

**INFLUENCE OF AGRICULTURAL PRACTICES ON SUSTAINABILITY
OF AGRICULTURAL PROJECTS IN NAROK-NORTH SUB COUNTY
OF NAROK COUNTY, KENYA**

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**A Research Project Report Submitted in Partial Fulfilment of the
Requirements for the Award of the Degree of Master of Arts in Project
Planning and Management of the University of Nairobi**

2019

DECLARATION

This project report is my original work and has not been presented for an award in any other University.

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DEDICATION

I dedicate this research work to my parents Mr. and Mrs. Kefa Omenda and to my brother Kevin Mairura and sister Dorca Mairura who have supported me in my academic walk.

ACKNOWLEDGEMENT

I acknowledge the huge support and contribution of my supervisor; Dr. Peter Nzuki for his untiring effort in assisting me finish this project. I am intensely thankful to him for his profound understanding of research topic. His support will endlessly be acknowledged.

My deep gratitude is extended to all my lecturers at the Open, Distance and e-Learning Campus of the University of Nairobi. Special gratitude to Prof Charles Rambo, Prof Harriet Kidombo, Prof Christopher Gakuu, Prof Dorothy Kyalo, Prof. Ganesh Porkhariyal, Dr. John Mbugua, Prof Raphael Nyonje, Dr. Lillian Otieno, Dr. Angeline Mulwa among others. I acknowledge the great support I got from their training and direction. I will not forget my colleagues Edwin Bore and Edith Ndaru for the support they gave me. God bless them.

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ABBREVIATIONS AND ACRONYMS

ASDS	Agricultural Sector Development Strategy
DFID	Department of International Development
FAO	Food and Agriculture Organization
GDP	Gross Domestic Product
GOK	Government of Kenya
GON	Government of Nepal
IFAD	International Fund for Agricultural Development
IFOAM	International Federation of Agricultural Movement
KAIP	Kenya Agricultural Insurance Program
NALEP	National Agriculture and Livestock Extension Program
NCIDP	Narok County Integrated Development Plan
NGO	Non-Governmental Organization
NMK	Njaa Marufuku Kenya
SARE	Sustainable Agriculture Research and Education
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
USAID	United States Agency for International Development

ABSTRACT

Agricultural projects “play a significant role in terms of employment, household income generation and food security. Agriculture is a major sector in rural area and donors have disbursed huge amounts of funds, farmers have funded themselves to curb food insecurity and to raise income. Sadly, most of these projects have failed to be sustainable. Agricultural practices have been linked to sustainability of agricultural projects in Narok North Sub County, Narok County. The study sought to examine the influence of agricultural practices on sustainability of agricultural projects in Narok North Sub County, Narok County by looking at how and the extent to which the variables influences sustainability of agricultural projects. Specifically it sought to examine the influence of crop insurance on sustainability of agricultural projects, examine the influence of Crop Diversification on sustainability of agricultural projects, determine the influence of Farm Input use on sustainability of agricultural projects, establish the influence of farmer training on sustainability of agricultural projects and asses the combined influence of agricultural practices on sustainability of agricultural projects in Narok North Sub County, Narok County. The study was guided by the Theory of Change and Risk Management Decision Theory. Descriptive research design was used targeting large scale farmers in Narok North sub county, Narok County. To collect both qualitative and quantitative data a sample population of 210 from a target population of 450 farmers was adopted. Questionnaires were used as data collecting instruments which were distributed and collected later after being filled. Data from questionnaires were summarized, coded, tabulated and analyzed. Editing was done to improve the quality of data for coding. Coded data was then entered into the statistical package for social sciences (SPSS) version 21. Descriptive statistics (Mean, Standard deviation, frequencies and percentages) were computed to measure relationships and give meaning. The study found out that, crop insurance cover, crop diversification, farmer training and farm input greatly influenced sustainability of agricultural projects in Narok North Sub-County, Narok County”. Through crop insurance farmers have a stable income and can restart again in seasons where there is complete failure of their crops. Farmers have adopted new technology through the use of farm inputs. Similarly, farmers have been made aware of these new technologies through farmer training. Key recommendations arising from the conclusion are that the government should offer subsidized crop insurance cover, supply adequate farm inputs on time, and increase the number of agricultural extension officers to offer farmer training.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Schwarz (2012) defines sustainability as the practice of keeping in existence or maintain. The beneficiaries are able by themselves without aid from external partner to keep on producing results to profit themselves forasmuch as the problem is present. According to Lungo, Mavole & Martin (2017) if sustainability is left out all the energies involved in a project become all wasted. Sustainability is seen as a long-term support or performance, maintenance of benefits flow “with or without the programmes or organizations that stirred those benefits, the benefits realized are continued even after donors have withdrawn” (IFAD, 2012). Sustainability in general is the cornerstone in any development effort. In the agricultural context, Sustainability of agricultural projects is an issue of concern in many Nations of the World. In most developing countries, sustainability of agricultural projects is considered as a “threat to food security”.

According to Zhou (2010), the concept of sustainability is a challenging one in agriculture. Agricultural projects and practices need to be economically viable, must take care of the environment and able to meet the people’s need for food in the long run. Therefore, sustainability of agricultural projects includes activities that seek or tend to sustain farmers, resources and also populations by way of encouraging agricultural practices and techniques which are profitable, friendly to the environment and good for people (SARE, 2012). In the event that a project cannot maintain its value and usefulness to society indefinitely then they are not sustainable (Cherfas and Hodgkin, 2011).

Agricultural practices have been linked to sustainability of agricultural projects and that agricultural practices are a collection of activities to apply on farm production to ensure high output, profitability, food security and least negative impacts to the soil (Zhou, 2010). According to the international Federation of Agricultural Movement (2013) agricultural practices may include agricultural risk management policies, technology transfer and adoption and activities that will sustain health of soil, ecosystem and people. Therefore success in terms of sustainability of agricultural projects may depend on reliable definition of sustainability by agreeing to the

profit motive as a driver, science and technology and right kind of policies, “access to farm inputs and services, extension services support and remunerative links to the market”.

Worldwide, agriculture faces increased change in science and technology, ever changing consumption patterns, continued growth in population, trade and globalization frictions in subsidies. Taking into account the changes, sustainability of agricultural projects is of increasing importance (Hani & Herren, 2007). For instance in Switzerland the sustainability assessment carried by Swiss Federal Statistical Office (2003) showed that about 1600 farms close every year, implying that 1600 projects cannot be sustained each year because of the high cost of inputs. The results from the study depicted that a higher proportion of trained farmers realized better outcomes than the untrained group and the higher the proportion of farmers with relevant training the better in terms of agricultural project sustainability (Bötsc & Jung, 2006)

In South Africa the government has an obligation of providing agricultural support services such as crop insurance and farmer training so as to intensify and encourage black entrepreneurs by five percent each year. Sustainability of these agricultural projects are affected because farmers have not acquired knowledge as well as essential expertise for management of the day-to-day tasks of the project and lack backing from community in purchasing local produce,(Mokgadi ,2012). Because of the role that agriculture plays many agricultural projects have been supported by the state and other partners also by farmers themselves to ensure food security, income generation and poverty and hunger alleviation.

1.2 Statement of the Problem

Agricultural sector is key to economic development and it acts as a vital role in the rural economies (FAO, 2019). The sector adds 26% of the Gross Domestic Product (GDP) directly to the economy and another 27% of GDP indirectly by links with other areas (ASDS, 2010-2020). For that reason, the sector is seen to be the carter of the economy and a means of source of revenue for bulk of Kenyan people. Donors have poured massive resources in agricultural projects in the form of initiating projects, financial support, technical support to boost productivity and creation of markets as a way to developing communities. Farmers and farmer groups in Narok North Sub County have financed themselves and started farming projects as an

employment to ensure household income and food security. However, most of these farming projects are partially active or the efforts have ultimately ended in a halt or failure leaving the beneficiaries poor, food insecure because of unsustainability of farming projects.

According to USAID (2010) project sustainability for development projects is at the levels of 40% in most developing countries. Agricultural projects are an example of development projects and so face the sustainability challenge. An impact assessment report by a non-governmental organization that operates in Narok North sub-county offering financial support to farmers shows that in Narok North only 35% of crop projects started by farmers are sustainable (Cereal Growers, 2017). A report from the “Ministry of Agriculture on the National Agriculture and Livestock Extension Program (NALEP)” implemented in every county shows that the rate of success of agricultural projects compared to their original plan is between 30 and 50% (Nalep, 2013)

Narok County Integrated Development Plan (2013-2017) shows that unsustainability of agricultural projects can be credited to high costs of production by farmers, poor farming practices that harm the soil, changing market condition, shocks such as unpredictable and unreliable weather, pest and diseases prevalence and effects of climate change and variability. The factors make it difficult for farmers to achieve household food security. The risks faced affects the economic life of individual farmer and county as a whole and by this household income is affected considering that agriculture contribute 66% of the household income and approximately 50% of informal employment in Narok North making sustainability of agricultural projects a matter of concern.

Agricultural practices have been linked to sustainability (Zhou, 2010). Agricultural practices such as the risk management practices (crop insurance, crop diversification), farmer training, access to farm inputs and activities that will sustain health of soil, ecosystem and people may help deal with unsustainability of agricultural projects (IFOAM, 2013).

For that reason, this research tried to find the influence of these agricultural practices such as crop insurance, crop diversification, provision and access to farm inputs and farmer training on the sustainability of agricultural projects in Narok North Sub-county.

1.3 Purpose of the Study

The purpose of the study was to determine the influence of agricultural practices on the sustainability of agricultural projects in Narok-north Sub County of Narok County of Kenya.

1.4 Objectives of the Study

- i. To examine the influence of crop insurance on the sustainability of agricultural projects in Narok-north Sub County of Narok County.
- ii. To examine the influence of crop diversification on the sustainability of agricultural projects in Narok-north Sub county of Narok County.
- iii. To determine the influence of farm inputs use on sustainability of agricultural projects in Narok-north Sub County of Narok County.
- iv. To establish the influence of farmer training on sustainability of agricultural projects in Narok-north Sub County of Narok County.
- v. To assess the combined influence of agricultural practices on sustainability of agricultural projects in Narok-north Sub County of Narok County.

1.5 Research Questions

- i) What is the influence of crop insurance on the sustainability of agricultural projects in Narok-north Sub County of Narok County?
- ii) How does crop diversification influence sustainability of agricultural projects in Narok-north Sub County of Narok County?
- iii) To what extent does the use of farm inputs influence sustainability of agricultural projects in Narok-north Sub County of Narok County?
- iv) How does farmer training influence sustainability of agricultural projects in Narok-north Sub County of Narok County?
- v) To what extent do the combined agricultural practices influence sustainability of agricultural projects in Narok North Sub County of Narok County?

