INFLUENCE OF FARM INPUTS SUBSIDY ON AGRICULTURAL PRODUCTIVITY BY SMALL SCALE FARMERS IN ALEGO USONGA SUB COUNTY, SIAYA COUNTY, KENYA

By

ELIAKIM BONYO AMBAJO

A352/4060/2016

A thesis submitted to the graduate school in partial/fulfillment of the requirement for the Award of the Degree

of

MASTER OF SCIENCE IN AGRICULTURAL EXTENSION AND EDUCATION

Department of Plant, Animal and Food Sciences

SCHOOL OF AGRICULTURAL AND FOOD SCIENCES

JARAMOGI OGINGA ODINGA UNIVERSITY OF SCIENCE & TECHNOLOGY

FEBRUARY 2022

DECLARATION

I, Eliakim Bonyo Ambajo do hereby declare that this thesis is solely my work and has not been previously submitted to Jaramogi Oginga Odinga University of Science and Technology or any other institution for an award of a degree or diploma. I further declare that all the works quoted have been dully acknowledged.

Eliakim Bonyo Ambajo

A352/4060/2016

Signature …….. Date: …….

Approval

This research thesis has been submitted for examination with our approval as the Jaramogi Oginga Odinga University of Science & Technology supervisors.

1.Dr.Calleb Olweny Ochia
Department of Plant, Animal and Food Sciences
Jaramogi Oginga Odinga University of Science & Technology
Signature…… Date…….

2.Dr Walter Akuno

Department of Agriculture Economics and Agribusiness Management

Jaramogi Oginga Odinga University of Science & Technology

Signature…… Date……

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DEDICATION

This research thesis is dedicated to my dear wife Millicent Mundu and my Sons Adrian Odhiambo and Alvin Onyango for their unwavering support and encouragement during my study.

ACKNOWLEDGEMENT

This thesis was compiled with the assistance of many individuals who volunteered their knowledge and experience. My supervisors, Dr. Walter Akuno and Dr. Calleb Olweny provided great assistance in completing my thesis. Their thoughtful advice assisted me in generating this high-quality work. Also, I'd want to thank Jaramogi Oginga Odinga University of Science and Technology for providing me with a wonderful learning atmosphere. I'd want to show my appreciation to my professors in the School of Agriculture and Food Sciences. I want to thank Dr. Caleb Olweny, particularly, for his thorough explanation of Research Methods, the course unit that served as the basis for my investigation. I also enjoy our time together, the enlightening conversations, and my colleagues' support. Thank you for allowing me to work and study, County Government of Siaya Department of Agriculture. Mrs. Philigona Ooko and the County Director of Agriculture are to be commended for allowing me permission to conduct this research. I am grateful to my family for providing me with crucial moral and spiritual support. I cannot adequately convey my gratitude to my Spouse for everything she has given me. Her prayers for me have kept me going so far. Adrian and Alvin deserve special recognition for putting up with my many absences from home as I pursued my degree. I also wish to acknowledge my friend Mr. Richard Onyango whose constant moral support and motivation incented me to strive towards my goal and achieve this academic height. Above all I wish to thank God for the gift of good health, wisdom and knowledge. Amen

ABSTRACT

To boost agricultural output and food security, the Kenyan government has given farmers agricultural subsidies since 2004. Alego Usonga does not have access to or use agricultural inputs since most farmers in the study region cannot afford certified seeds and fertilizers. Obstacles to their acceptance and usage include the expensive cost of new and better agricultural inputs and technology, erratic delivery networks, and a lack of technical expertise in their application. Due to decreasing productivity, farmers today face food insecurity and limited agricultural income. We looked at smallholder farmers in the Alego Usonga sub-county of Siaya County to see how agricultural input subsidies affected crop yields and incomes. 317 Usonga smallholder farmers that get input subsidies are the subject of the investigation. The goal of the research was to determine how to input subsidies affected household income, crop yields, and smallholder farmers' acceptance of input usage in the study region. to provide a definite answer to the investigation's objectives. Information from respondents was acquired by utilizing standardized questionnaires. The last samples were then randomly selected from the population strata after that. Afterward, the outcomes were evaluated statistically and qualitatively using SPSS version 19. The information was assessed using descriptive and inferential statistics like the correlation and Chi-square tests. Tables, graphs, and percentages were often used to show and evaluate quantitative data. The narrative analysis method was utilized to analyze the qualitative data. This method employed themes to compress the material, classify it into useful categories, summarize and contextualize the text, and find and understand linkage patterns. The main conclusions showed that participants comprised 55.5% of women and 44.5% of men. Input subsidies, according to the majority of respondents (62.1%), were thought to boost crop output (96.4%); fertilizer subsidies, according to the majority of respondents (61.5%); and crop yields, according to the majority of respondents (97.9%). The results show that input subsidies raise the yields and profits of smallholder farmers. Additionally, research demonstrates that input subsidies significantly impact adoption since they increase resource accessibility and consumer awareness. The paper recommended further research on an integrated strategy that uses agricultural technology, quick input delivery, and extension services to boost smallholder farmers' yields and profitability.

