

**EFFECT OF CROP INSURANCE AND FINANCING ON
PRODUCTIVITY OF WHEAT FARMERS IN NAROK COUNTY**

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DECLARATION

This Management Research Project is my original work, and has not been presented for any academic credit in any other academic institution.

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This research paper has been written in order to finish my Master of Business Administration degree at the University of Nairobi. I took a keen interest in agribusiness as a major economic contributor in the country. Am particularly interested in factors the enhance farmers income as well as boosting the country's food security. Financing is key to growth in any economic factor, but lenders are a bit weary in agricultural sector due to inherent risks it portents. Tying financing to crop insurance has but slowly stabilized the sector leading to agricultural growth. A lot of research has gone towards finalization of this project and I must sincerely thank the Almighty God for seeing me through exercise.

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This project is dedicated to my wife Caren, sons Pulei and Mamiki for patience and endurance they had to put up during my long periods of absence. I value their support, believe and momentous effort in seeing to it that I completed the project without any stress from their side. I also dedicate this to the young Maasai child who is still struggling to have basic education due to cultural and environmental restrictions. Education is the key to our continued relevancy in the broader community.

LIST OF ABBREVIATIONS

ADC	- Agricultural Development Corporation
AFC	- Agricultural Finance Corporation
APA	- Apollo Assurance
ANOVA	- Analysis of Variance
CIC	- Cooperative Insurance Corporation
CGAK	- Cereals Growers Association of Kenya
COOP Bank	- Co-operative Bank of Kenya
IRA	- Insurance Regulatory Authority
ISO9001: 1400-	International Standards Organization guide 1400 for Environment
KCB	- Kenya Commercial Bank
KNAIP	- Kenya National Agricultural Insurance Program
KSH	- Kenya Shillings
KWFT	- Kenya Women Finance Trust
MT	- Metric Tonnes
NCPB	- National Cereals and Produce Board
NPV	- Net Present Value
ROK	- Republic of Kenya
SACCO	- Savings and Credit Cooperatives
SOB	- School of Business
SFSA	- Syngenta Foundation for Sustainable Agriculture
SPSS	- Statistical Package for Social Sciences
UAP	- Union des Assurance De Paris
USA	- United States of America

ABSTRACT

This project aimed at exploring the effect of crop insurance and financing on productivity of wheat farmers in Narok County. Specifically, the study sought to establish the loan amounts and customer numbers by financial institutions as well as the insurance premiums on the large scale farmers within Narok County. The study was founded on four main theories including pecking order, insurance risk, working capital and productivity growth. A field study involved application of descriptive research design through which 20 large scale farmers registered with Cereal Growers Association of Kenya (CGAK) were sampled. The instrument of data collection was a structured questionnaire administered using field assistants who approached the farmers through a drop-and-pick system. The study found that 53 percent of farmers did not have consistent insurance before 2010 while all of them had insurance by 2015. Similarly, only 67 percent of the farmers had direct bank loans before 2010 while all of them had an attachment to a loan bank. It was also found that productivity had gone up by 11 percent. In conclusion, the study noted that both insurance and financing had a positive effect on productivity with a significance level of 0.02 when combined. However this declined when considered individually with insurance having a significance value of 0.04 and insurance fairing better at 0.03. The study therefore recommended that insurance premiums should be reviewed in order to encourage farmers take up more packages of the instrument. Another recommendation was that lending conditions should be relaxed to enable more farmers take up larger loan amounts. Finally, the study recommended further studies on other factors that could affect wheat productivity apart from insurance and finance including culture, politics, world markets, taxation and government policies.

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CHAPTER ONE: INTRODUCTION

1.1 Background

The high risk of exposure by the Kenyan farmers to the many vagaries of weather, diseases and uneven rainfall patterns has increased the rates of crop failure. This has on many occasions resulted into poor yields necessitating the importation of important food needs specifically maize and wheat. Farming is a practice of both large scale and small scale practitioners that is fraught with high risks. In both animal and crop farming, the practitioners are faced with the need to safeguard their investment which could be crop or animal (Panda, Sharma, Ninan & Patt, 2013). Traditionally, this could and has still remained to a large extent the preserve of security teams to protect animals against theft and wild animal attacks. In terms of crops, the traditional practice was to correctly predict the weather and carefully guard the crop both in the farms and when in the storage or away from the fields of production (ROK, 2014).

However, the traditional formats of crop protection meant that the farmers were strictly relying on chance to get their produce. Once the right seeds, fertilizer and crop or animal medicines have been applied, there is more that can be done to increase or enhance productivity in the small or large agricultural farms. Unknown to many farmers especially across Africa was the fact that insurance cover for crops and animals have existed for a long time. Many companies tried to introduce crop and animal insurance in the past without liaising with the financiers of such farms thus leading to the many failed attempts to embrace crop and animal insurance in the agricultural sector (Panda *et al.*, 2013). With the upgrading of technology, farming methods and increased awareness,

farmers have started taking crop and animal insurance more seriously. Studies by the Insurance Regulatory Authority (IRA) of Kenya have indicated a rise in insurance cover for farming activities. This according to the report (IRA Report, 2014) is due to the careful investment put in the agricultural sector after initially rejecting attempts to fund the lucrative but risk sector of crop farming. It is now imperative that the increase in technological advancements as well as awareness in farming demonstrated through the good returns will lead to increase in crop insurance thus enhancing the production of crop farming specifically wheat.

Insurance companies including UAP, Jubilee, CIC and Pacific have fully immersed themselves into the business of covering commercial crops including rice, barley, coffee, tobacco and specifically wheat. Other notable players like Syngenta Foundation for Sustainable Agriculture (SFSA). Their cover includes farm assets and equipment while also covering harvested crop, green houses and irrigation facilities. The companies also have another crop insurance that specifically covers damages against excessive or decrease in rainfall amounts as well as unexpected weather or bird invasion (Olila & Pambo, 2014).

1.1.1 Crop Insurance

Due to increasing losses faced by farmers, the government of Kenya launched the Kenya National Agricultural Insurance Program (KNAIP) supported by the World Bank. This was necessitated by the lack of adequate financial and insurance cover for the farmers specifically those found in the bread basket of Kenya wheat growing region. It simply means that there is no easy way of getting to the farmer while at the same time there is

lack of awareness by the farmer on the options that are available on the market for crop insurance (Arshad, Amjath-Babu, Kachele & Muller, 2016).

Insurance for agriculture just like fiancé of the same is normally tailored on the basis of several factors carefully considered by experts in the agricultural sector. These include the transportation of specialists who assess the roads and ease with which the crop can reach the market, meteorologists to accurately predict the weather conditions for at least six months, agronomists to give the perfect health condition of growing produce and market professionals who are able to forecast the demand as well as supply situation in the ideal market for the produce. Crop insurance thus have immediate advantages to the farmer and the chances of increased yields become higher with crop insurance (Panda, 2013).

Matuschke, Mishra, and Quim (2007) observed that combining financial, insurance and agrovet issues calls for top experts in order to have a positive impact on production for any given crop. In other words, it means having to utilize latest technology to transfer real-time information on the unpredictable weather, the market prices of the farm produce and how this would affect the current farm produce. With this in mind Ogunlan (2004), has called for partnerships among the farming stakeholders including insurance firms, the financing sources as well as communication firms that would enable speedy exchange of pertinent information in the system. Traditionally, many investors were very uncertain of investing in crop or animal farming due to the high incidences of a whole crop or animal farm being wiped out by a single incident of weather for example sudden drought, locust or quail invasion or fires when the crop is dry and ready for harvest (Arshad *et al.*, 2016).

Insurance cover for crops is taking place in forms of very low premiums that encourages the widespread of the service to many small as well as large scale farmers depending on the cost of input or estimate of the price forecast for the crop. This form of insurance also involves many forms of weather vagaries including drought, hail, wild fires or lightening fires, windstorms, excessive rain and dry spells during cultivation which could lead to poor yields (Arshad *et al*, 2016). Other forms of crop insurance do exist including when the crop is in storage where fires, lightening, explosions or even flooding can cause destruction of the storage facilities or the crop to directly get destroyed. Yet another form of insurance that is very common and concerns most farmers is the transit insurance in which the crop in transit could face the risk of theft, damage in uploading or offloading. The risks do not end there as the crop has to be stored in national large storage facilities and it is always possible for more damage to be caused or even theft leading to poor quality and quantity of the crop from the time it was harvested to the final location (Matuschke *et al*, 2007). As observed in all the explained forms of cover for the crop, it is inevitable that insurance cover involves several partners and several stages as the crop both on the farm and after harvesting has to undergo several processes or stages before reaching the consumer market. This means that collaboration between the financier to the farmer and the crop insurer is very much compulsory as so much risk is involved in bringing the wheat crop to the market (Peter *et al*, 2003).