1.6 Significance of the Study

The study will assist policy makers to formulate policy on agricultural development and agricultural project sustainability. The counties will be helped through the study to appreciate the contribution of some of the measures towards achieving sustainable agricultural projects and support what is working.

The study will provide empirical evidence on significant role played by parameters under study on achieving agricultural project sustainability. This will add significantly to one of the Kenya government's Big Four agenda on food security. The study's results may be a center of reference for coming research more so on related topics. It will be helpful therefore to academicians and researchers.

1.7 Delimitations of the Study

The study was limited to the Sub County because of the many farming activities that take place in the sub-county. Other sub-counties of Narok are majorly forest and others like the Mara region is wild reserve region with no agricultural projects. According to the Narok County Integrated Development Plan (NCIDP), "arable land where most agricultural" activities take place is mainly in Mau region and Narok-north constituency. The researcher sought to determine the sustainability of agricultural projects in Narok-north Sub County as a result of some agricultural practices. The study was restricted to collecting data from crop production farmers undertaking ongoing or complete projects and was restricted to obtaining data from the variables under study that include crop insurance, crop diversification, access to farm inputs and farmer trainings.

1.8 Limitations of the Study

Locating the homes and owners of farms posed a challenge since some of the farms have been leased by people who are not locals. To overcome these challenges field and extension officers from different support organizations in the area such as Osho chemicals and Cereal Growers Association were utilized. The officers have the databases for the farmers and their farms in the area. The chiefs and the sub-chiefs were also utilized. Most of the agricultural projects in Narok north Sub County take place in remote environments where sometimes the road network is not good the use of motorbike helped access the farms that vehicles could not reach.

This study faced lack of cooperation from some respondents, For example, those who receive government subsidies in the sub-County as some growers did not see benefits they would derive from the study. Keeping in mind the doubtful nature of farmers, some did suspect that the study was meant to extract bad practices. To avoid this, the researcher expounded the significance of this study to all respondents.

The collection of data was done during the short rain season. Getting farmers to fill the questionnaires during this time presented a big challenge since most of the farmers were busy in farm preparations. Early booking of appointments by the researcher to meet farmers during their free time helped overcome the challenge.

1.9 Basic Assumptions of the Study

It was presumed that the researcher would get the full support from the respondent (farmer) by answering all questions correctly and honestly and would remember all the required information for the study. It was assumed also that all the information sought by the researcher would be available.

Sustainability is influenced by a sum of factors and so the study presumed that the variables under study, that is, crop insurance, crop diversification, access and use of farm inputs and farmer training influences sustainability of agriculture projects in Narok North sub-county. The researcher also assumed that the target farmers would appreciate the greatness of this research and make available correct data.

1.10 Definition of Significant Terms Used in the Study

Agricultural practices: This is a collection of activities used in agricultural production aimed at high output and increased profitability.

Agricultural projects: These are farming activities started by farmers and farmer groups to improve food security and improve their incomes.

Content of Training: Is the subject matter that is included in the training activity which the trainees will be able to use to meet the training objective.

Crop insurance: Is a risk management practice used to protect a farmer against a

risk by giving financial compensation where a farmer experiences loss in the yield or revenue

Crop diversification: Is the growing of more than one crop in a piece of land, or increasing a number of locations under crop farming.

Farmer Trainings: Refers to the process of passing agricultural knowledge and skills to farmers to help them operate effectively and efficiently.

Farm Inputs Use Refer to the use of seeds, fertilizers, and agrochemicals in farming activities.

Subsidized Farm Inputs: These are low-cost farm inputs given to farmers by the government or non-governmental organizations as a motivation to increase productivity

Sustainability of Agricultural Projects: is the practice of keeping farming projects in existence by way of encouraging agricultural practices and techniques which are profitable, friendly to the environment and good for people

1.11 Organization of the Study

This study is structured in 5 chapters where the first one discusses the background of the research, problem statement, the purpose of the research, the objectives, research questions, limitations and delimitations of the research and definitions of significant terms. Chapter two entails the variables under study and the theory on which the study is built on and the research gaps while chapter 3 covers the study methodology that comprises of the design, the target population of the study, sampling technique, research instruments, data analysis techniques and operationalization of variables. Chapter four entails data analysis, presentation and interpretation of the findings. Data in chapter four was analyzed using Statistical package for social scientist (SPSS) version 21 and presented in tables with frequencies, means, standard deviation and percentages. Data was interpreted according to the findings of the research. Chapter five has summary of the results, discussion of the findings, recommendation and the conclusion.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter contains the literature on sustainability and agricultural practices. Specifically, the review deals with the influence of agricultural practices on sustainability of agricultural projects variables under study. The agricultural practices relate to crop diversification, crop insurance, farmer training and access and use of farm inputs. It also presents the theory on which the study is based as well as the conceptual framework.

2.2 The Concept of Sustainability of Agricultural Projects

Agricultural project sustainability is a serious test to all international development agencies (Mugo, 2017). According to IFAD (2012) sustainability is amongst its principles of engagement that are fundamental. Sustainability of agricultural projects is one of its key concerns. Developments in total productivity have not led to reduction in prevalence of hunger for all. Millions are hungry and are experiencing low incomes through agricultural projects. For this reason the long term sustainability of our existing agricultural projects is being questioned for many reasons. The hostile environmental impacts of agriculture, changing climatic condition, increased incidence of pest and diseases demand attention (Feder, 2011).

Sustainability in agricultural projects “focus on the need to develop agricultural technologies and practices that do not have adverse effects on environment, are accessible to and effective for farmers, and lead to improved food productivity and household income”. It includes the concepts of resilience which is the ability of projects or systems to safeguard “shocks and stresses and persistence, the ability of a system to last for over long periods and addresses many economic, social and environmental outcomes” (Pretty, 2007). The ability of a project to keep its actions, services as well as benefits through the projected lifespan is known as sustainability. Therefore projects started by donor agencies, government and even individual farmers are considered sustainable when its operations are maintained without halt and the benefits are continuous (Khan, 2010).

The “main crops grown in Narok County are wheat, barley, maize, beans, sugarcane and horticultural crops. The main horticultural crops include; tomatoes, potatoes, cabbage, French

beans, onions and indigenous vegetables. Maize, wheat, barley, tea, coffee, pyrethrum and sugarcane are grown as cash crops. Maize and wheat are the highest income earning cash crops in the county. On average the county produces about 200,000MT of maize and 135,000 MT of wheat each year. However, production of these crops has been fluctuating as a result of erratic rains and emergence of the devastating diseases” such as Maize Lethal Necrosis Disease. (NCIDP, 2018). In Narok North the main agricultural projects are wheat, Maize, Barley and Horticultural farming.

Project sustainability, particularly in the food crop project sector (Maize and wheat) has unrelentingly received great scholarly thoughtfulness. According to IFAD (2009) projects evaluated in 2007 50% together with the agricultural sector were ranked reasonably satisfactory in sustainability and 33% not satisfactory. An evaluation by UNDP records that there are several different practices that impact the success of agricultural projects. Therefore it is significant to identify and deal with these practices to ensure productivity and success (Mugo, 2017).

Development projects have a tendency to focus on matters around planning and implementation at the cost of agricultural practices which should be designed to guarantee project sustainability. Projects need to steadily find, analyze and act to risks in a way that will guarantee perpetuation of project benefits after end of the project. In Kenya lots of agricultural projects fail to achieve their objective. Wabwoba and Wakhungu, 2013 in their study in Kiambu County on sustainability of community funded projects showed that 14% of the funded projects(5 out of 36) by Njaa Marufuku Kenya (NMK) were in part active whereas the rest had become non-operational and could no longer be traced an indication of existence of challenges on sustainability of projects.

2.3 Agricultural Practices

2.3.1 Crop Insurance and Sustainability of Agricultural Projects

Agriculture is a main economic sector also a dire source of livelihood for a lot of households in rising countries and is mostly open to hostile natural occurrences which reduce farmers yield, threaten country food security in an event there is complete failure. Farmers have experienced droughts, pest, diseases and hail storms that normally affect their farm. Hostile events like this reduce farmer yields which have a direct impact on the cash flows. When an investment is not profitable then sustainability of the investment is threatened. Regrettably there exist many natural hazards like drought, excess moisture, flood, wind, diseases, insects and even fire which are outside the farmer control. The uncertainties make agriculture very risky.

Crop insurance has been linked to sustainability of projects (Jepchumba 2015). Agricultural insurance is the pooling of risk which is the merging of risks faced by many individual who normally contribute through payments to a shared fund that will be made use of to cover any loss suffered by an individual member of the pool. The helplessness of poor farmers is reduced through agricultural insurance and that opens farmers' access to range of financial services used to improve their farming and live hoods.it also ensures farmers continue to be credit worthy even in seasons of crop loss. Crop insurance is a practice through which crop farmers steady farm income and investment as well as protect themselves against catastrophic effect of losses caused by natural risks and also low market prices. A case of crop production, crop insurance does not only steady the farm income but insurance also helps farmers start again after a very bad agricultural year. It mitigates the blow of crop losses through provision of some minimum amount to farmers and also spreads losses over space or time again it helps farmers create more projects in agriculture. (Ndung'u 2010).

Agriculture insurance being one of a complete agriculture risk mitigation framework can contribute to sustainability of agricultural projects. Yet, it cannot work in seclusion. It is a practice that is endorsed if the basic agricultural services for instance well-timed obtainability of inputs, effective marketing channels for outputs and extension services are in place (Mahul and Stutley, 2010).

Governments in developing nations have remained in support of viable agriculture insurance programs (Mahul and Stutley 2010) This is because agricultural cover has been a strategic options to deal with climate change and other risks in farm production, infrastructure and farm revenues (Ghimire at al 2016).

According to European Union (2006), Agricultural insurance has been known as a means towards supporting the agricultural sector because it can target assistance to the farmers in need, provide credit access for operation and upgrading of the sector and it is a stage where risk contract are spread universally. In Nepal, the agriculture sector is highly exposed to alterations in climate (GoN, 2013) and agriculture insurance has become the key option to the management of climate related risks and other risks at farm level, infrastructure and income. Crop insurance has gained meaning in latest years due to the sudden changes in climate which have resulted to a huge decline in production. The Ministry of Agriculture Development in Nepal has introduced subsidy policies on all premiums paid for crop insurance since 2013 which has boosted production and has reduced the exposure to risks among farmers. In 2013/2014 50% insurance subsidies was paid which has increased to 75% since 2014/2015 to facilitate agricultural insurance service to farmers.