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ABBREVIATIONS AND ACRONYMS

AFA-	Agriculture and Food Authority
ASDS-	Agriculture Sector Development Sector
ASTGS-	Agriculture Sector Transformation Growth Strategy
CAN-	Calcium ammonium Nitrate
CGS-	County Government of Siaya
DAP-	Di Ammonium Phosphate
FAO-	Food Agriculture Organization
FAOSTAT-	Food Agricultural Organization Statistics
FGD-	Focused Group Discussion
FISP-	Farmers Input Support Programme
GDP-	Gross Domestic Product
GoK-	Government of Kenya
GRZ-	Government of Republic of Zambia
GSFP-	Global Food Security Index
JOOUST-	Jaramogi Oginga Odinga University of Science & Technology
KALRO-	Kenya Agricultural and Livestock Research Organization
KDHS	Kenya Demographics and Health Survey
KNBS-	Kenya National Bureau of statistics
Ksh-	Kenya Shillings
LM-	Lower midland
MoA-	Ministry of Agriculture
MT-	Metric Tones

NAAIAP- National Accelerated Agricultural Inputs Access Program

NAIVS- National Agricultural Input Access Voucher Scheme

NCPB- National Cereals and Produce Board

NGO- Non-governmental organization

NPK- Nitrogen Phosphorus Potassium

SLA- Sustainable Learning Approach

SSA- Sub Saharan Africa

THS- Tractor Hire Services

TOP- Theory of Performance

UM- Upper midland

UNDP- United Nations Development Programme

US- United States

USA- United States of America

USDA- United States Department of Agriculture.

WFP- World Food Programme

CHAPTER ONE: INTRODUCTION

1.0 Introduction

This section provides a guide to the issue statement, aims, hypothesis, rationale, research scope, assumptions, and limits of the research. It discusses the history of the research and presents opinions on worldwide concerns over the impact of agriculture inputs subsidies.

1.1 Background information

Given that agricultural inputs may significantly improve output, increasing agricultural productivity has been projected as a potential resolution to the problem of food insecurity (Gordon, 2000). In developing countries, many poor farmers are concerned that they will not be able to buy or be interested in the inputs and technologies required to enhance agricultural productivity (e.g., Wiggins & Brooks, 2010). A farmer may be eligible for agricultural input subsidies if they are incapable or reluctant to purchase agricultural inputs at marketplace prices, for example, due to a lack of funds or the belief that the inputs are not economically viable at market pricing based on their current understanding of their advantages. As a result, input subsidies may provide a strategy for increasing agricultural output, improving food security, and promoting pro-poor economic growth by lowering food prices.

The usefulness and application of agricultural input subsidies, as well as the situations in which they may or may not be beneficial, are passionately debated by politicians and economists, on the other hand (Wiggins & Brooks, 2010; Kilic et al., 2013; Pauw & Thurlow, 2014).

Farming inputs aids were common in emerging rural thrifts in the 1960s and 1970s, but by the 1980s and 1990s, the public saw them as useless. However, there has been a rise in interest and funding for "smart subsidies" in recent years. These subventions aim to maximize the numerous benefits of subsidies to various stakeholders while minimizing their distorting possessions on, among other things, the creation and operation of effective commercial markets. These systems employ vouchers for distribution, targeting, and rationing in the private sector. Africa has been the

most significantly impacted by this trend. The necessity to quickly attain food security while employing longer-term yield-boosting measures sparked this renaissance.

Numerous countries' economies depend heavily on agriculture, which also helps these countries meet crucial developmental milestones. Food security, agriculture, and the eradication of poverty are now at the top of the list of priorities for global development, according to research by the World Summit on Sustainable Development Food Security. During the 2002 World Summit on Food Security in Johannesburg, South Africa, the international community reaffirmed its commitment to establishing regional and national initiatives for food security, poverty eradication, and sustainable development. Several African countries changed their subsidy programs due to this meeting to provide agricultural farm products to low-income farmers at regulated and reduced prices, generally via subsidized loans. Evaluation of the Kenyan government's subsidy program's effects on food security is required as Kenya implements the Agricultural Sector Development Strategy (ASDS) and Vision 2030.

Various African countries, notably Malawi, Kenya, Zimbabwe, Tanzania, and Zambia, undertook extensive subsidy schemes from the 1960s through the 1980s After some years of trial and error, China announced its first countrywide direct subventions in 2004, with local governments vowing to ensure funds reached farmers in time for spring crop sowing. Reputable seed wholesalers received subsidies intending to pass on the savings to farmers. In order to increase grain output, China changed the structure of its agricultural production material subsidies in 2006. Subsidies were based on cultivated land area, agricultural equipment, income market prices, and other factors (Guo & Zhao, 2010).

Throughout the structural adjustment process of the 1980s and 1990s, agricultural input consumption and output fell as input markets were liberalized and subsidy programs were terminated. These systems were categorized by a government-controlled input (and output) promotion organization that gave farmers access to agricultural products at discounted and regulated prices, sometimes with very little credit. Despite their high expenditures, several of these initiatives effectively provided farmers with additional resources and contacts. Additionally,

because of high administrative costs, government monopolies, and political influence, fertilizer subsidy regimes were prone to inefficiency (Baneful, 2010b).