Any bank can finance project ideally, but traditionally only specific banks have been known to finance farming projects specifically crop and animal farming. Kenya in the early independence years set up specific banks to be used for financing farming specifically medium to large scale grain farmers that mainly dealt with Kenya's stable

foods like maize, rice, beans and wheat (Olila & Pambo, 2014). Such banks including Agricultural Finance Corporation (AFC) and Agricultural Development Corporation (ADC) were however misused politically to wreak havoc in the later years leading to the poor financing of crop and animal farming as well as their own collapse. Other players however have come up with programs combining crop insurance and crop financing including Syngenta, UAP Insurance, Safaricom and commercial banks specifically Co-op Bank, KWFT, and Equity Bank (Arshad *et al*, 2016).

However Binswanger-Mkhiza (2012) concluded that the importance of crop insurance can sometimes be overhyped to the extent that farmers forget to concentrate on any other strategy that would increase their profits. There was an observation that some risks could be mitigated without necessarily incurring the heavy cost as stipulated by insurance firms. Similarly, it is evident that farmers are not readily helped to predict the impact of crop insurance thus treating it with so much skepticism (Petraud, Boucher, & Carter, 2014). On the contrary, crop insurance is very much in demand as the populations of many nations continue to grow thus demanding more food produce. The lack of investment in projects that focus on fertilizer, crop irrigation and crop insurance demonstrates the status in which every potential farmer finds themselves without alternative solutions at the time of bringing the produce to the market (Loewenberg, 2011). Of notable concern is the increasing impact that climate changes have had on the farming activities complicating the farmer's ability to make accurate predictions once the decision to plant crop is reached and implemented. This is further complicated by the fact that there is mixed farming in which farmers in some regions have crop and livestock

leading to choice dilemma as to which type of assets require insuring against risk (Thorton & Herero, 2014)

1.1.2 Crop Finance

Crop financing is very critical in the era of commercialized farming. Scholars have indicated that modern farming is a full-fledged industry that requires both personnel and machines of the highest caliber. All processes from land acquisition, preparation, seed selection, planting and harvesting are heavily mechanized even on small scale farmers. Incidentally, commercial banks have normally shied away from financing farming activities leaving the exercise to the sole agricultural financier that is Agriculture Finance Corporation (AFC). There is also the aspect of transportation and storage of the crop before any marketing is done as well as the preservation of the same while in storage or transit from one location to another. Without a good financier, farmers thus get it difficult to access insurance facilities and vice versa (Mwihaki, 2015).

Specifically, machinery that is used in heavy farm mechanization requires heavy funding which in turn leads to the need to have insurance for the same equipment. Although any lender could lend a farmer the finances to purchase the machinery, it has become a trend in which specific banks in conjunction with particular insurance companies team up to finance the machinery of crop farmers. This is important since every production require specific machinery which in normal cases will not be found easily and have to be imported. Normally, banks lending finances to such farmers have to put the estimates of how long the machinery can last as well as the estimates of the returns to the farmer (Monroy *et al.*, 2013).

In terms of chemicals and fertilizers, farmers also have to approach banks who require ground specialists to ascertain that the required chemicals and seeds are sourced from a very reliable source and that the usage on the farms is appropriately done to avoid any misuse of the expensive inputs that the farmers have been lend. Since the produce is dependent on the appropriateness of the chemicals and fertilizers as well as the seeds used, both the banks and insurance firms have to get in the forward forecasts of production in order to adequately predict the market where the produce is to be produced in order to minimize risks. Care has to be taken too in the financing since quality can be compromised leading to high harvests but with poor prices due to the poor quality of produce (Wanyera *et al.*, 2006).

Farmers having realized the long chain of participants required to finance their crop have always turned to the way of creating cooperative links between the insurance firms and banking institutions. To do this, they also form cooperatives through which they can source their seeds, fertilizers and chemicals as well as utilize common storage and transportation facilities. Such cooperatives include Cereal Growers Association of Kenya (CGAK) which help farmers acquire loans and insurance as well as marketing their harvested crop. The same is also true for the farmers when negotiating for maintenance of roads and other means of transportation that strongly supports and sustains wheat crop farming (Ndiema, 2002).

1.1.3 Crop Productivity

There are three categories of farmers in crop farming: small, medium and large scale owning 1-30 acres, 30 – 100 acres and above 100 acres respectively. The average farm

size under small scale is 6.1 Hectares and that of large scale is 26.3 Hectares. Crop productivity commences with the size of the farm and the type of crop under that farm. The main crops in productivity are wheat, barley, tea, sugarcane and maize grown as the major cash crops. Other main crops grown are, beans, Irish potatoes and horticultural crops. These crops are grown under rain fed, micro, sprinkle and drip irrigation. Maize and wheat are the highest income earning cash crops while to some extent, sugarcane production has increased due to the construction of new sugar factories (ROK, 2014).

However, the entry of several players has led to medium as well as small scale farmers who have literally no access to the wheat market which unlike their rival grain product, maize that can be sold and fully consumed on the village market. These medium and small scale farmers are usually locals and speculators from other towns who own or lease between 10 to 15 acre pieces of land, hire people to do the cultivation, provide all the finances for the preparation and then call in middle-men to sell the crop at any price that will make them feel some profit thus failing to get the real big market where they could enjoy good prices and hence good returns. Similarly, the small scale farmers are not closely-knit as to influence the maintenance or construction of good roads in the areas where they grow their crop. Thus whereas for example, the government has recommended in excess of Ksh.3,000 per 90kg bag, brokers get to buy the produce as low as Ksh 1,500 or Ksh 2,000 thus leading to discouraged farmers with the hindsight of a fear for insurance or bank financing services since they could have gone at a loss if at all they had tried to fully be involved in crop insurance and financing. All these factors have contributed to poor production and lack of interest in the production of wheat leading to farmers reducing their wheat production (ROK, 2012).

Low prices are caused by the fact that the small and medium scale farmers are not in a position to influence or control the market for their produce. Farmers from such areas as Enabelbel, Nkorinkori, Oloropil and Olokurto have complained of the low wheat prices that cannot help compensate for the high cost of production which is compounded by the failure by the Kenya National Cereals Produce Board (NCPB) to fully and timely purchase all the produce. This leaves the farmers exposed to only two buyers who are Unga Limited and Mombasa Millers together with middle men who exploit the farmers purchasing the produce at half the recommended market price. Farmers in these regions also complain of poor road infrastructure and interconnections coupled with the threat of migratory birds menace especially Quela Quela birds in Duka Moja and Nkareta among other areas. The threat of desert locusts is also very real thus requiring expensive physical methods of scaring away the birds and use of winged aircraft for spraying against the locusts. The threat of such diseases as Ug99 still remained and requires well-prepared farmers to keep them off the farm (Singh *et al*, 2007).

Earlier in their paper on Kenya's wheat performance and regional trade, Nyangito, Ikiara and Ronge (2002) observed that large scale farming accounted for 75 percent of the wheat planting areas and 83 percent of the total production. The switch from purely pastoralist to mixed pastoralist and farming nature of the Maasai of Narok have meant that the region now has approximately 1000000 hectares of wheat producing potential with a rain fed system that makes the region most productive in wheat growing. The civil unrest in the region following the general elections in 2007 affected production levels in the years between 2007-2008. The same could also be said for the drop in production in 2013-2014 after the general elections in 2013. This negatively affects insurance of the

crop as insurers are likely to forecast another low production following any other general elections unless the political atmosphere remains very peaceful (Musyoka, 2009).

Instances have however arisen in which farmers complain about delays in payments from insurance firms with farmers directly pointing blame towards CIC insurance. Failure to pay for the promised or signed amounts heavily affects productivity as farmers incur losses which in practice should be compensated for by an equivalent of the insured amount. Prolonged drought followed by poor rainfall has been the main cause of low production against which farmers have insured their crop but to which they claim in recent past not to be well compensated for by the insurance firms. This is the common cause of concern by other farmers including maize and barley in which insurance firms have not quickly compensated the farmers after a loss of crop following such natural weather vagaries (ROK, 2015).