Through the insurance body, Nepal has introduced crop and livestock insurance orders that have made obligatory for insurance companies to offer which has increased the existence of agricultural projects by five percent. Development Bank has also implemented insurance scheme in various parts of the country with an aim of increasing the sustainability index even in the midst of risks in change of climate. (Ghimire at al, 2016).

Agriculture insurance has not made much progress in Kenya even after the need to protect farmers from agriculture inconsistency which leads to unsustainability of agricultural projects has been a current concern of agriculture policy.(Ohanga,2018) in the daily nation says that the food sector depends on consistent harvest from the farm nevertheless the weather is making their work risky with the droughts wounding into the harvests across Malawi, Rwanda ,Tanzania and Zambia and one of the tool for increasing farmer resilience is through crop insurance which helps the farmers to endure poor harvests and adopt to the changing climate hence sustainability.

In Kenya very few insurance companies are willing to enter into the sector which has led to the government coming in to give support through the Kenya Agricultural Insurance program (KAIP) supported by the World Bank. Education is critical given the low awareness of crop insurance in the region which may lead to hesitation to purchase of insurance due to lack of information (Byron, 2018). In Narok North Insurance companies including UAP, Jubilee, CIC and Pacific have fully immersed themselves into the business of covering commercial crops including barley and wheat. 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. 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).

2.3.2 Crop Diversification and Sustainability of Agricultural Projects

Crop diversification is an agricultural practice where a farmer grows more than one crop in a piece of land at any given time by way of rotation or intercropping (Makate et al, 2016). Again it can relate to increasing locations under crop farming, number of enterprises or sources of income. Diversification is among the adaptive measures that have been known as a possible answer to climatic unevenness and variation yet its implementation by most farmers for this purpose has not been well comprehended, (Kelly & Adger, 2000). Diversification as an agricultural practice can aid to shield farmer business risks, either the yield related with the variability of climatic conditions or other risks like price risk which is linked to commodity markets. (Bradshaw, Dolan, & Smit, 2004).

Crop diversification is a cheaper way towards overpowering income uncertainties as a result of market situations as well as climatic variations. In the rural areas agricultural income is share of the household's earnings. The total reliance on nature and existing market conditions has turned agriculture into a risky venture which requires some risk management strategies to maintain the incomes and ensure continued existence of the venture (Pomi et al, 2017). Crop diversification is low cost and a dynamic shielding path to counter climate change and market conditions that will threaten food security and income flows.

Agriculture is affected by existing climatic conditions making the agricultural sector to be named as a area which is open to any expected climate variation. (Parry & Cartel, 2005). The acknowledgement that climatic change might have negative impacts for the agriculture projects has led to the need to form resilience into farming projects and one sensible and economical technique may well be the carrying out of bigger crop diversification. (Brenda, 2011). Resilience may be improved through crop diversification in a range of ways by way of creating a bigger ability to subdue outbreak of pests, reducing of pathogen transmission, protecting yield production from the better climatic unevenness and life-threatening events. This profits show the evident values of embracing crop diversification to increase the resilience yet we see slowness in the adoption process.

Diversification has become important for agriculture due to the increased climatic fluctuations. Yields from crop production are sensitive to the changes that occur in temperature and precipitation. Maximum and minimum temperatures as well as the periodic changes have enormous effect on the growth of crops and its production. Unpredictability in precipitation that incudes floods, droughts and too much rainfall has impacted food security in many countries of the world. (Parry et al, 2005).

Economic incentive, the encouragement of production of some selected few crops, schemes and the conviction that monoculture is more fruitful than diversified agricultural systems and the push for biotechnological strategies e.g. the production of drought tolerant seeds has been the obstacle in promoting the strategy.

According to (Agriculture and Agri-food Canada, 2010) Canada lowlands agriculture has been known as a very important source to global cereal production which is centered on greatly specialized production systems. Agricultural projects in Canada's semi-arid lowlands since initial settlements has been influenced greatly and affected by climatic conditions. The government and the producers are considering a way for the low land farming to adjust to the anticipated climatic conditions. Crop diversification is the focus of the government and promotion among the other strategies, not only for the anticipated climatic alteration on the other

hand the recent crop policy reforms which have considerably improved production and risk environment of lowland production.

Resulting from the national policy in Thailand, the agricultural department has effected crop diversification in a number of areas of the country. In three quarter of the land mono-cropping is evident an indicator of slight realization in the advancement crop diversification. The inadequate impact of the diversification program has majorly been accredited to dissimilarity in land and the labor resources that are accessible to the reach of the farmer and soil suitability. The contact with farmers groups and attendance of training and interaction are among the significant factors. In Thailand crop diversification has not only delivered good returns more so to the small scale farmers but also it has fast-tracked the consumption of fertilizers and pesticides with little harm to the soil. “Broad policy” instrument are advocated for the operation of yet to come agriculture diversification in Thailand (Kasem & Thapa, 2011).

Pakistan economy has 3 broad sectors which are agriculture, industrial and service sector. The agricultural sector is most significant for the reason that agriculture income amounts to 62-64% of every household’s income and majority of its population live in rural areas consequently farming is the highest source of earnings for 42.3% of the population. The crop sector is of key importance since it is the main source of foreign exchange for the country.

With an increase in population, crop producers and the government will be forced to take innovative measures in the agricultural sector more so in crop production to satisfy the needs of food of the growing population. In Pakistan agricultural has become risky due to the change in climate and because of this the farmers have to work towards solving this problem of income inconsistency. The choice made by farmers in a season is likely to affect the farmer income in the following season and the country has implemented crop diversification as measure to the risks, income instability and sustainability of agriculture production. (Ashfaq et al, 2008).

2.3.3 Farm Inputs Use and Sustainability of Agricultural Projects

Agriculture is the main sector in many economies and farm inputs play an important role towards increasing agricultural production. Lack of access to necessary inputs like equipment, seeds and fertilizer is one main barrier toward improved productivity. This has been intensified by lack of well-organized input market and gaps in policy which weaken the effectiveness of market systems for vulnerable households. Agriculture input subsidies are aimed at making inputs like fertilizer and seeds available to the farmers at below market cost to incentivize adoption, increase agricultural production and profitability, increasing food availability hence stimulating economic growth (NEPAD, 2013). The availability and access to sufficient, timely and low cost inputs from different institution e.g. government is of importance to farmers and the rural poor. Limited access to necessary inputs like improved seed varieties, and fertilizers is among the key hurdles to improved agricultural production in most countries (Mutiso, 2015). While farming inputs are defined as a collection of materials used in “making agricultural production possible, input subsidies are below cost inputs given by government or non-governmental organization to farmers to reduce the production cost of farmers and also improve farmer’s profit margin” (Michael, Tashikama & Maurice, 2018). 75% of people who live in rural areas in most developing countries are poor and most of them are food insecure making development of agricultural production the central strategy towards reduction of rural poverty and safeguarding food security (World Bank, 2007).

Sibande et al 2015, several factors impede the strategy of improvement of agricultural production and the factors include low or no use of farm inputs in farm production e.g. fertilizer and improved seeds. With low income in the household, high poverty levels and limited source of income by most farmers, they are not able to purchase better-quality farm inputs towards producing enough food to meet household food and income supplies, so as then to promote use of inputs like fertilizers and hybrid seeds, provision of subsidies by government is one of the best used mechanism. Input subsidies increases purchasing power of farmers which in turn leads to increased yield and that also result to food security and increased income from crop sales. The cash from the trades and income savings from bought food could be put in in farming or other non-agricultural enterprises hence sustainability of agricultural production.

Literature reviewed on the sub-Saharan Africa shows an extensive agreement on small agricultural productivity as paralleled to other constituencies in the domain like Asia and South America. In comparison to this other constituencies of the world, Africa has a low rate of fertilizer use. Between 2002 and 2009 “nitrogen application averaged 5.9kg per hectare compared to 106.0kg per hectare in Asia and 36.6kg per hectare in South America (Chirwa & Dorward, 2013). NEPAD 2013 pinpoints the factors driving low rate of use are credit constraint for the farmers, increasing cost of key inputs and a lack of technical knowledge regarding input use on the part of the farmers”.

In the latest years an increasing interest has been seen in extensive input aids through the sub-Saharan Africa (Abubakari & Abubakari 2014). The argument for these subsidies for agriculture development is to encourage the embracing of new technologies and as a result increase agricultural productivity as seen in Mali and in Tanzania that access to endowed farm inputs intensifies individual farmers’ output.

In Nigeria the government has enacted several policies due to the significance of agriculture to the economy in order to improve the sector. The policies are aimed at facilitating in the adoption of technology because of the understanding that realizing any contemporary agricultural change and any increased productivity in Nigeria is determined by the availability and sufficiency of inputs. (Umar, 2015) shows that agriculture input subsidies occupies a critical role in the course of action of government. Subsidies in fertilizer alone, constituted almost sixth eight percent of the government’s agricultural spending in the years past. This policy though has been considered to be ineffective due to some hitches like diversion of the subsidies to profit the middlemen, the burdensome procurement process, late delivery of the subsidies and poor quality of a number of inputs. (Obayelu, 2017). But the implementation of an amended policy famous as “growth enhancement support scheme”, under the agricultural improvement agenda whose most important objective is to depoliticize the subsidized input sector by removing the state from supply of the subsidized inputs and the privatization of the channel of distribution has been a plus towards increasing the use of inputs hence an increase in produce which also affects the profit margins. This brings about sustainability in production.

China is the most packed country in the world and agriculture is the vibrant economic sector. Agricultural sustainability is being endangered by industrialization, scarcity of natural resources, urbanization and pollution as a result of overuse of fertilizer and chemicals. The Chinese economy is growing quickly and for that reason the employment of agricultural policies is supported by government monetary spending. The growth of policies in agriculture in china was manifest by eradication of tax for agriculture in the year 2006. Leading to a shift from taxes collected in the agriculture sector to provision of farm subsidies in agricultural production (Hongxing, 2013).

The Chinese government has explored the best ways to support and protect agriculture by creating a policy system that have really worked to enhance sustainability of agriculture. The policy system has four direct subsidies that include direct payment for producing grain, all-inclusive subsidies for farm production, subsidies to enhance use of hybrid crop varieties and farm machinery and the subsidies have helped in agriculture sustainability.

As a result of rise and fall in the prices for agricultural inputs since 2006 the Chinese central government announced a comprehensive subsidy for agricultural input such as diesel and fertilizer which has led to a substantial influence on grain farm income. Subsidies on input were aimed at reducing production cost and relieve the effects of price hikes.

2.3.4 Farmer Training and Sustainability of Agricultural Project

Agricultural training gives emphasis to the transmission of Practical information aimed at improving farmers' practices (Philip 2012). It is seen as an information carriage system whose general purpose is to help farmers realize better knowledge and understanding and to alter their behavior and practices in order to increase productivity, income and overall wellbeing for themselves, their families and neighbors. Training has a very key role in making farmers armed with skills as well as competences necessary for crop production and crop protection which is aimed at raising the household income (Yaseen at al, 2015).