The Tanzanian government started a scheme in 2008–2009 to reclaim agricultural inputs for the poor. (Arumugam,2011). The Tanzania Enhanced Food Safety Project seeks to increase food production and productivity in the target areas while improving farmers' access to crucial farming inputs. Large-scale agricultural subsidies have raised the living standards of the underprivileged, increased demand for goods and facilities in the neighborhood, abridged poverty, and disparity, and promoted social and party-political solidity (Tambwe, 2012). Kenya's GDP is directly boosted by agriculture to the tune of 24% and indirectly by manufacturing, distribution, and other service sectors to the tune of 27%. (KNBS,2018). Seventy-five out of a hundred of industrial raw resources, more than half of exportation incomes, and more than fifty percent of government revenue come from agriculture (KNBS,2018). The segment is the largest company in the nation, employing 60% of all employees in the economy. A whopping 80% of the population relies heavily on agriculture for their livelihood, particularly in rural regions. Sub-Saharan Africa (SSA), homebased to the great mainstream of the world's poorest people, has not made enough progress toward reaching the SDG on hunger, according to the National Agricultural Research Institute (2012). 2013 FAOSTAT (2013)

Compared to the rest of the world, Sub-Saharan Africa applied the least fertilizer (9 kg/ha), according to Crawford et al. This is not unexpected given that Sub-Saharan African farmers produce less food and use less fertilizer than farmers in other parts of the world. (Tiba,2000) Inadequate infrastructure makes transferring inputs to inaccessible locations costly, mostly in non-coastal countries. Banful claims that compared to Thailand's 20% transaction costs, Sub-Saharan Africa's (SSA) 50% market fertilizer prices are accounted for by transaction costs (Banful, 2010b). Only in certain situations, such as when combined with implementation support, are subsidies helpful (Duflo et al., 2010). China, Malawi, and a few other nations that participated in the green revolution employed subsidies effectively.

Despite several intervention efforts and policy declarations, Kenya's government has not achieved food self-sufficiency since the late 1970s (MOA, 2013). Low agricultural production and insufficient use of agricultural technologies were blamed for this. The majority of households in

Kenya are still struggling with food insecurity. More than 10 million Kenyans were projected to experience food insecurity in 2013, with the majority reliant on food handouts and other social support programs (USDA, 2014).

A global problem accelerates and sustains agricultural productivity-enhancing technologies (Otunge D, Muchiri N, Wachoro G, Gethi J, and Agili G, 2010). Although the low rate of smallholder farmers' adoption of technology is widely known, there has not been much investigation into the origins of this phenomenon, particularly in smallholder agricultural systems The capacity to increase and maintain agricultural production is a strength of sustainable agriculture technology (Komarek A, 2010).

The agricultural output of Siaya County depends on erratic precipitation. Low household incomes continue to be a major issue in the county despite its small land holdings and potential for enhanced agricultural output. This is impressive, given the region's usual poverty rate of 35%. (KNBS,2018).

1.2 Statement of the problem.

Siaya County is characterized by high poverty levels (47.56%) and food insecurity. (Siaya climate risk profile report, 2016). Agriculture is the main source of livelihood in the County, contributing about 60% of the household income and providing almost 61% of all employment opportunities. Maize, beans, sorghum, and local poultry are the key value chain commodities in the County (Siaya climate risk profile report, 2016). Low adoption of agricultural technologies, low use of inputs, high cost of credit, and poor-quality soils are some of the salient factors that exacerbate the impact of food insecurity. (Siaya climate risk profile report, 2016). Despite its rich endowment with high agricultural potentials, Alego Usonga Sub County is currently facing increasing food and nutritional insecurity. At least 50,000 children under the age of five in Siaya are stunted due to chronic malnutrition, (KDHS,2018).

Food crop farming has been the leading source of income for Alego Usonga residents. (Department of agriculture food situation report ,2020) Most countries of Sub Sahara Africa depend on agriculture for subsistence and economic growth. Agricultural production is by small-scale holder farmers, living in rural areas where most are poor and food insecure. Despite decades of policy attention to boost agricultural production not much has been achieved to help moderate the pangs

of food insecurity. This has resulted into hunger, malnutrition and school going children drop outs. (KDHS ,2018) The County Government has struggled with agricultural subsidies in order to boost yields and productivity but still there are poor harvests that cause food shortages for around seven months, the populace is compelled to purchase food from neighboring nations. Due to the difficulty and expense of procuring food, food prices and hunger have increased. Since authorized seeds and fertilizers are too costly for most farmers in the research region, access to agricultural inputs is restricted. Modern agricultural inputs and improved technologies are not extensively employed or accepted because of their high cost, unstable distribution methods, and lack of technical proficiency in their usage, application, and maintenance. Smallholder farmers in Alego Usonga Sub County, Siaya County, continue to endure poor agricultural productivity and profitability, even though the farm inputs subsidy program is designed to raise agricultural production while enhancing food availability and security. In addition, the subsidies fall short in timing, quality, and quantity. This research aimed to determine how agricultural input subsidies affect family income and food security in Alego Usonga Sub County.

1.3 Objectives of the study

1.3.1 Main Objective

The purpose of this research is to assess the contribution of inputs subsidy and their influence on agricultural productivity of small-scale farmers.

1.3.2 Specific Objectives

The study sought to achieve the following objectives:

i. To determine the influence of inputs subsidy on yields of crops grown by small-scale farmers.

ii. To analyze the effect of inputs subsidy and small-scale farmer's income levels.

iii. To examine the contribution of input adoption and the input subsidy on small scale farmers.