Specifically, farmers in Nkorinkori which is the leading wheat growing area in the whole county as well as East and Central Africa have always found the insurance of crops to be a boost in attracting financiers. However, there is a 10 percent import duty in East Africa forcing the market of millers to import wheat from the cheaper sources especially the Russian farmers and hence throwing the Narok wheat farmer with the low prices implying that farmers cannot recoup their costs even though they were fully financed by the banks. This has caused a huge outcry by farmers who feel that the government has not provided enough protection even though it does provide subsidized fertilizers. This then affects the financing of farmers by banks since the price of produce is too low to compensate for the loans issued by those banks.

1.1.4 Crop Insurance, Financing and Productivity

Agricultural development means increasing the quality and quantity of food production in which climatic conditions play a dominant role despite technological advancement. Climatic change and extreme weather conditions like drought or excessive rainfall or even high temperatures has continued to threaten crop farming and increase risk for farmers who depend on agriculture as their source of livelihood as well as for commercial farming enterprises. It calls for both heavy financing to achieve the highly mechanized nature of farming and insurance against the many uncertainties and risks (Nyangito, 2002).

Financing is a key ingredient in the planning of investment strategies. Working capital theory dictates that the measurement of performance in the long run requires proper management of finances from the onset of investment. This then leads to the predictability of the future but due to uncertainties, there is need for insurance against risk to mitigate so that performance or productivity is assured for the investor. Adequate finances helps make up for deficiencies in farming experience and the absence of crop insurance, such that farmers that have less experience or do not have crop insurance are more likely to adopt productivity enhancing activities. This also means that farmers are less likely to spend on output related items (additional farming acreage), as opposed to productivity enhancing items (such as hybrid seeds or fertilizers) as credit constraints become more severe. From the discussions of finance and insurance, there is evidence that financing increases farmers' willingness or ability to adopt productivity enhancing activities.

Studies by Yang and Wang (2013) indicate that farmers in China enhanced their farming activities ever since they were given access to financial support which was assured through registration of insured farmers. Some of the productivity enhancers included employees with health insurance, machinery with assured maintenance schemes and cooperative road maintenance that involved farmers' contributions specifically for repairs and upgrades of major farm roads. Similarly, Barine (2012) studied wheat farmers across Italy indicating that the productivity went high once a large loan was acquired from European Union for the large scale farmers. If well handled, there is thus clear indication that crop financing increases with more insurance uptake and hence positive productivity is realized.

Insurance firms including UAP insurance and CIC insurance now come to play a big role in the financing of wheat farms in Narok. The firms insist on farmers getting the correct fertilizers, seeds and all other chemicals used in preparation of land and actual cropping processes of wheat farming. One of the leading suppliers of approved chemicals and fertilizers is Syngenta Corporation that is trusted by both insurance firms and financiers. Tied to this is the financing of the many processes that involve farmers ploughing, planting and cultivating their crop. Banks including Co-op bank, KCB and Equity are the leading financiers of wheat farming in Narok and they have a policy of lending only to farmers that have fully taken insurance for their entire farming process. Previously, all the banks were only interested in giving out loans as an incentive to encourage farming but due to heavy defaults and poor returns by the farmers, all banks decided to link financing to full insurance. It was noticeable that productivity went up when farmers had insurance which encouraged banks to finance the farming process. Farmers who have not

fully insured their crop are not entitled to heavy financing by the banks. Specifically, Equity Bank removed the free lending to farmers that was only tied to land as collateral instead putting the clause for full insurance from recognized insurers on the wheat farming market (ROK, 2015).

1.1.5 Wheat Farmers in Narok County

Narok County is located on the South Rift Valley bordering the Republic of Tanzania to the South, Kisii, Migori, Nyamira and Bomet counties to the West, Nakuru County to the North and Kajiado County to the East. It is home to the Great Wildebeest Migration which is one of the “Seven New Wonders of the World”. It constitutes 6 sub-counties namely: Kilgoris, Narok North, Narok South, Narok East, Narok West and Emurua Dikirr. Narok town is the capital Head Quarters of the Narok County and stands as the major centre of commerce in the county.

There are over 3,000 farmers in Narok in such areas such as Enabelbel, Oloropil and Olokurto. Most of them are small scale farmers but with the main producers being large scale farmers with very mechanized forms of production. Many farmers are in agreement that productivity is affected by high cost of production, harvesting and transportation coupled with lack of reliable market as their major challenges. Indifferent weather has pushed the cost of production high. It is also notable that failure by the National Cereals and Produce Board (NCPB) to buy from the farmers is a double-blow on their productivity. Farmers in the Narok region have been having access to only two buyers who are Mombasa Millers and Unga Limited for buying the produce but sometimes when they decline to buy, brokers take advantage and buy the produce at as low as Ksh1,500 to

Ksh 2000 per 90kg bag. The small-scale farmers who grow between 10 acres to 15 acres of wheat also lamented over poor roads in the area which increases the moisture content of the wheat thus affecting the quality. The issue of insurance is also of great concern since premiums have been found to be costly to the farmers thus favouring mainly the large scale farmers. Without proper insurance mechanisms, many small scale farmers cannot access adequate finance to fund their wheat crop farming.

This study is focusing on wheat as a cash crop since it is more established than all other crops in terms of insurance support as well as funding by banks and other institutions of credit facilitation. The farming of wheat is also the most mechanized in the region and hence the most likely crop on which financing and insurance is concentrated by farmers and finance houses alike. Furthermore, Kenya total production of wheat is approximately 400 MT while Narok county alone produces approximately 200 MT and hence clearly a leading region for wheat production justifying its selection (www.narok.go.ke).

1.2 Research Problem

Agriculture in modern terms is a mechanized activity that calls for heavy financing and hence attracting insurance cover. Inevitably, theories of financial management point towards finance managers protecting their assets through insurance which in many cases is mandatory in risky financial investments like agriculture and mining (Monroy *et al*, 2013). Investment of any form that has risks will require mitigating measures in the form of insurance, but how this affects productivity or returns on investment is the main concern for managers. Wheat farming has been a strong pillar in Kenya's agricultural policy yet it suffers greatly from uncertain weather and unstable financing. This implies

many risks leading to uncertainties in production and high costs of importation or loss of crop and business. Narok county in particular as the leading county in wheat production has witnessed an upsurge in the intake of insurance by farmers following several years of crop failure and unstable prices. Specifically banks have linked up with insurance firms like CIC and Lion Group to put pressure on farmers applying for financial help from their banks. Cooperative Bank and Equity have been on the forefront in supporting the drive towards standardizing insurance as it is the pillar of financial planning. The results to a large extent have led to specific aspects of high productivity leading to the increase of wheat crop productivity. It therefore calls for strong investigation into the financing and insurance of the precious crop to understand the effect the two aspects have on the productivity of wheat farming specifically in the rich wheat growing region of Narok County in the South Rift of Kenya (Nyangito *et al*, 2002).

Torkamani (2005) has discussed the need to have policies that protect farmers across regions that do farming especially the grain. In the subsequent hurricanes and cyclones devastations of crops in the Indian plains, farmers invested heavily in the insurance of not just the crop but all farm resources including equipment, animals and personnel. The same was found to be true across Spanish and French wine farms in which strong snow blizzards could be blamed for the destruction of large swathes of vineyards. In most of this western crop farming, the farmers are normally well informed individuals or corporations with adequate state and private funding making it an unbroken business under all extreme weather hazards.

Across African, Naluscheke et al (2007) found out that farmers were always to be found into two categories even though they literally faced the same problems especially the rare weather vagaries but mainly weeds and diseases as well as animal destruction through birds among others. The scholar concluded that insurance and financing were mainly items of individual farmers even though the central governments have repeatedly tried to fund farming activities across their regions with what can be said lots of bias from country to country.

Studies carried out on the Kenya crop farming indicated that insurance was increasing as many farmers have started realizing the need for insurance of the crop. This according to Ogunlana (2004) has been necessitated by heavy losses incurred repeatedly by farmers especially from diseases and birds. Productivity was seen to be determined by how much the farmer would be able to save from such vagaries of weather, theft of crop and level of marketing. Similarly, Ndiema (2002) concluded that the main reason for poor wheat production was the failure by farmers to fully embrace farming as a life-sustaining activity. Instead, many farmers or people who hire farms to plant wheat for speculative purposes do not realize the need to take care of uncertainties through proper financing and well-designed insurance cover.