According to (UNEP 2002) in the years past it is evident that capacity building is an ultimate thing towards sustainable development. Evidence from Pakistan show that the agricultural sector is facing several challenges that lead to drop in farm produce, the encounters can be solved through capacity building and provision of training opportunities to the agriculturalists with the assertion of them being able to grow their production skills, competences and methods for sustainable agricultural development. (Yaseen at al, 2015).

Low productivity in agriculture and a partial implementation of innovative agricultural technologies by farmers remain the main development test seen through sub-Saharan Africa (Behaghel 2018) regardless of the low levels in production, crop farmers lean towards not adopting the innovative agricultural technologies and the likely reason for the partial new technology embracing is farmers have found it challenging to learn about the technology on their own. For this reason many regimes have invested in agricultural extension in order to pass information on new technologies to farmers.

When it comes to agricultural training for effectiveness or for impact to be felt a group of farmers organized by an extension agent can meet for training in a demonstration garden where new practices are tried out. The learning through groups is expected to be more effective since many will be reached. The adaptation to the agricultural practice and because the learners become situated in the context where it needs to be implemented add to the effectiveness. Experimental learning situated in the relevant environment provides skills in real life problem solving instead of merely spreading abstract knowledge. (Philip, 2012).

As a farmer one requires continuing education to stay mindful of fast moving development in technology. Agricultural training has facilitated farmers incorporate the modern scientific advances and technology tools into their daily farm operations. Operation with these tools has increased efficiency and has also led to less harm to environment and increased profit making agricultural sustainability sure.

Training in agriculture is perceived as the last stage in a linear process of knowledge transfer which is from the researcher to the farmers. Training can use different modes of transmission and that affects how the information is received. Radio programs are used in people's local languages

disseminating new practices or new crops. Some other communities are visited by extension officers of the government or agricultural workers of non-governmental organization who make presentations on new varieties of crops or any new technology.

In Kenya agricultural trainings vary in length, they can be short term trainings like a single day demonstration or extended time professional course that will last for many months (FAO 2002). The “government, private individuals and non-governmental organizations offer extension services to their farmers. The training varies from one to two days workshops or seminars, on farm training and demonstration and field visits” (Mutiso 2015).

2.4 Theoretical Framework

This study is guided by the theories of change, and risk management and Decision. These theories are explained in the following sub-sections.

2.4.1 Theory of Change

The theory of change explains the constructing blocks that are needed in order to get an extended goal and the practice of social change by way of showing clearly the insight of the existing condition; the primary causes, the change that is preferred in the long term and the issues that need modification for the preferred need to happen. (Adekunle & Fatunbi, 2014). A look at African agriculture shows a succession of progressive changes which are an outcome of the efforts to place the industry to respond efficiently to changes in population, trade needs and live hood support to people engaged in it. The changes seen though positive they may be very far from the goal expected to bring the desired impact on the public. Agriculture production in Africa is the lowest and unsustainable compared to other countries of the world because of lack of high yielding, disease resistant varieties of crops, the lack of access to the essential inputs, fertilizers, pesticides and above all the poor information on the suitable agronomic practices. Efforts are being made to bring a solution to the problems by the governments and non-governmental organizations.

The theory of change makes known the thought that dictates the intervention and action as well as the way of change within a system. It shows how each result (sustainability) is as a result intervention (practice). In agricultural projects the way to change identifies the main problem of

agriculture as decline in productivity and unsustainability of agriculture production. An effort to offer solutions identified, research, extension which includes farmer training and farmer field days and access to input subsidies are the most important areas towards sustainability of agricultural projects.

Sustainability and agricultural growth in Narok North depend on increased production of food and fiber i.e. technology is transferred to farmers through extension agents then adoption and lastly an impact is seen which in this case is increased production which also leads to sustainability.

2.4.2 Risk Management and Decision Theory

The agriculture sector is affected by variations in climate and that change in climate has a direct impact on yield and later sustainability of the project. The sector is sensitive to the uncertainty and risks which are characteristic features of production. Uncertainty and risks are very elementary terms to decision making context in agriculture. A risk is where there is inadequate information where the chances of a potential consequence are well-known, while uncertainty is when these likelihoods are not known, an individual does not know certainly what will happen (Bairwa et al 2013).

On a daily basis farmers make decisions, the decisions are made in a risky environment and mostly the cost of the decisions is not known while making the decision. The outcome may be good or worse than anticipated. Variability in climate, price and yield are the biggest source of risk in agriculture because this threatens sustainability. Agriculture is a monetarily uncertain activity. Each day farmers are met with an ever-changing land-scape of possible price, yield and endings that will affect their financial returns and sustainability. When the total demand changes e.g. farm prices can change and farmers may get return that vary greatly from their expectations. Risks like the production risks (which may occur since agricultural production is affected by numerous undefined happenings that are linked to weather) and market risks which are related to change in price of input and output call for assured decisions to mitigate or avoid the risks (Shoji et al 2013).

Crop diversification, vertical integration, production contracts, marketing contracts are some of the decisions made in relation to production and marketing risks to promote sustainability of agricultural projects. The decision theory which deals with uncertainty situations is used to select the best course of action with information available to the farmer.

2.5 Conceptual Framework

The following is a conceptual framework describing dependent, independent and moderating variables

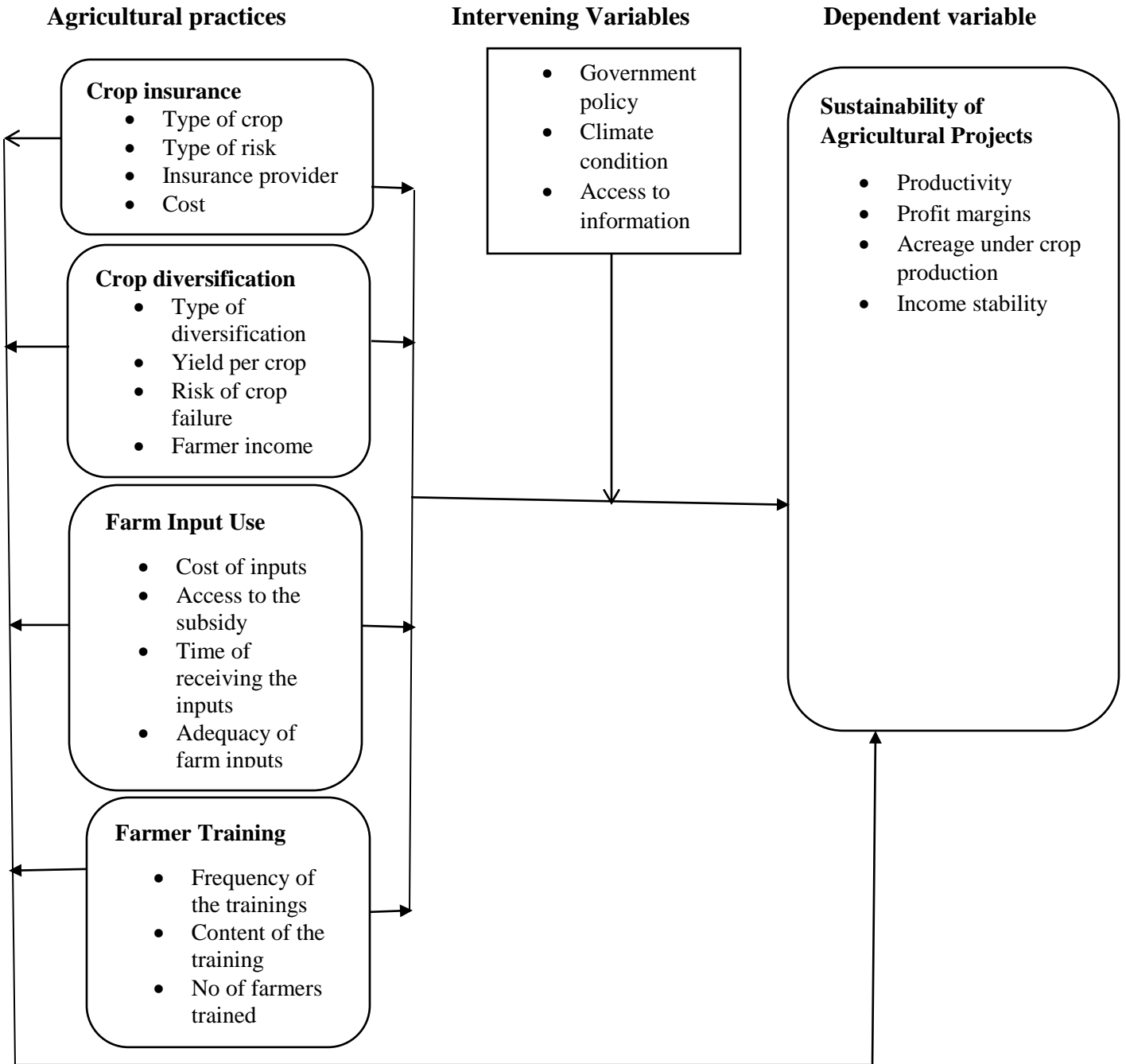


Figure 1: Conceptual framework

2.6 Knowledge Gap

The following section shows the research gap identified after reviewing literature. The summary of the gap is shown in table 2.1

Table 2.1: Summary of the Knowledge gap

Variables	Author(s)	Title of the study	Findings	Knowledge Gaps
Crop insurance	Lucy Jepchumba (2015)	“Influence of Agricultural insurance as a risk management tool on large scale maize farmers performance”	Farmers with insurance as a risk mitigation tool perform better than those with other forms of mitigation	This study focuses on how and to what extent does crop insurance influence sustainability of crop farming projects.
Crop diversification	N, Mango (2018)	"The role of Crop diversification in improving household food security”	Crop diversification has a positive and significant effect on the household Food Consumption Score	The study shall seek to find out how and the influence of crop diversification on sustainability of Agricultural projects
Farm input use	Akal (2017)	“Influence of Farm inputs subsidy on performance of small scale rice farming projects”	Provision of subsidies could influence performance	This study shall seek to find out how input use and access influences sustainability of agricultural projects
Farmer Training	Mutiso (2018)	Determinants influencing sustainability of agricultural projects	Farmers are trained only during field days and agricultural shows, agricultural extension officers had the least in the trainings conducted because farmers claimed that they were not available to offer assistance	This study focuses on extent to which farmer training, content and consistency of training influences sustainability of agricultural projects.

