from a single catastrophic event that exceeds an agreed deductible. Stop-loss, re-insurer covers up to a certain amount any part of a total annual loss that exceeds an agreed deductible.

Forward contract the simpler instrument available to deal with price risk is a forward contract. In such a contract, the farmer and a buyer of the agricultural output agree in advance on the terms of delivery, including the price. Through this mechanism a farmer can decide to sell some of his production represented by a quantity at a predetermined forward price. Only the quantity

produced that has not been hedged will be sold at the uncertain market price. The contract is standardized in terms of quantity, quality, and time and location for delivery.

Buyers of commodities typically purchase future contracts while sellers of commodities sell future contracts short hedging. A farmer hedging his price sells a future contract when planting, but he needs not to deliver the commodity at the end of the contract he typically undoes his position before then by buying a futures contract for the same delivery date. (Tomek, 1997) argues that a poor price forecast performance is compatible with efficient futures markets the forecast only need to be better than any alternative such as econometric forecast models. The use of futures contracts implies that farmers retain some basis risk measured by the difference between the cash price for the farmer and the future price. If there is no production risk, it can be shown that, regardless of the amount of production that is hedged, production decisions are determined by the future price (Holthausen, 1979).

## **2.5 Agricultural Insurance Performance Measurement**

Agricultural insurance has a positive impact on the long-term economic performance of farms. This is because insurance has a stabilizing effect on income through indemnity payments on insured losses. A stable income often is a condition to receive financial loans and to be able to invest. Farm investments are necessary for farm growth or to adapt the farm to changes in its environment. In addition, some production activities are too risky without insurance (Meuwissen et al. 2001), or on-farm risk reduction measures are not possible or not efficient. When having insurance, farm managers are able to readjust their production strategies and thus improve the economic performance when measures of risk avoidance or risk reduction are less efficient.

## **2.6 Empirical Research and Research Gaps**

The use of agricultural insurance use reflects to some extent demand and supply mechanisms on the agricultural insurance market. Even if the estimated impact of insurance use on economic performance would be positive, the low participation level is evidence for limited demand and/or not sufficiently elaborated and adapted insurance products. The research gap is the level at which agricultural insurance as a risk management tool influences the performance of large scale farmers. Therefore, the research sort to find out how farmers who have agricultural insurance perform as opposed to those who do not have insurance.

## **2.7 Summary**

This chapter explains the theoretical foundation of the study, discussion and review of various literatures on role of insurance in mitigation of risks, nature of agricultural insurance in agricultural industry and risk management tools and strategies. The theories discussed here include risk based theory, contingency, risk management and decision and performance theory. Risk management and insurance is widely reviewed.

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

This chapter outlines the methods that the researcher used in conducting the research study. The study design and population is described in each respective section including the sample and sampling procedure and procedures that were used in data collection.

#### **3.1 Research Design**

This research study employed a cross sectional survey research method. Cross sectional study is one that takes place at a single point in time. (William m.k 2006) in effect we are taking a slice or cross section of maize farmers in Kesses sub-County. The survey method involved, asking participants questions on how they felt, what their views were and what they had experienced (Babbie, 2002). Cross-sectional survey method was aimed to determine the level of agricultural insurance exposure in maize farmers in Kesses sub-county during the 2015 maize production season. The Subjects who are the maize farmers in Kesses Sub-County were contacted during this period and relevant information was obtained from them. Its advantage is that, it allowed the collection of large amounts of data from a sizeable population in a highly effective, easy and in an economical way. The data was collected by use of questionnaires.

#### **3.2 Target Population**

Mugenda & Mugenda (2003) defined population as a complete set of individuals, cases or objects with some common observable characteristics. The population of this study comprised of large scale maize farmers in Kesses sub-County. Large scale farmers were described as farmers cultivating land more than 50 acres. The Extension Agricultural Officer (EAO) in the sub county

was referred to by the researcher for direction in the target population. This is because by virtue of their positions and responsibility, they have access to database of farmers within the study area. There are 102 large scale maize farmers out of over 550 active farmers in Kesses sub-county. A total of 102 large scale maize farmers constitute the target population of the study which is a representative of the total population.