1.3.2 Hypothesis

i. H_{01}: there is statistically no significant influence of input subsidy on farm yields of small-scale farmers in alego usonga
ii. H_{02}: There is statistically no significant effect of inputs subsidy and small-scale farmer's income levels.
iii. H_{03}: There is statistically no significant effect on the contribution of input adoption and the input subsidy by small scale farmers.

1.4 Significance of the Study

With 12.5% of the world's population being hungry, it is crucial to improve food security (FAO, 2013). Food insecurity has been identified as a problem that may be resolved by increasing agricultural output, and agricultural inputs have the power to increase agricultural production (Gordon, 2000) greatly. To increase agricultural output in developing countries, certain inputs are required Many underprivileged farmers in developing countries worry that they will be unable to afford or will not be interested in the inputs and technologies required to boost agricultural productivity (Wiggins & Brooks, 2010). The government must recognize and eliminate the obstacles preventing people from becoming self-sufficient to ensure food security. The Department of Agriculture must first comprehend how to input subsidies impact yields and incomes to develop successful programs encouraging smallholder farmers to embrace sustainable agricultural practices. It is imperative to protect the enormous resources routinely and inefficiently utilized to sustain and expand agricultural output. The study's results will also aid in filling a knowledge vacuum that has to be closed if agricultural production is to steadily increase, maintaining food security, reducing poverty, and promoting overall national economic growth. This study aims to assist the Department of Agriculture in strengthening its current policies to achieve food security via agricultural subsidies by giving significant data and figures. The study's suggestions for future research in related fields may be helpful to academics and students interested in important research concerns.

The results could also be useful in explaining to farmers how government agricultural subsidies result in self-sufficiency. Additionally, the study will support non-governmental organizations (NGOs), donors, development partners, and other agricultural stakeholders in enhancing food

security and socioeconomic success at the national level. On the other hand, authorities may utilize the study's findings to develop more affordable extension service delivery strategies to aid smallholder farmers in implementing sustainable modern agricultural techniques. The study may also provide specialists with suggestions for effective ways to instruct smallholder farmers in sustainable agriculture.

It is believed that using and having access to agricultural farm inputs may considerably increase farm output and help ensure food security. The research results will aid in our understanding of agricultural input subsidies. The Department of Agriculture and other extension service providers need this data to create long-term, effective programs.

1.5 Scope

This study was confined to small scale farmers of Alego Usonga in Siaya County. It was limited to those farmers that benefitted from the input subsidy program and their direct dependance.it focused mainly on the influence of inputs subsidy on yields and incomes. The farmers produced maize crop using the certified maize seeds, planting fertilizer (DAP) and top-dressing fertilizer (CAN). A clustered sample of 317 farmers out of 1878 farmers were randomly selected from the six wards in Alego Usonga sub county namely; Township, North Alego, South East Alego, Central Alego, West Alego and Usonga. The study was done for a period of three years between 2018-2020 and subject scope was limited to farm inputs subsidy.

1.6 Limitations

The limitations of study included:

1. Data collection coinciding with farming activities such that data collection was not possible as per the schedule in some instances. The researcher consulted farmers before administering the questionnaires and rescheduled some new dates for data collection.
2. Data collection coincided with the onset of short rains which made data collection challenging due to accessibility in the wards. The researcher had to reschedule most interviews in the morning hours

3. Poor road network hindered access to some interior villages of the study area making it difficult to reach all the intended respondents easily. The researcher used motor cycles to access such areas.

1.7 Assumptions of the Study

The following assumptions were taken into consideration in the study;

i. All farmers under study are within a common agro-ecological zone (AEZ) with similar weather characteristics.
ii. The respondents will be willing to cooperate in providing correct and honest answers during the study.
iii. The respondents were within similar economic status.
iv. The farms in the study area are uniform in terms of soils, fertility, drainage and water holding capacity.

1.8 Definitions of significant terms as used in the study

Agricultural inputs: A range of materials, the usage of which may boost agricultural productivity. Fertilizers and genetically engineered seeds are two of the most important.

Certified seeds: A kind of seed must pass field examination, be treated by an accepted seed habituation plant, be sampled, and pass laboratory trials before it can be sold. This is done in order to guarantee varietal purity.

Crop yield: A standard measurement of the amount of agricultural production harvested.

Farm Logistics: Refers to farm mechanization services in the County Government of Siaya referred to as Tractor Hire Services (THS).

Farm Subsidy: Refers to agricultural incentive paid to agribusinesses, agricultural organizations and farms by the government in order to make inputs affordable to farmers

Food Security: A state in which everyone always has physical and financial access to enough healthful food to meet their nutritional needs and food predilections for an active and healthy lifestyle.

Government's Farm Subsidies: Government free supplied input subsidies of CAN Fertilizer, DAP fertilizer, certified maize seeds and Subsidized NCPB fertilizer vouchers.

Production: is the quantity, worth, or quantity of goods and services generated by an employee, a facility, a firm, or an economy. It is the sum of the consequences created by the many factors working together.

Productivity: In economics, a ratio that indicates output in terms of input. Inputs consist of both labor and capital.

Programme: A plan of action is established with the idea of reaching a certain objective, containing specifications on the kind of work to be performed, when it should be performed, who should do it, and the resources that should be used.

Provision of farm inputs: This is the distribution of resources that are used in farm production, such as fertilizer and seeds.