It is from the gaps above specifically the difference in farming between the developed countries and Kenya as well as the lack of focus on crop insurance that this study was inspired with a field question, “how does crop insurance and financing contribute to enhancing crop productivity in Narok County?”

1.3 Research Objectives

This study had the objective of examining the effect of crop insurance and financing on wheat productivity in Narok County.

1.4 Value of the Study

It was expected that the results from the field study would be of great importance to the various stakeholders in the crop insurance and financing of wheat. First, the government through agricultural policy and planning would be able to utilize the study results to enhance crop insurance and financing in order to boost productivity not just in the Narok County, but in the whole country at regions where wheat is cultivated as a major cash crop.

Second, the study would benefit investment professionals including licensed farmers, the small scale farmers, prospective commodity dealers of agriculture produce, and both insurance as well as financing bodies in the wheat market. It would also be possible for other non-bank financiers to utilize the study report to be able to forecast the importation and exportation of wheat in the country.

Finally, the study would be a boost to the body of knowledge and field of scholars dealing with crop financing, insurance and enhancement of wheat production. This is in addition to the contribution of other scholars who have carried out similar studies to support or oppose theories of crop insurance and finance with respect to productivity.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Chapter two is set to review the literature behind crop financing and insurance. The chapter is arranged to cover this introduction followed by theoretical review, wheat productivity, and empirical studies and finally identify the study gap through trends and relationships using a conceptual framework.

2.2 Theoretical Framework

In this section, the study focuses on the main theories that formed a foundation for this study based on the three main themes of financing, insurance and productivity. Justifiably, these theories are pecking order theory, insurance risk theory, working capital theory and theory of productivity.

2.2.1 Pecking Order Theory

Developed by Myers *et al* (1984), the pecking order theory portends that companies follow a pecking order when deciding on the type of financing they choose. When financing an investment, companies prefer internally generated funds to external funds and they prefer debt to equity issues. The explanation Myers use is based on information asymmetry and is as follows. Investors have no detailed information about an investment a firm is about to make so if a firm issues stock to finance the investment, the investors will not pay full price for the stock because of the risk he faces due to the information asymmetry (Brealey *et al.*, 2008). This means that if a firm wants to do an investment of let's say, 10 Million with NPV 12 Million they might need to issue stocks for 12 Million

to get the 10 Million needed for the investment. This scenario would mean that the company would not do the investment since the total NPV is zero.

The only scenario where a company would issue stock, under these assumptions would be when the stocks are overvalued. This also means that there exists an equilibrium level between issuing shares and debt. Investors are aware of this type of corporate behaviour nowadays and stock issues are generally met with suspicion from the market. This forces a company who need external funds to take on debt instead, thus forcing the company to adopt a pecking order, even though this situation is a bit stylized (Matemilola & Bany-Ariffin, 2011).

This theory is relevant to this study since the crop farmers' choice of credit rather than other forms of financing is dependent of various factors. Their preference for cooperative societies over other formal financial institutions for obtaining credit is based on their assessment of their financing needs. It is therefore inevitable that such a study on productivity would call on these theory as a foundation on productivity and how it is affected by insurance and finance.

2.2.2 Insurance Risk Theory

Insurance risk theory has historically dealt with a number of factors including , analysis of risk for given populations or classes (policy holders), determination of insurance premium rates, reinsurance required to mitigate risk for primary insurers and defining how much capital to reserve to cover potential claims. Much of the risk that insurance companies assume for policy holders is somewhat predictable. Insurance companies use predictive modeling that analyzes data and trends from many previous years' data. "For short tail insurance risks such as property, motor damage and theft, and for common

forms of loss such as those arising from theft, building fire, accident, and small to moderate storm damage, the risk is generally estimated from loss records (Liu, 2013).

Yang and Wang (2013) have observed that if all risk could be modeled in this manner, insurance companies would have a much easier time in predicting how many claims were likely to be paid and how much money would need to be kept in reserve to pay claims, meet operation expenses and ensure profitability. Risk models for catastrophic risks related to natural disaster or acts of terrorism have proven to be deficient or just plain wrong. The insurance industry is responding by developing new risk models for these types of events.

The risk of large losses from catastrophic events such as earthquakes and weather vagaries is based on complex computer models that simulate a large number of events representative of what would be expected over several years. Actuarial techniques involving triangulation have been developed to estimate the long tail insurance risks that are characteristic of casualty insurance. The theory underlying individual choices for any insurance policy is dependent on three factors:-price of the premium, expected utility, the potential gravity of the loss/ risk being expected. At a more general level but still part of the demand-for insurance-as-demand-for-certainty theory, other studies have postulated that the demand for insurance is by risk averse consumers who use insurance to avoid, eliminate, hedge against, kill, manage, shed, protect against, or bear he risk of loss (Liu, 2013)

Insurers need to maintain adequate financial capital to meet their obligations in terms of paying claims as well as to maintain solvency. Rating agencies, which assign solvency risks to insurers, are working to change capital models and are requiring higher capital

reserves. In conclusion, the theory of insurance risk is a bit complicated for farmers who have to understand all the insurance requirements forcing most of them to enter into contracts without fully understanding the consequences (Yang & Wang, 2013). It therefore calls for the inclusion of this theory in the foundation of a study in explaining how insurance is affecting crop finance specifically in Narok County.

2.2.3 Working Capital Theory

The theory of working capital management contends that if working capital is managed according to prescriptive theory then it would be expected that businesses would invest in working capital, finance working capital, monitor factors that influence working capital and manage cash. It also concludes that it leads to the measure and analysis of performance to ensure that the long term (fixed) assets are utilized effectively and efficiently. Working capital management involves the application of economic and management principles to managing short-term assets and short-term liabilities, as well as the management of all the relationships that exist between them in order to enhance liquidity, profitability and concomitantly firm value (Dauten, 1955; Barine, 2012). It is concluded that working capital in crop productivity is a working capital that is used by farmers to finance the crop from the early planting time to the harvest time. This also leads to the definition that working capital is money and land specifically meant for the crop by farmers (Riaz *et al.*, 2014)

Studies indicate that the working capital used by most farmers comes from their own working capital, middlemen, or cooperatives, as well as banking institutions. Most farmers tend to combine and use more than one working capital funding sources. It can

be observed that the most beneficial combination model of working capital funding sources for farmers is the combination between self-working capital and working capital gained from outside sources namely cooperatives, middlemen and to some extent, banking sources. However, most farmers tend to combine their own working capital with the one from non-banking sources more often due to the fear of high banking rates and penalties for defaulting which banks do not make very flexible in many cases (Barine, 2012).

The alternative working capital funding sources chosen by farmers are various, ranging from formal sources like banks and cooperatives to informal sources, such as neighbors or middlemen as well as sales from livestock. All the alternative sources selected by the farmers are considered beneficial for farmers, and middleman is the alternative source that the farmers tend to choose the most.

A cursory examination of most farmers' profiles is sufficient to show that the extent of a farmer's liquidity problems will depend upon the amount that is carried forward from the heavy income period after a harvest has been sold. It is from the surplus funds available at this time that repayments of debt and most investments are made. If too much money goes into these avenues, then the following months without any income from crop may cause serious difficulties for the farmers. However with proper financial planning, the deficit period can be avoided if an alternative crop is planted. The basic requirement in avoiding the pitfalls of the farmer lies in taking insurance cover however painful the premiums will always appear to be (Feenstra *et al.*, 2014). This theory is a strong foundation for studies based on productivity as the basis for funds allocation is then

pecked to the alternatives that farmers have as well as the sources of finance they have for such alternative crop productivity.

2.2.4 Productivity Growth Theory

Scholars including Solow (1957), Maddison (2014) and Siegenthaler (2015) concluded that Productivity growth is a major source of growth of aggregate. They have proved that agricultural output can grow in two main ways: an increase in use of resources of land, labour, capital and intermediate inputs or through advances in techniques of production through which greater output is achieved through a constant or declining resource base. Seen in this way, productivity can be defined simply as a measure of the increase in output that is not accounted for by the growth of production inputs. Under certain assumptions of efficiency, productivity growth and technical change are synonymous with all other farm variables remaining constant (Bollard *et al.*, 2013).