### **3.3 Sampling Procedure**

The researcher used Purposive sampling (also known as selective/ subjective sampling) when administering questionnaires. This is because subjects were selected based on their level of farming. Large scale farmers were particularly targeted since they were believed to have information and exposure to agricultural insurance. The sample studied was 30% of the 102 target population which relates to 30 large scale maize farmers in Kesses sub-county.

### **3.4 Data Collection Procedure**

Mugenda and Mugenda (2003) observed that, the pre-requisite to questionnaire design is definition of the problem and the specific study objectives. The primary data was collected using semi a structured questionnaire (Annexed Appendix II) which comprised of closed and open ended questions. Closed ended questions are questions where respondents were asked to choose from a list of answer choice. Open ended questions are questions where respondents provided a response in their own words. The use of semi structured questionnaire was important to the researcher because it enabled a mix of qualitative and quantitative information to be gathered and that they are best administered face to face. The researcher administered the questionnaires on a one on one basis. Direct interview with the selected population was used to collect the information because of literacy levels of the maize farmers.

### **3.5 Data Analysis**

The nature of data collected from the field was both quantitative and qualitative. The collected data was thoroughly examined and checked for completeness and comprehensibility. The questionnaires were edited. Editing refer to the process by which survey returns are checked for possible errors. Output editing was employed by the researcher where by it involved identifying possible errors by examining all of the survey returns for the current cycle as a whole (Hughes et al 1990). The data collected was then captured using spss. Data collected was entered, analyzed and results generated on tables, graphs, pie charts to facilitate the attainment of the research objectives.



## **CHAPTER FOUR**

### **DATA ANALYSIS, PRESENTATION AND DISCUSSION**

#### **4.1 Introduction**

This chapter constituted the analysis and presentation of data of study survey that were aimed at determining the influence of agricultural insurance as a risk management strategy on performance of large scale maize farmers. The data was collected from a sample of 30 large scale maize farmers of Kesses Sub-County, Uasin Gishu County. There was 100 percent response rate of the questionnaires. The findings are presented in percentages and frequency distribution tables' graphs and charts.

#### **4.2 Profile of the Respondents**

This section analyzes the demographic information of the respondents. This was crucial for the researcher to know the kind of people she was dealing with. This information includes the gender of the respondents, age brackets and educational level.

##### **4.2.1 Gender of the Respondents**

The gender of the respondents was sought. This was important as masculinity and femininity affects respondent's perception of issues in relation to large scale maize farming in Kesses sub-county. It was also meant to determine whether both men and women equally participated in large scale farming. The results of these items are indicated in Table 4.1.

**Table 4. 1: Gender of the Respondents**

<b>Gender</b>	<b>Frequency</b>	<b>Percentages</b>
Male	19	63
Female	11	37
<b>Total</b>	<b>30</b>	<b>100</b>

**Source: Researcher Data (2015)**

The results shown in Table 4.1 indicate that 19 or 63 % of the respondents were male and 11 respondents representing 37% were female. The findings show that there is gender imbalance in large scale maize farming in Kesses sub-county the results show that more men than women participate in large scale maize farming in the sub county.

#### **4.2.2 Age of the Respondents**

This was important as the age may affect the adoption and use of insurance by the farmer and also how many times they have been involved or exposed to risk. The older the farmer the more experienced they are on issues under investigation. This information was presented as shown in Table 4.2 below

**Table 4.2 : Age of the Respondents**

<b>Ages in years</b>	<b>Frequency</b>	<b>Percentage</b>
18-28 years	3	10
29-39 years	8	26
40 -49 years	8	26
Over 50 years	11	38
<b>Total</b>	<b>30</b>	<b>100</b>

**Source: Researcher Data (2015)**

The above table reveals that 3 respondents representing 10% were within 18-28 age brackets, 8 or 26% fell within 29-39 years age bracket. Within the 40-49 age brackets there were also 8 or 26% of the respondents. 11 or 38% of respondents were aged over 50 years who were the majority. This showed that majority of the employees were mature enough and could relate well with maize farming.

#### **4.2.3 Level of Education of the Farmers**

This was sought to give the researcher an insight of the level of education of the large scale maize farmers in the sub-county. The finding shows the relationship between farmers' performance and how they deal with the risks they are exposed to and qualification or level of education. This information is represented in Table 4.3 below.