Small holder farmer: People whose primary source of income is small-scale subsistence agriculture and who cultivate less than 2.0 hectares of land.

Subsidized Cost: A price of a product that is reduced because the government has paid part of the cost of producing it.

Training: Is an educational and learning process that involves acquisition of knowledge, concepts, rules and new information, changing of attitude, re-learning and reinforcement of existing knowledge and skills.

CHAPTER TWO: REVIEW OF LITERATURE

2.1 Introduction.

This chapter covers past studies on how agricultural inputs impact the yields and income of smallholder farmers. This includes compensation for fertilizer, seeds, mechanization, and extension services depending on small-scale farmers' demand and production. Components of this chapter include global subvention, subvention in Africa, subvention in Kenya, subvention in Siaya, theoretical framework, and logical framework.

2.2 Introduction inputs subsidy

Agricultural inputs are the many resources used to boost agricultural production. Future Agricultures by Wiggins and Brooks (2010). Input subsidies are government actions to maintain steady and low prices, reducing food costs for urban consumers and farmers with limited resources. Improved fertilizers and seeds are the most important factors. Consequently, a subsidy is a payment made using public funds to help a family, business, or industry compete for a product or service at a lower market price (Takeshima & Lee, 2012).

Agricultural inputs were essential to the green uprising that spread over Latin America and Asia in the 1960s and 1970s, and agriculture in industrialized countries continues to be highly dependent on them. (2009) Sub-Saharan Africa (SSA), which was largely excluded from the green revolution, relies on agriculture as its principal source of revenue. In 2002-2003, Sub-Saharan African farmers used 9 kilograms of fertilizer per acre, whereas South Asian, Southeast Asian, and Latin American farmers applied 100 kilograms, 135 kilograms, and 73 kilograms, respectively (Crawford et al., 2006).

A farm input subsidy is a concept that promotes the efficient use of agricultural resources such as water, pesticides, seeds, mechanization, labor, subsidies, and other types of financial aid. A

subsidy is a kind of financial aid or a more cost-effective grant distribution that may help fulfill several development goals. Without certain agricultural inputs, agriculture cannot flourish.

Many impoverished farmers in developing countries fear that they will be unable to afford or be interested in the inputs and technologies required to boost agricultural output (Wiggins & Brooks, 2010). A farmer may be eligible for agricultural input subsidies if they are unable or unwilling to buy agricultural inputs at market prices, such as owing to a lack of funds or a view that the inputs would not be economically viable given their current understanding of their advantages. Consequently, input subsidies may raise agricultural productivity, improve food security, and promote pro-poor economic growth by reducing food prices (Jayne & Rashid, 2013).

Politicians and economists debate the efficiency and use of farming input aids and the situations under which they may or may not be advantageous (Wiggins & Brooks, 2010; Kilic et al., 2013; Pauw & Thurlow, 2014). In the 1960s and 1970s, agricultural input aids were prevalent in rising rural thrifts, but by the 1980s and 1990s, they were largely seen as ineffective (Dorward, 2010). However, interest in and funding so-called "smart subsidies" has recently increased. The purpose of these subsidies is, among other things, to maximize their advantages for various stakeholders while minimizing their distorting effect on the establishment and functioning of effective commercial markets. This rise was motivated by the urgent need to restore food security while concurrently implementing long-term plans to expand output. Vouchers are used in these private-sector rationing, targeting, and distribution systems.

In history, the economic case for farming input subsidies included reducing transitory acquaintance and risk barriers to farmers adopting new technology and practices, boosting productivity, and allowing farmers and consumers to profit from food, labor market, and pricing advantages. While new and creative agricultural input subsidy schemes are being introduced, broader potential subsidy impacts such as private market development, soil fertility replacement, social guard, national and domestic food safety, and economic growth are being researched (Dorward, 2010).

Subsidies may help overcome resource capacity and distribution limitations by reducing the risk or eliminating poverty. As a result, commerce, innovation, investment, job creation, protection for the low-income, and other social evils or productivity may grow. In addition, it has the potential

to enhance rural development, raise agricultural revenue, and ensure a sufficient and steady food supply for the nation.

2.3 Agricultural subsidy worldwide

Since the early 1960s, most African and Asian countries have included mechanization, fertilizer, seed subsidies, and other farm input subsidies in their agricultural strategies (Wang et al., 2019). Pellegrini & Fernández from 2018 After 2005, the economic and political foundation for the second generation of targeted input subsidy schemes in Sub-Saharan Africa was improved. They do market research using data from Sub-Saharan Africa to make more educated decisions on input subsidies (Jayne et al., 2018). The initiation and implementation of the new subsidy program are marred by poor decision-making and a lack of appropriate processes. Rashid and Jessica collaborate well (2013). In addition to only partially fulfilling their intended objectives, they faced various unintended negative consequences. One of the most crucial concepts was having a clear departure path, but this was disregarded, making the bulk of modern systems dull rather than brilliant.