2.7 Summary of the Literature Reviewed

In this chapter, literature related to the study is discussed. Literature reviewed focused on what researchers, scholars and other academicians found about the parameter on influence of agricultural practices on sustainability of agricultural projects. The literature was examined according to the variables under study that include crop insurance, crop diversification, farm input use, and farmer training were examined against the dependent variable which is sustainability of agricultural projects. The chapter has also reviewed the theory of change and risk management and decision theory and the development of the research instruments was based on the theoretical contribution of the theories.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This study relied on primary data to examine sustainability issues in Narok-north Sub County. This section provides a plan for data collection, measurement and analysis. Also, the design of this research, the population and target population, sampling procedure and sample size are defined in the section below

3.2 Research Design

This study employed descriptive survey design. According to Waliman (2017), descriptive research surveys help become more conversant with the phenomena or get a new understanding, it also situations and provides meaningful information that facilitates future predictions when present conditions are held constant. Furthermore, descriptive study method helps to unfold the desired features of a sample population and provides generalized conclusions from a representative sample to a larger population (Omair, 2015). Therefore, in this study, the method provided the researcher with complete explanation of each single phenomenon, thus making it superlative in achieving the objectives of this research.

3.3 Target Population

A population refers to a whole set of individuals, a complete set of cases or objects that have shared evident features (Mugenda & Mugenda, 2003). The researcher selected large scale crop production farmers in Narok north Sub County which is more business oriented compared to small scale crop production. According to “Narok County Integrated Development Plan (2018-2022), the average farm size under small scale is 6.1 hectares and that of large scale” farmers are described as farmers who are cultivating any cash crop in a piece of land more than 26.3 hectares. According to the National Cereals and Produce Board (2017), there are about 450 registered large scale crop producers in Narok North Sub-County these constituted the target population of the study.

3.4 Sample Size and Sampling Procedure

3.4.1 Sample Size

A sample was carefully chosen to represent the whole population. Sample size for the research was determined using the Morgan and Krejcie (1970) formula for sample determination. The formula is $S = \frac{X^2 NP (1-P)}{d^2 (N-1) + X^2 P (1-P)}$ and gives a sample of 210 as computed herein

$$(N= 450; P=0.5; d= 0.05; X=3.841)$$

$$S = \frac{(3.841)^2 \times 450 \times 0.5(1-0.5)}{[(0.05)^2(450-1) + (3.841)^2(0.5) (1-0.5)]}$$

$$S = \frac{14.753281 \times 450 \times 0.25}{(0.0025 \times 449 + 14.753281 \times 0.25)}$$

$$S=210$$

The population of 450 large scale farmers gives the corresponding sample size of 210 farmers.

3.4.2 Sampling Procedure

Sampling refers to the process of selecting parts of the population for evaluation (Rahi, 2017). This technique aided the researcher in selecting a representative sample i.e. a sample containing all features expressed in the entire study population. Further, the researcher used stratified random sampling to pick a total of 210 respondents drawn from large scale crop farmers in the sub county that ensured representativeness. Notably, Narok North Sub County contains six wards which were treated as strata. Moreover, simple random sampling was applied within each stratum to select respondents. The method of stratification guaranteed that the various sets of the whole population are represented in the sample. (Ogula, 2009)

Table 3.1: Target Population per Strata and Sample size

Ward	Target Population	Sample Size (80/450)×210=37
Olposimoru	80	37
Olokurto	95	44
Narok Town	50	23
Nkareta	80	37
Olorrupil	75	35
Melili	70	32
Total	450	210

Source: National cereals Board (2017)

3.5 Data Collection Instruments

Data was collected using structured questionnaires to account for the fairly large and geographically spread population. The questionnaire was formulated in regard to the objectives of the study. Specifically, it restricted to both close and open-ended queries. The open queries enabled respondents to provide adequate details on the variables. On the other hand, closed ended questions and Likert scale enabled the researcher to measure the results. The questions were complemented by a list of probable options from which respondents would choose the answer that best defines their condition. Likert scale was used to determine the degree to which the respondent agreed or disagreed in a statement. Finally, secondary data like the farmers register was acquired through observation from the County Government of Narok and National Cereals and Produce Board website.

3.5.1 Piloting of the Instruments

Piloting of instruments represents a miniature type of the complete ‘mock’ field study performed in preparation for the main research. A pilot study covers at least 10% of the sample size (Calitz, 2009). For this study, Twenty five individuals from Loita Ward in Narok South were randomly selected and the instruments for research were pre-tested to determine their efficiency and usefulness. The pilot study was done to expose the faults and anticipated challenges before the

commencement of data collection. Also, it offered the researcher the opportunity to familiarize himself with the instruments and estimate the time needed for data collection. Furthermore, pilot testing provided insights on the validity and relevancy of the instruments used in the study.

3.5.2 Validity of Instruments

Validity depicts if the study measures a phenomenon correctly and if the instrument measures what it is designed to measure. Is the point to which a study instrument measures the phenomenon it is supposed to measure (Kimberlin & Winterstein, 2008).

In this study, the researcher conducted content related validity since no statistical experiment was performed to investigate the extent to which a measure satisfactorily represented a content area or sufficiently portrays a theory. Despite its usefulness, content validity is subject to the scrutiny of experts in the field. For this reason a “pilot study was done through administering questionnaire randomly to 20 carefully selected respondents with similar features as the case under study. Necessary adjustments to the questionnaire based on the pilot study” results were made to enhance the validity.

3.5.3 Reliability of Instruments

An instrument is considered reliable if it can be used by different researchers and still produce similar results under unvarying conditions. The internal consistency of the items and reliability coefficients was calculated from the pilot study data. The split half was done to obtain the correlation coefficient(r) using Cronbach’s Alpha Coefficient with the aid of SPSS programme. The recommended reliability coefficient is between 0.7-1 (Nachmias 1996) therefore the higher the coefficient the more the reliability. The results obtained are as shown in Table 3.1

Table 3.2: Summary of Cronbach’s Alpha Reliability Coefficients

<i>Questionnaire section</i>	<i>Cronbach Alpha</i>
Section II	0.84
Section III	0.82
Section IV	0.79
Section V	0.71
Section VI	0.75
Section VII	0.80
Average Reliability	0.785

3.6 Data Collection Procedure

The researcher obtained primary data through structured questionnaires that contained both closed and open-ended queries. With authorization from the university, the researcher was issued with a research permit from the “National Council for Science and Technology”. The researcher distributed the questionnaires and picked them on a later date this ensured that the respondent filled them at their own convenience. Afterwards, the researcher made follow up through visits and telephone calls which prompted the respondents to complete the questionnaires. Also, the researcher worked with field officers in Narok North Sub County as they were moving from farm to farm to visit their clients. This will speeded up the data acquisition for this research.

3.7 Data Analysis Techniques

This study used both qualitative and quantitative data. Data collected first went through the process of data management which included cleaning, sorting, and identification of incomplete questionnaires which were eliminated from the study. The collected data was analyzed for descriptive statistics such as means, frequencies standard deviations by using “Statistical Package for Social Sciences” (SPSS) which were presented in tables for interpretation.

3.8 Ethical Consideration

After obtaining the research permit the researcher sought for approval from the Narok County Government and Narok North Sub County. The researcher explained details to all respondents on the purpose of the study; promised concealment of their responses and identity and called for a verbal consent for participation. Above all the researcher adhered to the proper conduct in relations to the rights of respondents like choosing not to be part of the respondents or withdrawing from the study. This was ensured by always reminding the respondent on his or rights to continue in the study or withdraw.

3.9 Operationalization of Variables

Research objective	Type of variable	Indicators	Level of scale	Level of analysis
Sustainability of Agricultural projects	Dependent variable	Increased production Increased farm output Increased profit margin Increased land under production	Ordinal Ratio Ratio	Means, Frequencies, Standard deviations.
To examine influence of crop insurance on sustainability of agricultural support projects	Independent variable	Knowledge about insurance Type of risk Insurance provider Income stability Resilience against shocks and stress Access to credit	Nominal Nominal Nominal Nominal Nominal	Means, Frequencies, Standard deviations.
To examine the influence of crop diversification on sustainability of agricultural support projects	Independent variable	Number of crops grown Risk faced Maintained income	ordinal Nominal Ordinal	Means, Frequencies, Standard deviations,
To determine the influence of farm inputs use on sustainability of agricultural support projects	Independent variable	Seed and fertilizer access Farm inputs that are subsidized Cost of farm subsidies Access to farm subsidies	Nominal Ratio Ordinal	Means, Frequencies, Standard deviations.
To establish the influence of farmer training on sustainability of agricultural support projects	Independent variables	Training on best agricultural practices Risk management training Environmental friendly training Regularity of the training Content of the training No of farmers trained	Ordinal Nominal Ordinal	Means, Frequencies, Standard deviations.
To assess the combined influence of agricultural practices on sustainability of Agricultural projects	Independent Variables	Projects started and active Better Farming Practices Improved production Production sustained	Ratios	Means, Frequencies, Standard deviations

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter reports the results of the data collected during the study. The chapter contains the return rate, demographic information of the respondents and findings on the influence of agricultural practices on sustainability of agricultural projects in Narok North Sub-County, Narok County, Kenya.

4.2 Questionnaire Return Rate

Questionnaires were distributed to the respondents through drop and pick later method. A total of 126 respondents out of 210 filled the questionnaires representing a response rate of 60% of the target population. 24 questionnaires were incomplete and were discarded. The response rate was considered good. According to “Mugenda and Mugenda (1999), a 50% response is adequate, 60% good and above 70% rated very good”. The return rate was 60% as shown in Table 4.1. This provided a sound basis for analysis, interpretations and reliable conclusions.

Table 4.1: Questionnaire Return Rate

Ward	Sample size	Responses	Return Rate (%)
Olposimoru	37	24	65
Olokurto	44	27	61
Narok Town	23	14	61
Nkareta	37	22	56
Olorrupil	35	19	54
Melili	32	20	63
Total	210	126	60

4.3 Background Information of the Respondents

The study asked the respondent to indicate their gender, educational background, the size of the land one farms, crop grown and the ownership rights one had on the piece of land he or she cultivated. The responses are reported in the sections that follow.

4.3.1 Gender of the Respondents

The study sought to establish the gender distribution of the respondents and the responses are shown in Table 4.2

Table 4.2 Gender of Respondents

Gender	Frequency	Percent
Male	77	61.1
Female	49	38.9
Total	126	100.0

From the Table 4.2, 61.1% of the respondents were male and 38.9% were female. This shows that more male were active participants in agricultural projects as compared to their female counterparts.