**Table 4. 3: Respondents Level of Education**

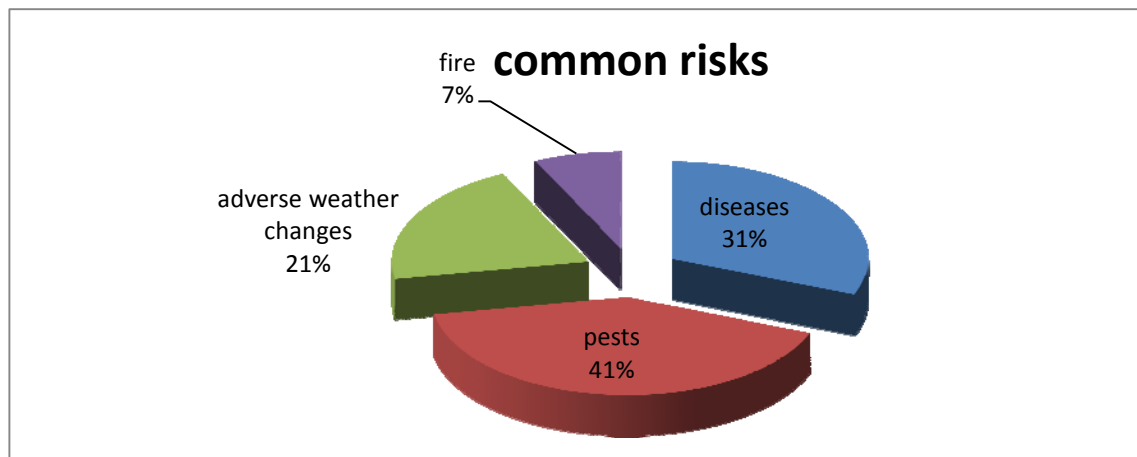
<b>Level of Education</b>	<b>Frequency</b>	<b>Percentage</b>
Certificate	4	13
Diploma	6	20
Degree	6	20
KCSE and below	14	47
<b>Total</b>	<b>30</b>	<b>100</b>

**Source: Researcher Data (2015)**

Majority of the farmers hold KCSE certificates and below as represented by 14 respondents or 47 %. Both degree and diploma holders were represented by 6 or 20 % of the respondents. 4 farmers representing 13 % are certificate holders. This shows that majority of the farmers are quite educated and thus can relate to issues regarding insurance and risk management.

#### 4.2.4 Common Risks Faced By Large Scale Maize Farmers

**Figure 4. 1: Common Risks**



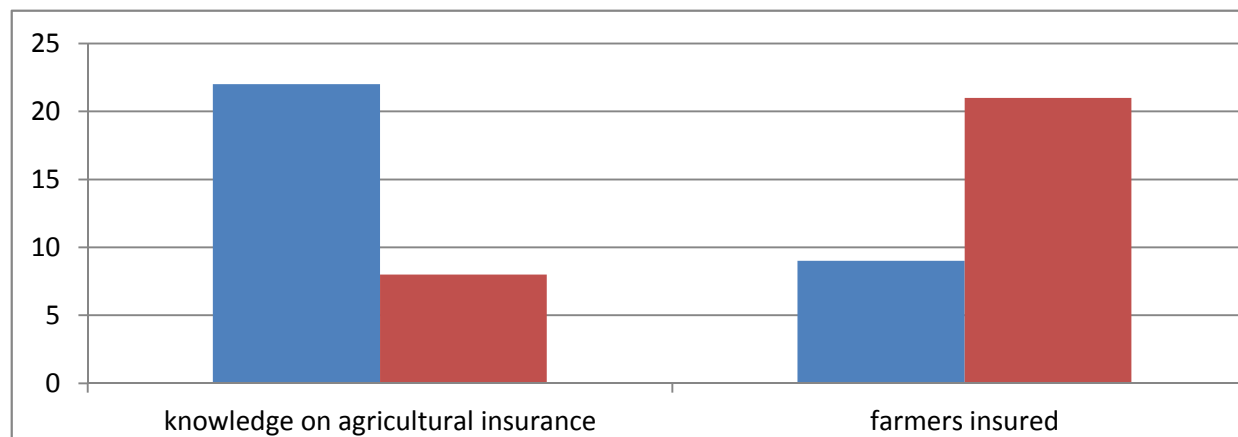
**Source: Researcher Data (2015)**

According to Figure 4.1 it was found that pests and diseases were the most common risks that the maize farmers faced these were represented by 41% and 31% respectively. 21% of the risks that farmers faced are related to adverse weather changes. Fire is the least of risks occurring to farmers which was represented by 17 %.