Agricultural inputs were crucial to the "green revolution" that swept Asia and Latin America in the 1960s and 1970s. They are essential to industrial agriculture (Agricultural inputs subsidy evaluation report,2012). In contrast, SSA was mostly disregarded by the green revolution, and agricultural input utilization in this area remains low. In 2002-2003, Sub-Saharan African farmers used nine kg of fertilizer per productive acre. Farmers in Latin America consumed 73 kilograms, farmers in South Asia consumed 100 kilograms, and farmers in Southeast Asia consumed 137 kilograms (Crawford et al., 2006). In contrast to Latin America and Asia, where agricultural production and output have increased over the last four decades, they have mostly stalled in Africa, increasing the continent's reliance on imported grains and the number of hungry people (Wiggins & Brooks, 2010; Future Agricultures, 2010).

In several major industrialized nations, agriculture subsidies have increased, reversing a long-standing pattern in which governments increased agricultural expenditure despite tight budgets and increasing food prices. The English Corn Law, a typical example of agricultural support via trade restrictions, heralded the beginning of government intervention in the American food and

fiber markets. After a lengthy time of administering Great Britain and Ireland, it was disbanded in 1846. As a consequence of the damage wrought by World War I, significant American export markets were closed in 1918, initiating a sequence of events that would ultimately lead to the formation of farming price and profits support programs.

Price and revenue support programs were established in the United States due to the widespread belief that farmers in the market economy were underpaid for agricultural commodities due to severe farm income and financial problems (agricultural subsidy).

The United States ushered in the modern age of agricultural subsidies with the Farming Modification Act of 1933, which gave the government the authority to set minimum prices and included administration stock purchases and land plans to decrease supply by culling cattle (summer, 2008).

Local governments were obligated to provide financial assistance to farmers to cultivate spring crops in 2004. As a result, subsidies were provided to premium seed producers with the expectation that farmers would save money in terms of fostering development and alleviating poverty, conventional wisdom is that the Asian Green Revolution was superior to input subsidies (Economist Intelligence Unit, 2008). This belief persists despite many studies demonstrating the effectiveness of subsidies in promoting agricultural growth in food staples in large countries, with high physical returns from input use.

Claim for non-agricultural properties and facilities with a greater domestic value and increasing supply capacity are two long-term structural trends in rural and national economies. Lowered food expenditures and increased income Due to changes in food prices and earnings, the actual incomes of the poor and those receiving food aid have increased.

According to Dorward et al. (2010), these future issues should not obscure the early importance of input subsidies in the development of civilization. Subsidy pessimism results from the ineffectiveness of subsidies in poor, impoverished Asia and the experiences of non-African nations with similar subsidies. According to Berg's analysis, input subsidies are integral to ineffective and unsustainable financial and economic policies that distort market incentives, limit farmer incentives, and competition, and impede the expansion of the African private sector. Subsidized

input programs were designed to aid farmers, but theoretical difficulties, diversion, and inefficiency usually limited their effectiveness. Despite this, several African countries have tried input subsidy schemes, which initially boosted productivity but eventually unsuccessful to withstand the financial asset and market procedures required to preserve advantages owing to political and economic concerns (for example, Zimbabwe and Malawi).

When these Asian and African understandings are combined, Dorward et al. 2011 find surprising failures and successes in maintaining the wide and long-term expansion of smallholder food staples (as noted above). Government and business economists may be more confused by persistent rural poverty than by macroeconomic and fiscal crises. In contrast, private sector initiatives are often ineffective and seldom productive. One may argue that private market-based solutions have never been proven effective because liberalizing food markets, not only in Africa, has been so challenging. However, expected business sector developments may be hampered as a result..

The Indonesian program attempts to achieve two objectives: first, to increase agricultural output and ensure national food security; second, to enhance farmers' ability to use fertilizer as effectively as feasible. The distribution of fertilizer is thus tightly supervised. Due to fertilizer shortages during planting season, the Indonesian government fell short of its goal of providing everyone with affordable fertilizer.

2.4 Agricultural subsidy in Africa

There is a high need for agricultural input subsidies in Sub-Saharan Africa; hence initiatives focusing on fertilizers, seeds, and equipment have been developed. Among the countries lowering the cost of agricultural commodities are Ghana, Zambia, Nigeria, Tanzania, Rwanda, Mali, and Senegal. A good illustration of how housing subsidies may be managed is the Zambian system of splitting rural and urban districts depending on population density or land area. A voucher system was developed for institutions that need direct government supply to do away with direct purchases from commercial providers. According to the World Bank (2010), this was done to improve efficiency and efficacy, broaden the distribution of subsidies to specific farmers, eliminate fraud,

and lower operating costs. Chirwa and Dorward (2011). Self-targeting will be built and put into place by public works, and these items and coupons will be delivered to the selected farmers.

Meanwhile, only affluent farmers had access to necessities (Minot & Benson, 2009). For instance, the Malawian government's invention was insufficient for the farmers who were supposed to utilize it since it required farm families to register before getting coupons, followed by monitoring and evaluation to avoid fraud and a request for user input. This innovative allocation strategy fell short of the expectations of the targeted farmers. This was achieved by expanding the number of organizations overseeing subsidy programs. Jayne with her coworkers in 2011

More than 80% of Tanzania's workforce is employed in agriculture, which generates more than 45% of the nation's GDP and is crucial for economic development. The Tanzanian government launched a scheme in 2008–2009 to recover agricultural inputs by encouraging the growth of low–income families (Arumugan, 2011). In order to increase food production and productivity in the targeted regions, the Tanzania Accelerated Food Security Project seeks to better farmers' access to necessary agricultural inputs. By boosting regional demand for products and services, lowering poverty and inequality, and promoting social and political stability, subsidized agriculture has improved the lives of the poor (Tambwe, 2012). The Tanzanian government created the National Agricultural Input Voucher Scheme to investigate further assistance options in response to crop failures in 2007 and 2008. (NAIVS). This sped up the development of sizable pilot projects with the World Bank between 2009 and 2012. The main goals of NAIVS, according to the World Bank (2009), were to increase fertilizer use in high-potential areas, lower high fertilizer costs to increase food production and prices, foster growth, and improve the private input supply chain.