Today, many developing countries are shifting from subsistence farming to the promotion of new export-oriented crops. However, the shift from subsistence agriculture to commercial agriculture, to production for the world market, has led to the division of tasks and specializations in agriculture. In adopting the different farm innovations, farmers need financial resources. The structural changes in agriculture have increased the demand for farm loans. The increase in loan demand is due to the much greater returns to investment obtainable from the new, more productive farm technologies. It has been proven that easy access to credit facilitates the adaptation and use of new farm technologies and hence increases agricultural production (Siegenthaler, 2015). There is however an observable constraint. Increasing loans to farmers requires the

transformation of rural credit system from limited informal, traditional, local savings and lending arrangements to an integrated formal, national savings and credit system that involves banks and insurance firms of international repute as well as stability on the local money market (Anderson & Strutt, 2014).

It is noticeable that improvements in rural credit enable economic development in many ways. The rural financial markets provided by banks enable a greater mobility and flexibility in exchanges in rural areas. Farmers are able to make payments from distant locations without having to meet in person. More so, rural savings and loans enable improved resource allocation. This occurs when they mobilize excess cash from farmers with few, low-return investment opportunities and lend it to the farmers with higher-return investment prospects. It is also practicable that, loans allow farmers to better manage the inherent risks associated to the nature of the agricultural production. Credit facilitation implies that loans enable farmers to take on large investments specifically farming on large acreages without fear especially if there is a high intake of insurance products to back up the farmers (Dabla-Norris *et al.*, 2013).

Credit availability to farmers also means that loans can diminish the effects of life-cycle problems, in which the young need to acquire farm and household assets, often by borrowing from community members who have accumulated savings. From the above positives, Kenya's strength in wheat farming could be said to arise from its possession of vast fertile lands in Narok wheat growing zone which has attracted financial support and insurance cover to the profitability of the crop farmers. However, poor crop prices caused by economic factors as well as other factors beyond the farmers' planning have

negatively contributed towards low productivity. This category also includes such lows as poor infrastructure, fertilizer from unqualified sources, weather vagaries and illegal importation of wheat from countries as Russia and Pakistan to the local market that destabilize market production prices. This theory represents the foundation of the main study objectivity as it seeks to find out the productivity of wheat crop as it is affected by insurance and finance.

2.3 Determinants of Wheat Productivity

This section of the study specifically deals with the main factors that affect wheat productivity. This is in theory covering global, regional and local players. In particular, the factors are return on investment as well as government schemes, alternative land usage, environmental and weather vagaries, as well as crop finance and insurance.

2.3.1 Return on Investment and Government Schemes

From the experience across the world, high returns from selling crop for little input will naturally cause more crops planting to take place. As a crop this affects long term production. In the short term higher returns encourage growers to apply more inputs such as fertilisers and pesticides which increases the yield. However, farmer prices are sometimes set by governments or can be influenced by internal market factors other than the world crop price.

It is also true that the role of government in assisting growers is a leading factor in the grower's decision whether or not to plant crop. Assistance can take different forms, from assistance with setting up and rehabilitation to cheap loans. Extension services may also

assist smallholders. This applies in all areas both large scale or small scale leading to the conclusion that governments can largely determine the return on investment for most crops planted especially for industrial processing. This is more so if the crop is apparently a major determinant of people's livelihood in the area. It also brings to the fore the issue of government policy in terms of marketing the crop and protecting their local produce from fierce and sometimes unfair competition from foreign countries. The negative side of government schemes could be that there are cartels which side with corrupt officials to import cheap crop produce thus undermining the efforts of the local farmer (Liu & Tao, 2013).

2.3.2 Alternative Land Usage

Observations in most farming areas indicate that land suitable for one crop is also able to support other crops. Naturally and logically, farmers will abandon a crop if it has a low return for a long time, despite the costs of uprooting and replanting. This has been witnessed in many countries that for long had their farmers believe the crop was the only viable farming they could make returns from the farms. In Kenya for instance, farmers in most parts near the city of Nairobi have long since abandoned their coffee plantations with very many alternatives for land use including estates and greenhouse farming. This definitely plays a big role in the productivity of any crop (Nyangito, 2002).

Major crops that suffer from such alternative usage are normally meant for the export market and the farmers have no alternative market for the crop if the foreign market fails. It could be caused by political or environmental changes as well as technological changes that make the export market switch or collapse altogether. Other examples include the

spices market which shifted dramatically from being predominantly East Asian to the Latin Americas caused by the low cost of producing the products in the region nearer to the consuming European and North American market (Lobell & Gurdji, 2012).

Traditionally, pastoralists communities have had the culture of using large tracks of land for their livestock. The change in climate as well as lifestyle has forced the communities all over the world to re-think their common lifestyles leading to farming activities as opposed to livestock grazing on the vast lands. The change in modern living styles and introduction of market forces also has meant that people switch to alternative land usage which increases or reduces the productivity of one crop while having the opposite effect on the others (Muller & Robertson, 2014).

2.3.3 Environmental Influences and Weather Vagaries

A large influence on crop productivity emanates from environmental causes and unpredictable weather vagaries. These has a combined large list of things like pests, diseases, drought and floods, climate, soil, water supply, human actions and other environmental factors that are normally hard to control or mitigate against. As indicated by Syverson (2011), the effect of pests and diseases can lead to low productivity or even farmers abandoning the whole exercise of crop farming. In particular failure to get support in terms of government subsidy or financial back up due to crop failure discourage crop farming leading to zero or low yields all round.

Sometimes, human actions can be the cause of environmental problems in which case, the people in the farming area decide to steal harvested crop, intentionally burn ripening crop in the farm or set animals onto the farms to destroy sizeable junks of the crop. In

other words, malice can lead to poor productivity for example if farming communities living near elephant populations are not fully protected, the animals can cause untold damage of the crop if unleashed from their sanctuary in the parks or national reserves (Nyangito, 2002).

Climatic changes and soil fertility also play a very important role in productivity since some soils would be suitable for a specific crop while totally failing to support another however attractive the returns would seem to be. It is also noticed that a specific crop might lead to the soils not being as productive as they were before meaning that the productivity of the region goes down. The remedy for this is careful study of the soils and the water supply in the region before embarking on major crop farming. Even though many countries have departments or divisions of agriculture that deal with crop farming soils, on many occasions especially in the developing world, people are lured into crop farming by their friends on speculative approaches. Thus, lands are bought without proper soil examination leading to poor productivity from the farms (Gitau *et al*, 2010).

2.3.4 Crop Finance and Insurance

Clearly from the mentioned factors, there is one important factor running across all the rest and that is adequate, reliable and timely financing both at input and output level. Finance at the input level requires loaning or direct funding to farmers while at the output level, there is need for attractive prices and readily available market whose access require adequate financing. This then brings in the question of reliability and timeliness which must be addressed through insurance. A large part of the cost of establishment and maintenance of production is labour. The next major cost is inputs such as fertilisers and

pesticides. Both of these costs will vary with the size of the farm and the type of farming carried out. Financial success in setting up a cocoa farm depends on quick returns from the initial investment and increasing yields to cut unit costs (Loewenberg, 2011).

As a marketing strategy, farmers require multiple channels to sell their produce and hence the need for governments to provide appropriate policies that govern market forces in terms of taxations and tariffs in order to keep the crop at profitable market trading. With the uncertainties both to the input and output front, insurance factor becomes very critical since all other factors cannot be predictable to the utmost accuracy. In conclusion, no one single factor can dictate productivity of wheat farming since none can be left out in the equation of wheat productivity (Muhammadi, 2012).

2.4 Empirical Review

Bashir, Mehmoud and Hassan (2010) carried out a study on the effect of credit facilities on wheat farming in Pakistan which has got wheat as a major staple food. Using a structured questionnaire on two farming regions, the scholars aimed at establishing the impact of crop credit on wheat productivity.

In their findings, the scholars established that credit played a very important role in encouraging and motivating farmers to fully participate in crop farming not just for subsistence but on a large scale professional level. As a country or region reliant on agriculture, farming was very important and hence the recommendation by the scholars that policies should be put in place to assure the farmers of continued support by banks and any other lending institutions specifically tailored to have credit facilities to farmers. They also found that there were middle men who could come in between the farmers and

banks in order to lend to the farmers; further demonstrating to the study that credit facilities to the farmers was a paramount requirement.