#### 4.2.5 Knowledge and Adoption of Insurance

The researcher sort to know the extent to which farmers in Kesses sub- county understand insurance and the level of adoption. This is represented in Figure 4.2 below.

**Figure 4.2: Knowledge and Adoption of Insurance**



**Source: Researcher Data (2015)**

The researcher sought to find out if the maize farmers had ever heard about agricultural insurance having knowledge on agricultural insurance was crucial for the researcher. In this regard, the researcher was also keen to find out whether the farmers adopted agricultural insurance. Most of the farmers agreed that that they had heard about agricultural insurance as shown in Table 4.2 above. Of the 30 farmers who responded 22 farmers knew about agricultural insurance while only 9 farmers were insured.

### **4.3 Other Risk Management Strategies**

The researcher sought to find out what other strategies do farmers who have not insured their crops use to mitigate the losses in the event damages occur from unforeseen risks. Figure 4.3 below shows the findings.

**Figure 4. 3: Risk Management Strategies**



**Source: Researcher Data (2015)**

Since most farmers had not adopted agricultural insurance as results in table 4.2 suggested, the researcher was keen to determine what other strategies farmers used to mitigate the risks they face in their farms. It was found that 12% mitigated risks through risk reduction 23% did what is possible to avoid the risks while a bigger percentage represented by 65% of the farmers retained the risks.

#### **4.4 Extra Benefits from Insurance**

The researcher found out that farmers with insurance got other benefits apart from just being compensated in the event of loss on risk insured. These benefits include; trainings on awareness of insurance assess to good and quality seeds and modern agricultural inputs, visits by insurance officers and other agricultural specialists, Information on disease breakout and prevention was also made available to the farmers. Access to loans form financial institutions as they have insurance as security there by using quality inputs and maximizing on production.

#### 4.5 Challenges Faced in Accessing Agricultural Insurance

Results show that most of the farmers who have insurance have difficulties in dealing with insurance companies especially when it comes to compensation of loss incurred, in terms of timelines it's clear that the insurance companies take a long time up to more than a year to compensate a loss. Breakdown in communication was also a big challenge for farmers since they don't have access to internet thus they rely on their mobile phones which are not answered when they call insurance offices. This situation forces them to travel all the way to the offices physically to put up their claims. According to the response of the farmers the researcher found out that high cost of premium rates discouraged farmers from adopting agricultural insurance. Poor understanding of policies was a factor that contributed majorly to none adoption of agricultural insurance by the farmers. These meant that farmers were being denied full disclosure.

#### 4.6 Loss Compensation

**Table 4. 4: Percentage Loss Compensations**

<b>%loss compensation</b>	<b>Frequency</b>	<b>Percentage</b>
Below 50%	1	13%
51% to 80%	2	25%
81% to 100%	5	62%
Not compensated	0	0%
<b>Total</b>	<b>8</b>	<b>100</b>

**Source: Researcher Data (2015)**

Table 4.4 above shows the response of the interviewees on the opinion that the insurance companies compensated them when they incurred loss. As it is stipulated from the results is clear that the insurance companies supported the farmers during loss. 5 or 62% of the farmers were compensated fully. None of the farmers incurred loss and were not compensated. 2 or 25% were compensated 50% to 80% while 1 or 13% was compensated below 50%.

#### **4.7 General view on Agricultural Insurance**

Generally the respondents had positive views on outcomes that were directly linked to usage of agricultural insurance as risk management tool. Some agreed that compensation after the loss incurred was sufficient to manage their farm production. Since the farmers who had insured the crops were assured of production security in the event of losses they were therefore able to diversify production and even increase maize yields. The insured farmers also appreciated the quality seeds they were advised during the trainings that it increased the level of production thereby positive income was experienced now and in future.