Voucher-based subsidies were in use before 2014 (NAIVS). However, the government ceased utilizing vouchers because of the difficulties involved. Obstacles that prevent farmers from delivering their products include dishonest agricultural input suppliers and government agencies (URT, 2014). The Tanzanian government suggested group loans for smallholder farmers on July 11, 2014, to share agricultural input subsidies.

When fertilizer and hybrid maize seed subsidies were resumed ten years ago, the Government of the Republic of Zambia (GRZ(Zambia)) set its agricultural development and scarcity reduction

goals. In the context of structural adjustment, this article analyses the Farmer Input Support Programme (FISP) and other GRZ input subsidy schemes. The effect and results of program targeting are then examined using historical and current data. Even though 73% of smallholder farmers grow less than 2 hectares and 78% live in poverty, smallholder farmers who produce larger plots of land get 55% of the FISP fertilizer. Wealthier families get bigger input subsidies while all other factors remain constant. Subsidized fertilizer increases maize production and growth at the price of fallow land. However, for every kilogram of extra subsidized fertilizer, the average quantity of maize planted rises by 1.88 kg. The financial benefit-cost ratios for FISP fertilizer are substantially lower due to low maize fertilizer response rates, poor targeting, crowding out, and fertilizer diversion. Despite a lengthy history of government involvement, Akande et al. (2011) revealed that Zambia's subsidies have changed significantly regarding rate and approach. It is a frequent method of fertilizer application. Because of substantial diversion, fewer than 30% of small-scale farmers have access to free or extremely low-cost fertilizers. The scenario is similar in Kenya, where most farmers are competent and qualified. The impoverished and weak also get little sums, making it more difficult to make significant returns.

Concerns among African politicians, non-governmental organizations, and some policy analysts about the alleged failures of liberalized policies to support broad-based agricultural development provided the primary impetus for a new perspective on input subsidies in Africa, focusing on fertilizer subsidies. Concerns in Africa about deteriorating soil fertility, agricultural stagnation, and rural poverty coexisted with the awareness that input subsidies may be a viable instrument for social protection measures (due to the growing legitimacy of democratic governments in Africa and diverging donor perspectives on the merits of subsidies). Because of these constraints, input subsidies are now more likely to fulfill a wider range of objectives (sometimes implicit ones) than in the past.

2.5 Subsidies for agricultural inputs in Kenya

Kenya, like many other SSA nations, employed "universal" subsidy schemes from its creation in 1963 until the early 1980s, when structural adjustment policies (SAPs) were implemented (Dorward, 2011). These state-owned businesses dramatically increased agricultural productivity using cutting-edge inputs, such as fertilizer (Badiane et al., 2015). Since they privileged the

wealthiest members of society, they were often removed (Druilhe & Barreiro-Hurlé, 2012). Furthermore, due to high administrative costs, a government monopoly, and political influence, fertilizer subsidy schemes were ineffectual (Banful, 2010).

Kenya's input markets were opened in the 1980s and 1990s due to structural adjustment programs (SAPs.) Fertilizer cost 24 Kenya Shillings per kilogram in 2001, down from 4 Kenya Shillings in 1990. Kelly et al 2011). Several Sub-Saharan African (SSA) nations, notably Kenya, reinstated subsidy programs at the end of the 1990s, mostly to avoid poor agricultural performance brought on by SAP's negative consequences (NEPAD, 2013). To avoid the drawbacks of universal subsidies, intelligent subsidy systems were developed, and the Abuja Declaration of 2006 established the legal foundation for their widespread use in Africa (Bunde et al., 2014).

Kenya's GDP is directly contributed to by agriculture to the tune of 24% and indirectly by manufacturing, distribution, and other service-related businesses to 27%. Agriculture is the source of more than 45% of government income, 50% of export sales, and 75% of industrial raw materials. With a share of employment in the sector of 60%, it is the biggest employer in the nation. Agriculture is the primary source of income for more than 80% of rural populations. Center for Agriculture Research in Nairobi (2012) In light of these circumstances, the Government of Kenya (GoK) has continued to support agriculture as a crucial tool for the country's prosperity. Food insecurity is this industry's main problem. Like other governments, the Kenyan government has implemented three major policy changes in response to food crises: supply, price, and income-related policies; agricultural input subsidies, particularly fertilizers, are the main focus of supply-related policies. The National Cereals and Produce Board (NCPB) acquires and distributes agricultural inputs to achieve this goal. Kenyan farmers have benefited from agricultural subsidies since 2004 by increasing yields, reducing post-harvest losses, implementing new production techniques and technology, and developing market connections. As a result, farmer earnings and small farmers' ability to run their businesses and produce food have increased. Kenyan government (2010).