Solomon, Tesema and Bekele (2014) studied the adoption of improved wheat varieties in Ethiopia using several households. The scholars found out that improved varieties alone could not be a motivating factor in the productivity since farmers would be willing to spent high amounts with the assurance that the roads were good enough to transport their produce to the market and that the prices in return from their output would adequately compensate for their efforts on the expensive inputs involving wheat farming. Similarly, the scholars concluded that the main driver to all the success in adopting new varieties was access to stable finances. They therefore called for the development of various components of production in order to encourage or motivate farmers to adopt the new higher quality seeds.

Woodward *et al.*, (2012) have studied insurance losses and the effect on crop farming in the USA. In their study of patterns in loss-ratio experience in the U.S.A corn insurance market, the use of spatial econometric model was applied across the wheat growing belts. The results demonstrated that there were very many unrecorded factors that lead to insurance losses on crop financing. This study led to the conclusion that many insurance firms do not fully get the exact impact of a would-be risk and hence end up not prescribing the right premiums to the crop farmer. This has meant that farmers who observe their fellow farmers subscribe to particular loans get discouraged when they see the results while in some areas, those who follow suit and get crop insurance end up disappointed with unpaid claims resulting from conflicting information.

The situation is made much worse where there is a third party and hence the difficulty in establishing who exactly should pay the insurance premiums. This happens especially when people lease farms for crop farming. Whereas the farm lender is fully financed and the crop is insured, the third party might be at risk in case of a crop failure. The benefits of crop insurance however were found to outweigh the negatives as most financial institutions had put up insurance as one of the most important requisites for crop finance. Insurance was also found to be a deterrent against use of low quality seeds or chemicals from any unknown sources. With insurance, farmers were now required to document through an ISO9001:1400 system in which the source of chemicals and fertilizers has to be ascertained to be foolproof.

Dercon *et al*, (2011) studied the demand for insurance under limited credibility in Kenya using mathematical models that based on the insured and insurer trust linkages. The scholars identified that there was so much information asymmetry due to lack of common data bases on most farmers and failure by insurance firms to have an open policy on what exactly the whole business of insurance is meant to be. The groups of people within any community that have low trust in the insurer will be very sensitive to any variations in the premium to the extent that they can cause a panic withdrawal. However, those who are in high trust of the insurer have access to large finance resources and will keep the doubters not far away most of the time even if they do not eventually subscribe in large extent across all the aspects of insurance.

Gitau, Mburu, Mathenge and Smale (2011) aimed at examining the competitiveness of the wheat and rice sub-sectors in Kenya compared to some countries in the region and in the world. Specifically, their study estimated the cost of production for wheat and rice at

the farm level. The study also established the various marketing costs along the value chain for both commodities from production level to the processing stage using the value chain approach. Costs and profit margins along each node of the value chain were established. The scholars also determined inefficiencies existing along the chain of grain production. Using both primary and secondary data, the scholars applied a questionnaire in the main wheat growing regions in Narok, Nakuru and Eldoret while rice household data was collected from Mwea and Ahero irrigation scheme in Kirinyaga and Nyando districts respectively.

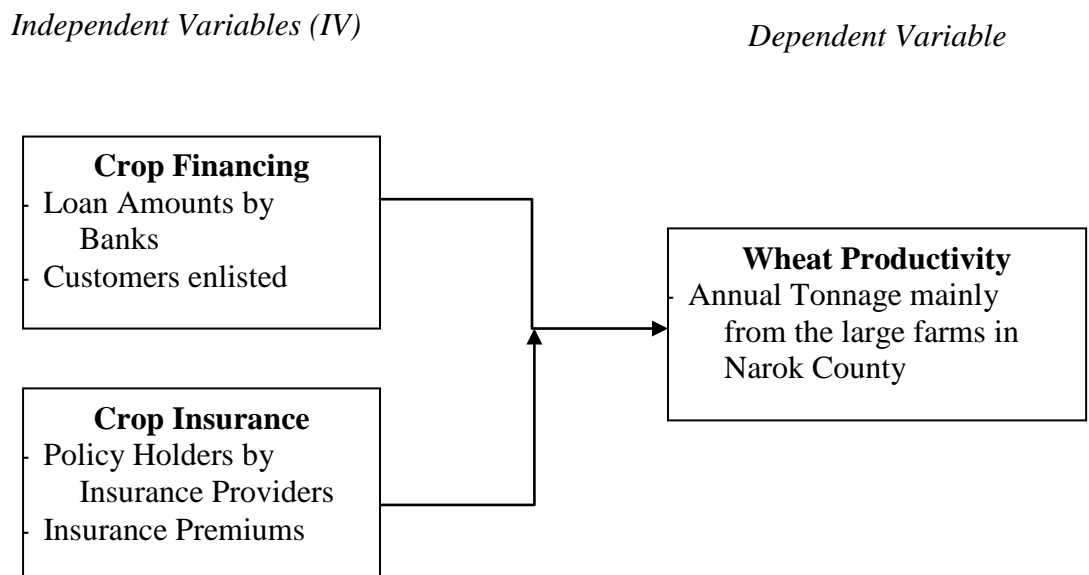
In their findings, Gitau *et al.*, (2011) established that there was high chance of improved competitiveness when farmers were exposed to international competitions, exhibitions and trade shows both locally and in foreign countries. They also recommended that farmers should be accorded such opportunities in order for them to better understand the market they are producing for as well as discover ways and means of accessing credit facilities both locally and internationally. They also cited political changes and stable economic conditions that would lead people to use farms rationally as per the world market requirements without cultural hindrances.

2.5 Conceptual Framework

In order to actual the field study, this section highlights briefly the main variables in the field to be tested. This is demonstrated using a conceptual framework. Kothari (2008) has justified the use of conceptual framework in linking variables. It gives a guide as to what measurements to use in a study. In this study the dependent variable is wheat productivity while the independent variables are crop insurance and crop finance.

Productivity is mainly affected by the two major variables of finance and insurance with all other sub-factors falling within the two. Factors like land preparation, fertilizer and chemical acquisition all require financing which can only be secured much more easily if the whole process is insured. In essence, it is now almost impossible to have access to open funds without demonstrating that one is fully aware of the existence of insurance apparatus. This is demonstrated using the study gaps from empirical review and the diagram shown in Figure 1 of conceptual framework for wheat productivity.

Figure 1: Conceptual Framework for Wheat Productivity



2.6 Research Gaps

This study section identifies the gaps and trends from the theoretical review as well as the empirical ones in order to come up with workable gaps that could be filled by completion of the current study. In the first instance, there is a trend culminating in all cases calling for proper financing of crop farming in general. Specifically, there is a clear indication that finances play an important role on the productivity of grain farming. However, there are no specific areas identified in the studies as requiring more funds than the others.

Theories for this study have been based on financing, insurance and productivity. However, there are many factors that affect wheat productivity of which the mentioned theories cannot cover and to which a solution or recommendation would be sort during the study in the field. Some of the assumptions by the theories especially in productivity cannot be replicated in crop farming and only apply in banking institutions.

Similarly, whereas there is a trend of most inputs appearing to be similar across the various nations from where the studies have been carried out, there is very little emphasis on the component of crop insurance. In particular, there is scant evidence of similar studies from African and specifically Kenya thus prompting a gap that will be filled by this study by applying to the Kenya situation. It is also noticeable that recent studies are not abundantly available implying that the recommendations made more than two years from the year of current study could be irrelevant or not very applicable to the current time. There is thus enough evidence to suggest that a study on the productivity of wheat and how insurance is affecting financing is viable.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

Chapter 3 deals with the research methodology. These are the choices that researchers make about field phenomena to be studied. This means it is the methods of data gathering and other forms of data analysis to accomplish the study objective. Methodology links to rules followed in a carrying out inquiry. These include the research design, population, sampling, data collection and data analysis procedures (Kothari, 2009).

3.2 Research Design

This study adopted a descriptive research design. Descriptive study is concerned with current or past status of phenomena and allows for making of preliminary identification of outcomes. The design also allows for the description of causal relationships between variables under study (Cooper & Schindler, 2009).

3.3 Population and Sample

The target population for the study comprised large scale farmers registered with Cereal Growers Association of Kenya (CGAK) and who have taken loans as well as insurance policies in Narok County. The choice of large scale farmers is due to their high probability of having financial loans and insurance cover as opposed to small and medium scale farmers. Kothari (2008) explains that a target population is a set of subjects that have similar characteristics and can be used as true representative of the whole

population. The study covered all factors that affect insurance uptake and acquisition of loans by farmers leading to the changes in crop productivity.