4.3.2 Distribution of Respondents by Age

In the study also sought to establish the age category of the farmers involved in agricultural projects. This was done to identify the most active group in the running of agricultural projects. Their responses are shown in Table 4.3

Table 4.3: Distribution of Respondents by Age Category

Category	Frequency	Percent
18-30	13	10.3
31-39	38	30.2
40-49	46	36.5
Above 50 years	29	23.0
Total	126	100.0

10.3% of the farmers were aged between 18 years to 30 years, 30.2% of the farmers were aged between 31 years to 39 years, 36.5% of the farmers were aged between 40 years to 49 years, 23% of the farmers were aged above 50 years. This shows that most large scale crop farmers in Narok North Sub County are between the ages of 40 to 49 years.

4.3.3 Education Qualification Certificates

The education level of farmers may present a yardstick for measuring the sustainability of agricultural projects. Therefore the study sought information on the level of education of farmers. Distribution of farmers based on their level of education is presented in Table 4.4

Table 4.4 Education Qualification Certificates of Respondents

Education Qualification	Frequency	Percent
KCSE and below	9	7.1
Certificate	30	23.8
Diploma	54	42.9
Degree	12	9.5
Masters	21	16.7
Total	126	100.0

The Table shows that majority of the farmers have attained diploma certificates represented by 42.9%. Those farmers with KCSE certificates and below were 7.1%, certificate level was 23.8%, degree level 9.5% while masters was the highest level of certificate represented by 16.7%. The results point out that the agricultural projects have been started and managed by people with sufficient knowledge to sustain the projects.

4.3.4 Crop Grown

The study sought to establish which crop was grown so as to identify the most common crops in the area of study. The farmer responses are presented in Table 4.5

Table 4.5 Crop Grown by Farmers

Crop Grown	Frequency	Percent
Wheat	50	39.7
Maize	38	30.2
Barley	25	19.8
Irish potato	9	7.1
Any other	4	3.2
Total	126	100.0

39.7% of the farmers practiced wheat farming, 30.2% grew maize, 19.8% Barley, 7.1% Irish potatoes and 3.2% grew other crops. This showed that majority farmers grow wheat followed by maize and then barley. The three crops are the most dominant in Narok North.

4.3.5 Farm Ownership Rights

The study sought to find out the ownership rights of the land one was farming on. This was important because some agricultural practices are a result of the ownership rights one enjoys. In leasehold one wants to make maximum profits at low costs. The responses on ownership rights are shown in Table 4.6

Table 4.6 Farm Ownership Rights

Ownership Rights	Frequency	Percent
Freehold	52	41.3
Leasehold	74	58.7
Total	126	100.0

Table 4.6 indicates that majority of farmers 58.7% have leasehold rights and 41.3% have freehold rights on the farm they are farming. This shows that most agricultural projects in the area have been started on leased land.

4.4 Sustainability of Agricultural Projects

In the scale of 1-5 the respondents were asked to rate the extent to which certain statements conform to sustainability of agricultural projects in Narok North sub county, Narok county Kenya. The respondents were to rate the statements as follows: SA-strongly agree, A-agree, N-neutral, D-disagree and SD strongly disagree. Table 4.7 presents the findings.

Table 4.7: Sustainability of agricultural projects

Statement	SA	A	N	D	SD	mean	Sd
From my farming I have realized profits	76(60.3%)	25(19.8%)	16(4.8%)	6(4.8%)	3(2.4%)	4.31	1.023
I have realized an increase in produce	4(3.2%)	8(6.3%)	13(10.3%)	98(77.8%)	3(2.4%)	2.30	.762
Production targets have been realized	5(4%)	9(7.1%)	63(50.0%)	36(28.6%)	13(10.3%)	2.66	.905
Am thinking of increasing area under crop production	13(10.3%)	60(47.6%)	39(31.0%)	8(6.3%)	6(4.8%)	3.52	.936
As a farmer I have been empowered by farming	44(34.9%)	58(46.0%)	14(11.1%)	4(3.2%)	6(4.8%)	4.03	1.011
I will encourage others to start farming	90(71.4%)	16(12.7%)	8(6.3%)	9(7.1%)	3(2.4%)	4.44	1.047
Mean						3.54	0.95

From the research findings on the dependent variable sustainability of agricultural projects as shown in Table 4.7 obtained using a mean score of six statements was 3.54 and standard deviation of 0.95. From individual item means and standard deviation respondents agreed strongly (60.3%) that from their farming they have realized profits (mean of 4.31, SD=1.023), and can encourage others to start farming (71.4%, M=4.44, SD=1.047).8% of the respondents agreed to a lesser extent that they have realized an increase in produce and have realized their production targets.50% of the respondents were neutral in agreeing that they met their production targets.

4.5 Crop Insurance and Sustainability of Agricultural Projects

This section sought information on the influence of crop insurance as a practice that influenced sustainability of agricultural projects. This was measured in terms of the type of risk one faces in farming, the knowledge and cost of insurance, resilience against shocks and stress, income stability and access to credit.

4.5.1 Common Risks in Agricultural Projects

Farmers were asked the risks they commonly faced while farming and the response are shown in Table 4.8

Table 4:8: Common Risks in Agricultural Projects

Common Risks	Frequency	Percent
Pest and diseases	58	46.0
Drought	52	41.3
Fire	10	7.9
Excess rain	6	4.8
Total	126	100.0

The table shows that pest and diseases were the main risks faced. The risk was mentioned by 46% of the farmers. Drought was mentioned by 41.3% of farmers while fire accounted for 7.9% of risks and excess rainfall was mentioned by 4.8% of the farmers. Pest and diseases is the main threat to sustainability of agricultural project making insurance necessary.

Farmers were also asked to state whether the risks faced threatened their profit margins or not. 80.2% of the farmers agreed that the risks indeed threatened their profit margins. The findings on the influence of risks on profit margins are shown in Table 4.9

Table 4.9 Threat of Risks on Profit Margins

Threat of Risks	Frequency	Percent
Yes	101	80.2
No	25	19.8
Total	126	100.0

4.5.2 Crop insurance Awareness

Farmers were asked if they are aware of crop insurance and the responses on if farmers are aware of crop insurance are shown in Table 4.10

Table 4.10: Crop Insurance Awareness

Crop Insurance Awareness	Frequency	Percent
Yes	97	77.0
No	29	23.0
Total	126	100.0

77% of the large scale farmers in Narok North Sub-County have heard of crop insurance.

Farmers were also asked if they have taken a crop cover and 65.1% of the respondents showed that they have a crop cover. This is shown in Table 4.11

Table 4:11 Farmers with Insurance Cover

Farmer with Insurance Cover	Frequency	Percent
Yes	82	65.1
No	44	34.9
Total	126	100.0

75.4% of the farmers with crop cover were covered by private institutions within the county and 24.6% by government as shown in table 4.12.

Table 4:12 Insurance Provider

Insurance Provider	Frequency	Percent
Government	31	24.6
Private sector	95	75.4
Total	126	100.0

From Table, 4.10, 4.11 and 4.12, it is clear that because of the risks which affect profits and threaten the existence of agricultural projects most large scale farmers have taken a crop cover.

4.5.3 Crop Insurance Cover and Loss Reduction

The study sought to know the extent to which crop insurance has reduced losses occasioned by risks farmers faced. The findings on the extent to which crop insurance cover has been able to reduce losses to farmers are shown in Table 4.13

Table 4.13: Extent to which crop insurance has reduced loss

	Extent of loss Reduced	Frequency	Percent
Valid	0-20%	2	1.6
	21-40%	8	6.3
	41-60%	38	30.2
	61-80%	68	54.0
	Above 80%	10	7.9
	Total	126	100.0

The table shows that 54% of the respondents point out that through crop insurance cover 61-80% of the losses have been covered.

4.5.4 Crop Insurance Cover and Access to Credit and Income Stability

Farmers were asked if through crop insurance cover they were able to access to credit and income had been stabilized and the responses are shown in Table 4.14

Table 4.14: Access to credit and Stable Income

Access to Credit	Frequency	Percent
Yes	113	89.7
No	13	10.3
Total	126	100.0

89.7% of the large scale farmers point that because of the insurance cover they are able to access credit and again they have a stable income even when there is change in climate and crop failure.

4.6 Crop Diversification and sustainability of agricultural projects

The study sought to address the objective that sought to determine how crop diversification influences sustainability of agricultural projects. This objective investigated whether farmers practice crop diversification if any, why they practice crop diversification, the form of diversification and the influence of crop diversification on crop yield.

4.6.1: Crop Diversification

The finding on whether farmers practiced any crop diversification is shown in Table 4.15.

Table 4.15: Crop Diversification

Crop Diversification	Frequency	Percent
Yes	118	93.7
No	8	6.3
Total	126	100.0

From the table 4.15 on whether respondents practice crop diversification, it was found that 93.7 % respondents practice crop diversification.

Farmers were also asked to state why they practiced crop diversification. The findings on why farmers practiced crop diversification are shown in Table 4.16

Table 4.16 Why Farmers Practice Crop Diversification

Why Crop Diversification	Frequency	Percent
Profits	40	31.7
Diseases	16	12.7
increase in yield	60	47.6
Climate change	10	7.9
Total	126	100.0

The table shows 47.6% of the respondents diversify to to increase their yield and 31.7% to increase profits, 12.7% because of diseases and 7.9% diversify because of change in climate.

4.6.2: Form of Crop diversification Practiced

There are several forms of crop diversification that can be practiced by crop farmers. The respondents were given options to choose from on the type of crop diversification practiced and the findings are presented in table 4.17

Table 4.17 Form of Crop diversification Practiced

Form of Crop Diversification	Frequency	Percent
Same crop many location	60	47.6
Variety of crops	66	52.4
Total	126	100.0

From Table 4.17 it was noted that most farmers 52.4% grow a variety of crops. This shows that large scale farmers grow more than one crop to cover for any risk or crop failure that may occur hence sustainability of crop projects.

4.6.3: Influence of crop diversification on Crop Yield

The study sought to know the influence of crop diversification on crop yield and the results are shown in Table 4.18

Table 4.18: Crop Diversification and Crop Yield

	Frequency	Percent
Cover up for the loss	80	63.5
Increased the total yield	46	36.5
Total	126	100.0

From the table it was pointed out by 63.5% of the farmers that crop diversification has covered up for the losses in one project while 36.5% show that crop diversification has increased the total yield.

4.7 Farm input use and sustainability of agricultural Projects

Farm inputs use is an important practice in agricultural production. Respondents were asked their views in relation to input use, who provided them with the farm inputs, cost of inputs, access to subsidies, and time of receiving the input subsidies and the adequacy of the inputs.

4.7.1 Farm input Use

The study sought to find out whether the respondents use farm inputs. The findings on whether respondents use farm inputs are shown in Table 4.19

Table 4.19: Whether respondents use Farm inputs

Use of Farm Inputs	Frequency	Percent
Yes	126	100.0
No	0	0
Total	126	100

The table shows that all large scale farmers use farm inputs in production. This shows that large scale farmers depend on farm inputs in order to get maximum produce.