#### **4.8 Summary**

This chapter presents the data analysis captured during the data collection to validate the researchers' question and to give answers that will lead to conclusion of study. The data includes; age of farmers, level of education, methods of risk management used, number of insured farmers, level of insurance knowledge, extent of compensation after loss and the farmers' general view of using insurance as risk management tool to mitigate losses. All the questions were answered and analyzed.



## **CHAPTER FIVE**

### **SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS**

#### **5.1 Introduction**

This chapter gave the summaries and conclusions derived from the study findings and finally came up with some recommendations based on these findings, which were relevant for adaptation by the insurance companies and also for further research. The objective of the study was to influence of agricultural insurance as a risk management strategy on performance of large scale maize farmers in Kesses Sub-County, Uasin Gishu county Kenya.

#### **5.2 Summary of the Major Findings**

Large scale maize farmers in Kesses sub-county cultivate a minimum of 50 hacters of land and a maximum of 700 hacters. The results indicate that large scale farmers at least understand the effectiveness of taking insurance as a control measure in reducing the loss that may occur due to unavoidable circumstances. As a result of this many farmers are aware of agriculture insurance according to the sample but quite a number have not insured.

Findings suggest that even though effectiveness of agriculture insurance is a key precursor to performance of large scale farmers, but since only a few understand how it works thereby prohibiting their ability to make decision with regard to taking insurance as loss mitigation strategy. Similarly large percentage of farmers retain the loses in terms of productivity hence low income which translates to poverty, food shortage and economic problems to the county at large. Furthermore, results shows diverse risks faced by farmers which include pests and diseases as taking the larger percentage followed by adverse weather changes and finally fire according to farmers who have experienced losses.

### **5.3 Conclusion**

The study concludes that low influence on agricultural insurance as a risk management tool in Kenya has been caused by various factors which include lack of proper knowledge, understanding and awareness by the intended consumers, high cost of premiums, non-involvement of insurance companies to farmers who are the potential clients amongst others.

The agricultural sector in Kenya is highly exposed to weather risks, mainly of hydro meteorological nature. Only a small part of the country is of high and medium agricultural potential with adequate and reliable rainfall. A majority of farmers practice rain-fed agriculture. The farming population faces severe financial and personal consequences if rainfall is not optimal. Over the past decades, droughts and floods have been hitting the country on several occasions.

The role of insurance firms in enabling adoption of agricultural insurance which is critical particularly in ensuring the current customers are satisfied of their products so that the negative perception held by the public about nonpayment of claims by Insurance companies is corrected. Once this is done, the researcher concludes that agricultural insurance is the most effective way of managing risks the farmers faces especially the natural causes, diseases and pests. This therefore impacts positively on the production and stabilizing farming activity even after losses.

#### **5.4 Recommendation**

Based on the findings and conclusions, the study recommends that in order to enhance influence in agricultural insurance as a risk management tool there is need for concerted effort by the Insurance companies in implementing strategies that will ensure that the various challenges identified as hindering uptake are dealt with.

The recommendations included, training on agricultural insurance public education needs to be carried out to farmers on the benefits of Insurance and risk management so that the traditional methods of addressing problems when they have already occurred are replaced with upfront risk management. This can be well addresses through marketing and forums in conjunction with the ministry of agriculture. So as to create wealth and improve the standards of living for the people of Kenya thus aiding the economic pillar of development under vision 2030. It is recommended that Insurance be introduced as a subject in secondary schools so that as children are growing up, they are introduced to the culture of risk management and saving.

The government can offer incentive schemes where they subsidize premiums in the area of agricultural Insurance and then set up strategies for long term sustainability. This will greatly contribute to the achievement of the millennium development goals in the area of food security and poverty eradication. Further studies can be done on adoption of insurance by other crop farmers and small scale farmers.

### **5.5 Limitation of Study**

Due to limited resources the research was able to cover a small section of the potential maize production regions in Kenya. Therefore these results cannot be generalized to show the overall picture of effectiveness of agriculture insurance as risk management tool in Kenya. The low literacy level of some farmers selected for interview made it difficult for the researcher to cover comprehensive information on agricultural insurance are of study. During the research it was realized that most farmers lack information on general insurance.