3.4 Data Collection and Instruments

Primary data was collected on various factors from farmers concerning financial loans, insurance premium uptakes and the amount of tonnage per hectare of crop. This involved a survey of large scale wheat farmers who had been in crop farming for the past 10 years and registered with CGAK. The data was collected using a structured questionnaire to capture insurance, financing and productivity data.

3.5 Data Analysis

Data from primary sources was analyzed through descriptive analysis using Statistical Package for Social Scientists (SPSS version 20) computer package. Descriptive analysis involved getting the tables with frequencies and percentages and performing a test of significance on the relationships to test the difference in productivity between various variables of the study. The relationship between these variables and how they affect productivity of wheat was established through a linear regression of the type;

$Y = a + bx + c$, as shown in the next equation:

$$Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + e$$

Where:

Y was the dependent variable (Wheat Productivity – measured by wheat production)

β_0 was the constant term

β_i was the coefficient of the independent variable [i = 1...3]

X_i was independent variable as follows;

X_1 = Insurance Premium (Log of insurance premiums),

X_2 = Loan amounts (Log of total loans),

X_3 = Size of farm (Log of farm productivity),

e was the error term (unexplained sector noises e.g. politics and culture).

Further tests to establish relationships between wheat productivity and its determinants involved a Test of significance of the coefficients over the 10 years at 95% level of significance. Premiums for both insurance and loan amounts were measured through comparison of loaned amounts against actual crop produce to determine profit or loss. Finally, there was a test of differences in significances for the 5-year period before and after adoption of crop insurance and financing to ascertain effects of insurance and finance on crop productivity. The analysis results were discussed in chapter 4.

CHAPTER FOUR: ANALYSIS, FINDINGS AND DISCUSSIONS

4.1 Introduction

This section of the report set to present data analysis as produced from SPSS and Excel computer packages. It also produced findings and linked the same through discussion of similar or dissimilar studies with findings related directly to this study. Finally, the section linked independent and dependent variables of the study through regression and test of significance analysis.

4.2 Response Rate

The study set out with a target of 35 large scale farmers in Narok County. All the targeted farmers were given a questionnaire to fill in a drop-and-pick manner in which assistants collected responses at a later date. There were 20 full responses in which the farmers gave all the information required. Ten respondents completely refused to participate citing personal and logistical problems of their participation. These were mainly farm managers who expressed fear of being victimised by their superiors who did not recommend participation in such surveys. The final 5 respondents had their questionnaires in mutilated format where some parts were deliberately left blank while others deleted or information crossed-out after filling the document thereby leading to disqualification of the whole questionnaire piece. It was therefore possible to make full analysis using the 20 large scale farmers with fully-filled questionnaires. The information is tabulated in Table 1.

Table 1: Field Response Rate

State of Response	Frequency	Percentage
Fully responded	20	57
Did not respond	10	29
Mutilated or spoiled response	5	14
Totals	35	100

4.3 Effect of Insurance

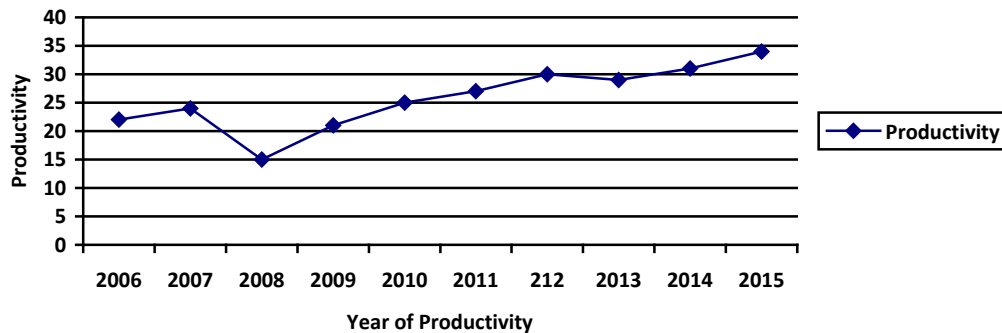
One of the main objectives of the study was to find out the effect of insurance on the productivity of wheat farmers in Narok. The 20 farmers interviewed had received insurance from 3 main firms including CIC, UAP and APA as indicated in Table 2 in which CIC leads with 43 percent of the farmers followed by APA with 27, UAP 14 and Miscellaneous insurance firms at 6 percent. CIC was the first insurance firm to fully get into the farming business and has since been attracting more farmers than the competing insurers.

Table 2: Insurance Firms

Insurance Firm	Frequency of farmers	Percentage
CIC	9	43
APA	7	37
UAP	3	14
Miscellaneous firms	1	6
Totals	20	100

In the preceding period before the government enforced insurance uptake by farmers, there was clearly a fluctuating productivity in which the situation came to stabilize in the period when most farmers acquired insurance for their crop. This is demonstrated on Figure 2 in which there is a clear steady rise in productivity. The result is a direct corroboration of what other scholars have found in studying productivity of grain. Olila and Pambo (2014) observed that insurance uptake had contributed to the stable productivity especially after the infamous Kenya post-election violence of the year 2007-2008. Similarly, Siegenthaler (2015) concluded that low productivity was caused by uncertainty which was best solved if there was strong insurance culture among the farmers.

Figure 2: Effect of Insurance on Productivity

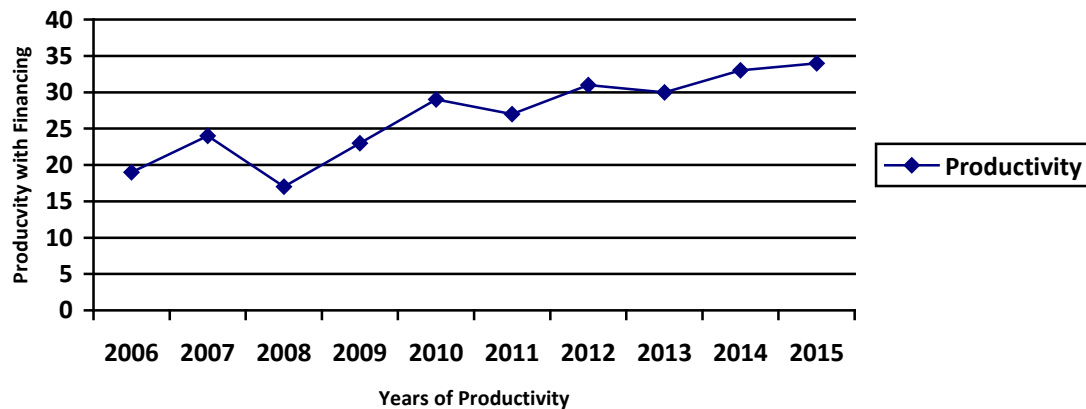


4.4 Effect of Finance

The next specific variable was effect of finance on wheat productivity in which the sampled farmers also indicated that there was an improved productivity in their farms following the interest shown in their activities by banks, cooperative societies and individual or group financial sources. The trend was very similar to the other variable of insurance in which productivity was dipping just before the year 2010 but fully stabilized thereafter with unexplainable difficulties not related to their financial sources being cited

as the main cause of slow growth in productivity. As indicated in Figure 3, the growth of wheat productivity continued to go up but by less than 11 percent over the period 2010-2015 as opposed to 2006-2010 which had experienced a growth rate of 7 percent. Binswager-Mkhize (2012) pointed out that finances could not be the sole reason for improved productivity. Other scholars to relate productivity and finances include Bazzi and Clemens (2013) who clearly concluded that whereas it was important to have adequate finances; other factors need to be considered when exploring their effect on crop productivity. All the studies support or oppose the current one and hence it implies that finances cannot be neglected in studying productivity on farms.

Figure 3: Effect of Finance



4.5 Analysis of Combined Insurance and Finance Effect

This section aimed at establishing the link between two independent variables of finance and insurance, and the dependent variable which was wheat productivity. This required the conversion of linear formula $Y = a + bx + c$ using logarithms in the form $Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \epsilon$ where X_1 was the log of insurance premiums and X_2 was the log of total

loans. Y remained the log of farm productivity. We therefore have the following equation:

$$\text{Log (productivity)} = \beta_0 + \beta_1\text{Finance} + \beta_2\text{Insurance} + \beta_3\text{Farmer}$$

4.5.1 T-test for Variables

Regression results for the study variables are presented in Table 3.