Farmers were also asked to show the source of the inputs that they use. The results are shown in Table 4.20

Table 4.20: Who provides you with inputs

Input Provider	Frequency	Percent
Personal saving	62	49.2
NGOs	14	11.1
Government	50	39.7
Total	126	100.0

The table shows 49.2% of the inputs were bought from farmer's personal savings, 39.7% indicated that input is supplied to them by the government as subsidies and 11.1% from non-governmental organization operating within the area. This shows that most large farmers purchase inputs from their profits and also some receive from Government as subsidies.

4.7.2 Farm Input cost

The study sought to find out the cost of input subsidies and the findings on the cost of inputs subsidies are shown in table 4.21

Table 4.21: Cost of input Subsidies

Cost of Inputs	Frequency	Percent
Expensive	14	11.1
Moderate	38	30.2
Affordable	74	58.7
Total	126	100

From the table 58.7% agreed that input subsidies are affordable and can lower the cost of production.

4.7.3 Farm input use

Questions were developed to examine the parameter farm input use and the findings are shown in Table 4.22

Table 4.22: Farm input use

Statements	n	Mean	Std Dev
Most crop farmers depend on subsidized inputs in production	126	2.44	.675
Farm Subsidies received are cost effective	126	3.74	.821
Farmers Can easily access the subsidies, through the year and in time	126	3.65	.871
Brokers and connected people can get the subsidies easily	126	2.41	.906
Farm subsidies affect your profits	126	3.51	.994
Provision of subsidized inputs is the way towards new technology adoption	126	4.52	.927
The farm inputs provided are not adequate	126	3.96	1.106
Mean	126	3.46	0.9

Research findings on the parameter farm input use obtained using a mean score of seven statements was 3.46 and standard deviation of 0.9. from individual items mean and standard deviation, responses agreed strongly that provision of subsidies is a way towards adopting of new technology and sustainability of projects (M=4.52, SD=0.927), farm inputs subsidies provided are not adequate (M=3.96, SD=1.106), farm input subsidies received are cost effective (M=3.74, SD=0.821) and that farm input subsidies affect farmer profits i.e. lower the cost of production M=3.51, SD=0.994.

4.8 Farmer Training and Sustainability of Agricultural Projects

Farmer training is an important aspect in any farming project. The researcher sought to address the objective that looked to establish how farmer training influences sustainability. The researcher investigated the frequency of training, content of the training and number of farmers trained in Narok North Sub County.

4.8.1 Agricultural Production Training

The study sought to find out whether the respondents have ever been trained on agriculture production. The findings are shown in Table 4.23

Table 4.23: Training in Agricultural Production

	Frequency	Percent
Yes	109	86.5
No	17	13.5
Total	126	100.0

From Table 4.23, 86.5% agree that they have been trained on agricultural production. This shows that the knowledge most farmers have in Narok North has been transferred through the trainings attended. This means that farmers learn on good agricultural practices in trainings.

4.8.2 Frequency of Farmer Training

The study sought to find out the frequency of farmer training. The findings are shown in Table 4.24

Table 4.24: Frequency of Farmer Training

	Frequency	Percent
Once	7	5.6
Twice	30	23.8
Several times	89	70.6
Total	126	100.0

It was found that 70.6% of the farmers received the training several times, 23.8% twice, 5.6% once. The training is mostly done by extension officers where more than 50 farmers are trained per session.

4.8.3 Farmer Training Indicators

Eight questions were developed to examine the parameter farmer training, the questions included whether training has improved farmer performance, learning on good agricultural practices,

whether training has helped maintain productivity, if training should be practical, training has helped farmers know of new technology whether the farmers have ever been visited by extension officers in their farms and whether they have received training on environmental friendly practices. Table 4.25 illustrates the research findings.

Table 4.25: Farmer Training and Sustainability Indicators

Statement	Mean	Std Dev	Frequency	Percentage
Farmer training has improved my performance as a farmer	2.54	.745	89	69
Learning on good agricultural practices has helped me maintain production hence sustainability	4.62	.778	99	78.9
Training should be practical	4.44	1.085	92	73.0
I know of new technology through training	4.67	.727	100	79.4
I have been visited by extension officer	4.45	.816	80	63.5
Training is important for sustainability to be realized	3.67	.604	67	53.2
I have received training on the best agricultural practices	4.41	.932	78	61.9
Training has exposed me to environment friendly practices	3.60	.887	60	47.6
Mean	4.82	0.817		

From individual item mean and standard deviation, responses agreed strongly that training on good agricultural practices has helped in maintaining productivity leading to sustainability. This was supported by M=4.62, SD=0.745, training should be practical M=4.44, SD=1.085, farmers in Narok North have learnt of new technology through farmer training M=4.67, SD=0.727), as a farmer he or she has been visited by an extension officer at the farm M=4.45, SD=0.816 and that most farmers have received training on best agricultural practices M=4.41, SD=0.932.

The overall mean and standard deviation $M=4.05$ and $SD=0.817$ implied that the responses in this study were not scattered but concentrated around the agreed responses. This shows that responses were similar and tended to agree with most questions.

4.9 Combined Influence of Agricultural Practices

The study sought to determine the combined influence of the agricultural practices under study by looking at the “comparative significance of each of the variables with reverence to the” sustainability of agricultural projects in Narok North. The respondents were requested to rank the variables from the most influencing one to least influencing in relation to sustainability. The findings are shown in Table 4.26

Table 4.26: Combined influence of Variables

Variables	Frequency	Percent
Crop insurance	10	7.9
Crop diversification	3	2.4
Farm input access	13	10.3
Farmer Training	100	79.4
Total	126	100.0

From the table it was found out that farmer training has more influence on sustainability 79.4% followed by farm input use 10.3%, crop insurance 7.9% and Crop diversification 2.4% are least influential. This shows that if farmers are well trained then sustainability of projects will be something that can be achieved.

CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSION, CONCLUSIONS AND
RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of findings, discussion, conclusions drawn from the findings, and recommendations made, which are in link with the objectives under the study.

5.2 Summary of Findings

This segment presents the summary of findings in line with the objectives of the study. The objectives were; to examine the influence of crop insurance on the sustainability of agricultural projects, to examine the influence of crop diversification on the sustainability of agricultural projects, to determine the influence of farm inputs use on sustainability of agricultural projects, to establish the influence of farmer training on sustainability of agricultural projects and to assess the combined influence of agricultural practices on sustainability of agricultural projects in Narok-north Sub County of Narok County. In the study, majority of the farmers 61.1% were males while 38.9% were females. Most of the farmers 36.5% are between the age of 40-49 and most of the large scale farmers 39.7% are wheat farmers doing projects mostly on leased lands 58.7%. Majority of farmers 42.9% had attained a diploma level as the highest education, followed with those with certificate level at 23.8%.

5.2.1 Crop Insurance on the Sustainability of Agricultural Projects

The first objective was to examine the influence of crop insurance on the sustainability of agricultural projects. 46.0% of the farmers indicated that they face the threat of pest and diseases and 41.3% face the risk of drought. These risks threaten profit margins and the existence of these agricultural projects 80.2%. Most farmers 77% agreed that they have knowledge on crop insurance and how through insurance the risks which lead to halting of the projects can be mitigated. Majority farmers 65.1% have taken crop insurance to reduce the losses, to be able to access credit 89.7% since most financial institutions fear giving loans to agricultural projects due to risks involved and through insurance farmers have stable income and can restart again even when there is complete failure in production through compensation.

Most of the respondents 88.1% agree that they benefited from insurance hence sustainability of their projects.

5.2.2 Crop Diversification on the Sustainability of Agricultural Projects

The second objective was to examine the influence of crop diversification on the sustainability of agricultural projects.

93.7% respondents indicated that they practice crop diversification in order for them to increase the total yield 50.8%. Most respondents 52.4% grow a variety of crops in one place or various places so that in case of failure of one crop the other crop may cover for the losses. If one project fails due to drought or pest and diseases the other crop project will cover for the losses 63.5%.

5.2.3 Farm Inputs use on Sustainability of Agricultural Projects

The third objective was to determine the influence of farm inputs use on sustainability of agricultural projects.

All large scale farmers indicated that they use farm inputs which majority 49.2% buys from their own savings. Farmers buying for themselves inputs of high cost 58.7% as compared to subsidies which are affordable is because most subsidies are not received in time 69.0% and are inadequate 45.2% i.e. even if one receives them they are not enough when you compare the size of the farms most of the farmers farm on.

The third objective wanted to establish the influence of farm input use on sustainability and the study further established that provision of subsidized inputs is the way towards new technology adoption which influences sustainability of agricultural projects at a mean of 4.52 and profits of large scale farmers are increased through lowering the cost of production an argument supported by a mean of 3.51. The lower the cost the higher the profits and the more sustainable the agricultural projects will be.

5.2.4 Farmer Training on Sustainability of Agricultural Projects

The fourth objective sought to find out the influence of farmer training on sustainability of agricultural projects. It was found out that through training farmers have learnt of new technology this was supported by a mean of 4.67, training on good agricultural practices has helped farmers maintain production this was supported by a mean of 4.62, the visit by agricultural extension officers in their farms has ensured sustainability since the learning is more practical this was supported by a mean of 4.44. These were seen to be the most significant factors on training farmers. Other significant factor were training on practices of environment-friendly as an alternative to conventional agriculture (mean=3.60).

5.2.5 Combined Influence of Agricultural Practices on Sustainability of Agricultural

The fifth objective sought to assess the combined influence of agricultural practices on sustainability of agricultural projects. Among the findings made were that at the combined level farmer training is considered heavier in terms of influencing sustainability. This was supported by 79.4% respondents. Farm input use came second in terms of the combined influence 10.3% followed by crop insurance 7.9% and lastly crop diversification.

5.3 Discussion on the Findings of the Study

The findings on the demographic information shows that majority of the respondents were males demonstrating an imbalance in gender representation in the starting and running of agricultural projects. This is in agreement with Beard (2005) who highlighted that women had limited participation in agricultural projects owing to cultural limitations consequently; men were more likely to participate in project activities than them. On the age of those participating in agricultural projects most respondents were elderly above the age of forty showing lack of interest by youth in farming. This is also an agreement with Gakuu (2018) who found out that farming is not taken as serious economic activity by the youth. Most farmers have attained a diploma level education showing that most projects are being run by people with basic knowledge on farming hence sustainability. Words echoed by Lungo and Mavole (2017) that most projects with people with basic knowledge on what the project is doing tend to sustainable.