### **5.6 Suggestions for Further Research**

More research can be done in Agriculture insurance by interested bodies such as Insurance Regulatory Authority, Insurance companies, Ministry of Agriculture and fellow students. Areas of research can include the following. First, finding out the penetration of insurance in agriculture sector and determine the factors that may improve insurance in the sector. Secondly, the practical relationship between agricultural insurance and economy performance in Kenya so as to encourage the government to implement and lay down laws through IRA that will help farmers use insurance. Thirdly but not least is to determine if the products offered by insurance companies are appropriate to fully manage agricultural risks.

### **5.7 Implications for Policy and Practice**

The implications of study findings are clear for farmers in different Kesses sub-county and other counties in Kenya that want to employ agricultural insurance as their risk management tool. First, the farmers who have not tried agricultural insurance can be educated and encouraged to use it as a tool to reduce their losses and improve their performance. Second, insurance companies should reach out to the farmers in all parts of the country to create awareness and get

to tailor make products for different regions depending on the major risks faced. The efficiency and effectiveness of agricultural insurance should be the target of IRA and the government in order to help improve the economy through reduction of food shortage problems, poverty and also increase GDP of the country. Third, organize the counties and develop useful data systems and use the data to reflect and improve the influence of agriculture insurance on performance of both large scale and small scale farmers across the country.

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## APPENDICES

### APPENDIX 1: LETTER TO RESPONDENTS

Lucy Jepchumba

P.O Box 517-00100

Nairobi.

Tel: 0728 543 090

Dear Respondent,

Re: Request for participation in research work

I am a postgraduate student pursuing a master of Business Administration (MBA) degree at the University of Nairobi, School of business. As part of my requirements for the award of the degree, a student is expected to carry out and submit a management research project. I am currently conducting a research on influence of agricultural insurance a case study of Kesses sub-county Uasin gishu county. The information will be treated with utmost confidentiality and will only be used for academic research purpose. Should you require the findings of this research, I will not hesitate to provide the information. Your participation is highly appreciated.

Yours Faithfully

Lucy Jepchumba

MBA Student.

**APPENDIX II: QUESTIONNAIRE**

**THE INFLUENCE OF AGRICULTURAL INSURANCE AS A RISK MANAGEMENT STRATEGY ON LARGE SCALE MAIZE FARMERS' PERFORMANCE IN KESSES SUB-COUNTY, UASIN GISHU COUNTY, KENYA.**

**SECTION ONE: IDENTIFICATION**

Name of the respondent----- Phone number (optional)-----

Location-----Village-----

**SECTION TWO: DEMOGRAPHIC INFORMATION**

1. What is your gender (optional)?

Male ( ) Female ( )

2. What is your age (optional)?

18-28 years ( ) 29-39 years ( ) 40-49 years ( ) 50 and above ( )

3. What is your highest academic qualification?

Certificate ( ) Diploma ( ) Degree ( ) Masters ( ) K.C.S.E and below ( )

4. What scale of land do you farm?.....ha.

**SECTION THREE: RISK MANAGEMENT TOOLS EMPLOYED**

1. What are the common risks you face in farming?

i. Diseases ( )

ii. Pests ( )

iii. Adverse weather changes( )

iv. Fire ( )

2. Have you heard about of Agricultural Insurance?

Yes ( )            No ( )

3. If yes, are you insured Yes ( )            No ( )

4. If not adopted what other forms of risk management strategies do you use? (Tick in the box)

Risk Avoidance	
Risk Retention	
Risk Reduction	

**SECTION FOUR: IMPACT OF AGRICULTURAL INSURANCE IN KESSES SUB-COUNTY**

5. Have you benefit from adopting agricultural insurance as a maize farmer?

Yes ( )            No ( )

6. If yes to what extent did it reduce your loss?

0-20 % ( )    21-40% ( )    41-60% ( )    61-80% ( )    Above 80% ( )

7. What other extra benefits do you enjoy from insurance?

.....

8. What constraints do you face?

(a) Accessing agricultural insurance ( )

(b) Using agricultural insurance ( )

(c) Dealing with insuring company ( )

(d) Other, specify.....

9. What should be done to resolve these constraints and by whom?.....

10. What is your general view on usage of agricultural insurance as risk management tool?

.....

\*\*\*THANK YOU\*\*\*