Table 3: Model Summary

SUMMARY OUTPUT	
<i>Regression Statistics</i>	
Multiple R	0.998380294
R Square	0.996763212
Adjusted R Square	0.995144818
Standard Error	0.07934
Observations	10

From the results in Table 3 above, the independent variables of the study can be strongly related to the dependent variable. They can therefore explain up to 99.67 percent of the productivity in wheat farming. This relationship with a standard error of 0.07934 is indicative of the strong relationship between the two sets of variables.

Further tests were revealed in Table 4 using analysis of variance (ANOVA) results.

Table 4: ANOVA

ANOVA	<i>Df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	7.06E+12	2.35371E+12	615.896550	7.40906E-08
Residual	6	2.29E+10	3821598571		
Total	9	7.08E+12			

From the above results in Table 4, the regression between independent and dependent variables is significant with F value of 0.007 ($p < 0.05$). This indicates that the variables are strongly related to a high degree and that independent variables can heavily affect the dependent variable. The F-statistic is positive indicating that the results is replicable in any other test, thus proving further relationship between the dependent and independent variable.

4.5.2 Analysis Using Beta Coefficients

The final analysis was carried out using the results of beta coefficients as shown in Table 5 and estimate using both Excel and SPSS.

Table 5: Beta Coefficients

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95.0%</i>	<i>Upper 95.0%</i>
Intercept	330713.7498	110703.7	2.98737	0.02440	59831.44	601596.1	59831.440	601596.058
farm	0	0	0	0	0	0	0	0
Ins	17.2337	3.881937	4.43945	0.0407	7.73	26.73	7.73	26.732
Loans	-0.316685	0.327451	-0.96712	0.0308	-1.12	0.484	-1.12	0.4845

From the above results in Table 5, the farm size variable was constant and hence played no influence or significance in the productivity of the wheat farmer. The t-statistic for the regression was 2.99 on the intercept while it was also large enough at 4.43 for insurance but a negative value at -0.97 for finance influence through loans. In both cases, the p value for insurance and finance were significant. However, finance (loans) at significance level of 0.03 ($p < 0.05$) was stronger than that of insurance at 0.04 ($p < 0.05$). the significance levels were found acceptable at 95 percent level of significance.

CHAPTER FIVE: SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter discusses the summary of findings in order to derive conclusions. It also gives the recommendations from the conclusions that lead to suggestions on further studies as well as limitations of the study as encountered in the field.

5.2 Summary of Findings

The objective of the study was to establish the effect of insurance and finance on the productivity of wheat farmers in Narok County. The first finding was that farmers experienced a far much more stable productivity from the year 2010 which coincided with the government's enforcement of the rule to have farmers insuring their crop. Another finding was that insurance intake was on the increase but only specific insurance firms were the leading in terms of clientele in the Narok County.

The study also found that there was credible evidence to show that more finances would increase the productivity of farmers in Narok County. This also implied that farmers were fully aware of the sources of finances but had been kept away from the sources of finance through other factors. The study found that the combined effect of adequate finances and availability of insurance had increased the farmers confidence leading to steady productivity.

5.3 Conclusions

From the study findings, it was concluded that farmers in Narok County have varied access to their financial sources. It was also concluded that even though insurance firms have tried to get to the farmers repeatedly, there are hindrances to the full commitment of farmers into the insurance schemes. This means that farmers were having reservations on whether or not to have insurance cover even though the risks in farming are well-known to the farmers.

The study also concluded that the main insurance firms were targeting large-scale farms as opposed to small and medium scale. This is evidenced from secondary sources in which there was an indication as to the lower acceptable limit of insurance by the firms. It can therefore be concluded that both finance houses and insurance firms had strict measures of taking up their products. This means the farmers were limited in the scope of searching for finance and insurance sources leading to the slow growth in productivity.

5.4 Recommendations

Observations from the study findings and conclusions, the study made various recommendations. First there was need for farmers to come together and form groups that can be recognized especially when sourcing for funds. Similarly it was recommended that farmers should seek similar cooperation when seeking for insurance.

The government on its part should have some of the controllable variables like market prices and taxes well planned to avoid exposing the local farmer to unfair competition. Policy planners should put in place measures that ensure the taxation and rates levels are

favourable to the farming person so as avoid high cost of acquiring finance and insurance since both have proved to be very crucial in crop productivity.

There is also need to have the scholarly world educating on how insurance should be modeled in order to attract the farmer or any other producer in the economy. In other words, scholars should find a way of infusing the need for insurance among the upcoming farmers and young entrepreneurs.

Finally, it was recommended that banks and lending institutions should aid the farmers in marketing their crop while giving favourable rates to those who borrow funds since the business of farming is very risky especially with the poor water supply in the region.

5.5 Limitations and Areas for Further Studies

The study had many encounters of resistance from farmers but this was sorted out through the use of community leaders who helped explain to the farmers the academic nature of the study. The distances within Narok were a big challenge but with proper transportation means, this was well-overcome.

It is therefore suggested that further studies should involve a census of the farmers in Narok county covering other factors that could have an effect on their productivity. Similarly a study concerning the size of farms and alternative farming could help further explain why productivity has been steady but not rising.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE: FARMERS IN NAROK

Dear Farmer,

The purpose of this questionnaire is to study the productivity of wheat and how it is affected by insurance and financing in Narok County. It is intended to serve as academic requirement by the University of Nairobi during the author's MBA studies. All information is voluntarily provided and with assurance of total confidentiality. The resultant report can be shared on request once the study is completed.

Thank you in advance for your time and cooperation.

Douglas P.N. Nkere

1. SECTION A: PERSONAL DETAILS

- a) Name (Optional):-----
- b) Gender: Male Female
- c) Age: 18-25 26- 34 35- 45 Above 46
- d) Name of Farm -----
- e) Position on the Farm-----
- f) Size of Farm (Approximate acreage):

.....

2. SECTION B: GENERAL FINANCE AND INSURANCE

a) What was the cost of starting your wheat farming business? (In KSH)

- i. Less than 50,000-----
- ii. 50,000 to 100,000-----
- iii. 100,000 to 250,000-----
- iv. 250,000 to 500,000-----
- v. Above 500,000-----

b) What is the source of funding for your farming in the wheat business?

Source of Finance	Percentage
Personal, family source	
Bank loan	
Cooperative or SACCO	

c) What is the source of insurance for your farming in the wheat business?

Source of Insurance	Percentage
1.	
2.	
3.	

d) In terms of cost, give an estimate of how much each of the following components take in wheat farming?

Component	Cost (%)
Farm preparation and planting	
Plant care to maturity	
Harvest and extraction	
Post harvest processing and quality control	
Transport to selling	
Other (specify):	

e) In terms of importance, what farming factors require insurance as a pre-requisite for any financing: (1 represents least required, 5 represents most required)

Farm Item	Not needed	Little	Neutral	Required	Very Necessary
Labor	1	2	3	4	5

Seed	1	2	3	4	5
Fertilizer	1	2	3	4	5
Chemicals	1	2	3	4	5
Water	1	2	3	4	5
Land rent	1	2	3	4	5
Transport and Marketing	1	2	3	4	5
Taxation	1	2	3	4	5
Other expenses	1	2	3	4	5

f)

Where do you sell your wheat produce?

Destination	Percentage
Domestic open market	
Subcontracted (middle men)	
Specific wheat flour company	
Export market	

g) What is the average production in the last 10 years on your farm? (Please indicate if you had insurance during that year)

Year	Without Insurance	With Insurance	Total tonnage (or bags)
2006			
2007			
2008			
2009			
2010			
2011			
2012			
2013			
2014			
2015			

g) Generally, how do you think insurance and financing has affected wheat productivity in Narok County?

.....

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Thank you very much.

APPENDIX II: SAMPLED LARGE SCALE FARMERS' DATA

Year	Farm	Ins	Loans	Prod
2006	89100	635	356,500	334162
2007	89100	355	232,500	238059
2008	89100	715	305,800	186648
2009	89100	955	344,100	221460
2010	89100	3,054	459,750	234263
2011	89100	117,150	1,784,500	1795520
2012	89100	125,200	1,772,800	1960400
2013	89100	124,950	1,826,700	1829500
2014	89100	129,880	1,776,100	2049800
2015	89100	130,200	1,893,800	1962700