The findings on influence of crop diversification on sustainability revealed that for agricultural projects to be sustainable the agencies involved must underscore the importance of

diversification. Various benefits were identified that assure sustainability of agricultural projects. These benefits included cover for the loss, income stability and increasing the yield. An agreement with Bobojonov (2013) who stated that “crop diversification could secure income of downstream farmers during the climate-driven decline in water availability. Greater crop diversity can lead to a sustainable development path in the region”.

The study found out that farmers face risks and mostly they face the menace of pest and diseases outbreak and drought. The risks are beyond their control and since they have the knowledge of insurance most have taken crop cover a practice pursued because the risks they face threaten the profits and can also lead to complete failure of the projects. Through insurance the income is maintained and through compensation in case of any risks the project can be restarted again hence sustainability. This is in concurrence with Jepchumba (2015) farmers who do large scale farming at least understand the effectiveness of taking insurance as a control measure in reducing the loss that may occur due to unavoidable circumstance and ensuring continuity of activities. Words echoed by Hazell (2010) that “farmers face a variety of price, yield and resource risks that make their incomes unstable and unpredictable from year to year. They are similarly confronted by the risk of catastrophe. Crops may be totally destroyed by drought or new pest outbreaks, input costs may increase and product prices may fall because of adjustments in home or world markets, and assets and lives may be lost due to hurricanes, fires and floods” making insurance necessary for sustainable agriculture.

On input access and use, the study showed that access and usage of necessary inputs an example improved seed and fertilizer has significantly in a positive way influenced the sustainability of agricultural projects in Narok North. Input subsidies can lower the cost of production and availability of inputs subsidies can be a channel through which new technology e.g. improved seeds can be adopted. This agrees with Jayne and Muyanga, (2006) who suggests that “the immediate need is basic support in the form of inputs to produce food for the family. Once the input need is met, additional support in the form of credit, extension services and supportive policies is needed to help these households become more productive and enter commercial markets to generate income and improve their livelihoods”.

The study found out that through trainings farmers have learnt new technology and how it works and that training on good agricultural practices has helped farmers maintain production hence

sustainability. Visits by extension officers, has made learning more practical and need to be continued. This is in agreement with studies by Birkhaeuser et al., 2011; Van den berg et al., 2007; Delia et al., 2008 “who argue that farmer training is an important tool widely utilized by development programs in developing countries. The government and privately run extension services as well as non- governmental organizations offer training packages to their farmers”.

5.4 Conclusion

The study found out that findings of the study it is established that crop insurance, crop diversification, farm input use and farmer training influence sustainability of agricultural projects in Narok North Sub County

Secondly the findings of the study established that farmers face risks that can lead to failure or halt of the projects. Crop insurance cover and crop diversification were found out to be effective in covering for the losses; necessary information on crop insurance is needed. Crop insurance and crop diversification are the most effective ways 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.

Most agricultural projects take place Narok North Sub County. Projects can be more sustainable by providing the farmers with adequate and timely inputs and since farmers agree that input subsidies affect their profits, if these farmers can be able to access subsidized inputs throughout the year this can guarantee timely planting. On the other hand with financial ability farmers can expand their farming in terms of acreage.

The study found out that farmers and the extension officers are in close contact i.e. they have ever been visited by extension officers. If the frequent training in the farms is maintained and training made more practical then projects will become more sustainable. Since new technology is learnt through training government should capitalize on that to introduce quality seeds that can stand during pest and diseases and droughts.

5.5 Recommendations

From the conclusion it is recommended that

1. More trainings to farmers by extension officers needs to be conducted as way of building their capacity thus increased productivity.
2. Adequate subsidies should be made available in time so as to lower farmer cost of production and increase their profit margins.
3. The government should intervene and subsidize the price of quality seeds and fertilizers which are basic inputs in farming and also offer subsidized insurance to large scale farmers since it is mostly offered by private organizations according to the findings.

5.6 Suggestion for Further Research

The study commends that further research be done on

1. New technology adoption on sustainability of agricultural projects.
2. Time of receiving farm inputs on farmers yield.
3. Crop insurance policies on sustainability of crop projects.

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APPENDICES

APPENDIX I: INTRODUCTION LETTER



UNIVERSITY OF NAIROBI
OPEN, DISTANCE AND e-LEARNING CAMPUS
SCHOOL OF OPEN AND DISTANCE LEARNING
DEPARTMENT OF OPEN LEARNING
NAIROBI LEARNING CENTRE

Your Ref:

Our Ref:

Telephone: 318262 Ext. 120

REF: UON/ODeL/NLC/31/211

Main Campus
Gandhi Wing, Ground Floor
P.O. Box 30197
NAIROBI

20th September, 2019

TO WHOM IT MAY CONCERN

RE: EZRA OMBABA MAIRURA - REG.NO. L 50/10209/2018

The above named is a student at the University of Nairobi, Open Distance and e-Learning Campus, School of Open and Distance Learning, Department of Open Learning pursuing a Masters course in Project Planning and Management.

He is proceeding for research entitled "*Influence of Agricultural Practices on Sustainability of Agricultural Project in Narok-North Sub County of Narok County, Kenya.*"

Any assistance accorded to him will be appreciated.


CAREN AWILLY
CENTRE ORGANIZER
NAIROBI LEARNING CENTRE



APPENDIX II: RESEARCH QUESTIONNAIRE FOR FARMERS

SECTION I: DEMOGRAPHIC CHARACTERISTICS

1. What is your gender (optional)? Male () Female ()
2. What is your age bracket (optional)?
 18-30 years () 31-39 years () 40-49 years () 50 and above ()
3. What is your highest education level?
 Certificate () Diploma () Degree () Masters () K.C.S.E and below ()
4. What is the size of the land you farm (in ha) 6-26() 27 and above ()
5. What crop do you grow? Wheat () Maize () Barley () Irish Potato () any other specify.....
6. Which ownership right do you have of the land you farm? Freehold () leasehold ()

SECTION II: SUSTAINABILITY OF AGRICULTURAL PROJECTS

On the scale of 1-5 please show to what point you agree or disagree with the following statements. 5=strongly agree, 4=agree, 3=Neutral, 2=disagree, 1=strongly disagree

	Statement	5	4	3	2	1
1	From my farming I have realized profits					
2	I have realized an increase in produce					
3	Production targets have been realized					
4	Am thinking of increasing the area under crop production					
5	As a farmer I have been empowered by farming					
6	I will encourage others to start farming					

SECTION III: CROP INSURANCE

1. Which of the following risk do you commonly face in farming?
 Pests and Diseases () Drought () Fire () excess Rains ()
2. Do the risks threaten your profit Margins? Yes () No ()
3. Ever heard about Agricultural Insurance? Yes () No ()
4. If yes in question three above, do you have a crop cover? Yes () No ()
5. If yes in question four above who has offered the insurance cover? Government () Private organization ()

6. If no in question four above, how do you deal with risk? What other risk Management strategy do you use? Contract Farming () Vertical Integration () Crop Diversification ()

7. If you have a crop cover have you benefited from the insurance cover? Yes () No ()

8. To what extent has crop insurance reduced your loss?

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

9. What other value have you enjoyed from insurance...?

10. I can easily access credit when am insured? True [] False []

11. I have stable income even when there is change in climate and crop failure? True [] False []

12. What is your general view on usage of insurance as a risk management strategy?

SECTION IV: CROP DIVERSIFICATION

1. Do you practice crop diversification? Yes () NO ()

2. If Yes why? Profits () Diseases () increase the Total Yield () Climate Change ()

3. Which form of diversification do you Practice? Same crop many locations () Variety of crops ()

4. What influence has diversification had on sustainability? Cover up for loss () increased the total yield ()

5. Your Farm income has increased through diversification? Yes () No ()

6. Diversification has covered the risk of one crop failure? Yes() No()

SECTION V: FARM INPUTS

1. Do you use farm inputs? Yes [] No []

2. Who provides you with farm inputs? The government () NGO's () Personal savings ()

3. What subsidy do you receive from government or NGO? Fertilizer () Seeds () Finance () All ()

4. Subsidies are received in time? True [] False []

5. How can you rate the cost of inputs? Very cheap () Moderate () Expensive ()

6. How can you rate the cost of input subsidies received? Very cheap () affordable () expensive ()

On a scale of 1 to 5- 1 being the lowest and 5 the highest, to what level do you agree or disagree with the following statements. 5=strongly agree, 4=Agree, 3=Neutral, 2=disagree, 1= strongly agree						
	Statement	5	4	3	2	1
1	Most crop Farmers depend on subsidized inputs in production					
2	Farm subsidies received are cost effective					
3	Farmers can easily access the subsidies, throughout the year and in time					
4	Brokers and connected people can get the subsidies easily					
5	Farm subsidies affect your profits					
6	Provision of subsidized inputs is the way towards new technology adoption and sustainability of agricultural projects					
7	The farm inputs provided as subsidies are adequate					

SECTION VI: FARMER TRAINING

1. Have you ever been trained on agriculture production? Yes () or No ()
2. What is the number of farmers trained per session of training? 1() 20-50() 50 and more ()
3. If yes how many times? Once () Twice () Several times ()
4. If No why.....
5. What materials were used in the training meetings? Newsletters () Exhibitions ()
Extension officers ()

On a scale of 1 to 5- 1 being the lowest and 5 the highest, to what level do you agree or disagree with the following statements. 5=strongly agree, 4=Agree, 3=Neutral, 2=disagree, 1= strongly Disagree						
	Statement	5	4	3	2	1
1	Farmer training has improved my performance as a farmer					
2	Learning on good agricultural practices has helped me maintain production hence sustainability					
3	Training should be practical					
4	I know of new technology through training					
5	I have been visited by extension officer					
6	Training is important for sustainability to be realized					
7	I have received training on the best agricultural practices					
8	Training has exposed me to environment friendly practices					

SECTION VII: COMBINED INFLUENCE

	On a scale of 1 to 10, 1 being the lowest and 10 being the highest, rate the degree to which the following practices influences sustainability of agricultural projects in Narok North Sub County									
Practice	1	2	3	4	5	6	7	8	9	10
Crop insurance										
Crop diversification										
Farm input Access										
Farmer Training										


APPENDIX III: MORGAN AND KREJCIE (1970) FORMULA FOR SAMPLE DETERMINATION

<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>	<i>N</i>	<i>S</i>
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

APPENDIX IV: RESEARCH PERMIT

Ref No: **407713**

RESEARCH LICENSE




This is to Certify that Mr. Ezra Mairura of University of Nairobi, has been licensed to conduct research in Narok on the topic: Influence of Agricultural Practices on Sustainability of Agricultural Projects in Narok-North Sub County of Narok County, Kenya, for the period ending : 25/September/2020.

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