The Kenyan government said in 2009 that agricultural subsidies were the key factor in ensuring that the country produced enough food at the end of the year (Kato,2016). According to the government, farmers in breadbasket areas got low-cost seeds and fertilizers, while those in desert

regions received seeds for food crops resistant to drought (Sheahan & Barrett, 2017). The agriculture ministry's laws provide for the production of enough food for both domestic and commercial purposes (Walls et al., 2018). In addition, irrigation systems are necessary rather than relying only on crops supplied by rainfall. Small-scale farmers in Kenya find it challenging to get fertilizer subsidies, even though the National Cereals and Produce Board (NCPB) provides them to the community. This is because the wealthy are unlikely to let the underprivileged get them (Ricker-Gilbert et al., 2013).

2.6 Agricultural input subsidy in Siaya county

Since 2013 devolved agriculture, the Siaya County Government has enacted a variety of agricultural subsidies. In 2014, the county distributed 4,938,000 Kenyan shillings worth of maize and sorghum seeds. In the same year, the county provided 8 592 800 Kenyan shillings in fertilizer subsidies. In 2015, Kenya spent 3,6 million shillings on maize seed subsidies. In 2016, the county spent 19,990,000 Kenyan shillings on fertilizer and planting. The county has spent 37,110,800 Kenyan shillings in subsidies over the last three years, excluding the substantial expenditures of acquiring tractors for subsidized plowing services. The Siaya County Department of Agriculture

Siaya County's output has grown yearly, but it is important not to assume that fertilizer and seed subsidies help farmers produce more food. Even with subsidies in 2014 and 2015, the 2015 increase of 863 Metric Tonnes is inadequate to support subsidies. Furthermore, it might be claimed that fertilizer subsidies decreased production since crops would only wilt in the lack of sufficient rainfall if fertilizer were sprayed on them. Other essential food productions and accessibility factors include irrigation infrastructure, supply-driven extension services, soil monitoring, testing services, etc.

Siaya County's experience illustrates that food production subsidies are costly and are not a panacea for enhancing food supply or affordability. Indeed, the frequent food shortages and high food prices in Siaya call into doubt the substantial effect of subsidy programs. Subsidies allow counties to produce enough food for their needs and excess for sale. In contrast, county governments must establish comprehensive, accountable, and successful programs. Infrastructure for irrigation is essential for all subsidy systems. Targeting farms with limited resources, providing

extension services, and monitoring soil quality is crucial to the overall effectiveness of agricultural input subsidies.

2.7 Policy responses to the recent food crisis

The 1954 Swynnerton Plan stands out among national plans since it attempted to improve agricultural operations in Kenya's colony and raise grain and animal production for the indigenous people. Worse, Session Paper No. 10, "African Socialism and Its Application to Planning in Kenya," which advocated the development of so-called high-potential zones, was passed.

Due to devolution, nations are responsible for tailoring their agricultural policies to local conditions. This is Siaya's first agricultural plan, intending to direct agricultural expansion.

This approach is based on the 2030 Agenda for Sustainable Development and significant government activities in the agriculture sector. Some of these policies are the National Food and Nutrition Security Policy, the National Seed Policy, the National Agriculture Research Systems Policy, the Agricultural Sector Development Strategy (ASDS 2010-2020), and the Agriculture Sector Transformation and Growth Strategy (ASTGS) (2019-2029).

This strategy aims to localize national strategies and plans, adapt them to the country, and use them as the foundation for sector-specific policies and plans. Agriculture in Siaya is controlled by both local and federal laws. According to Legal Notice No. 160 of the 2012 Transition to Devolved Government Act, agriculture was devolved to Siaya County Governments. The Animal Diseases Act (Cap. 254), the Maritime Zones Act (Cap. 371), the Biosafety Act (2009), the Food, Drug, and Chemical Substances Act (Cap. 254), and agricultural, livestock, and fisheries research are all governed by the Kenya Agricultural and Livestock Research Organization (KALRO) Act of 2013. The sole local legislation is the Siaya Fisheries and Aquaculture Act of 2016.

The "Big Four" plan outlines the country's economic growth from 2018 to 2022. It focuses on the ingredients required to improve Kenyans' living conditions as the nation strives to achieve upper-middle income status by 2030. Even though agriculture is Kenya's key economic engine, the country is facing a food crisis. Food production has dropped due to reliance on rain-fed agriculture, inadequate technological adoption, frequent insect and crop disease assaults, harsh weather,

agricultural land degradation, urbanization encroaching on arable land, and youth migration from rural to urban regions.

The increase in food production and supply, price reductions to preserve food affordability, and assistance for value addition throughout the food processing value chain will be stressed to ensure food and nutrition security. Implementing post-harvest technologies, such as increasing food reserves for storage, developing cold storage facilities, and improving large-scale production, would need energy usage.

Agriculture accounts for around 30% of the yearly GDP. Kenya is still believed to be in the grip of a food crisis. Every year, one-third of Kenyans suffer from chronic food insecurity and malnutrition. Furthermore, 13% of the country's children are underweight, 30% are stunted, and 7% are wasted. 20% of people do not eat enough calories to have an active and healthy lifestyle. According to the Kenya National Bureau of Statistics' Policy Observation Report for January through March 2018, 57.4% of food consumed in rural areas and 68.3% in urban areas is purchased (2018). This shows insufficient food production, leading households to purchase food from the market to meet their nutritional needs. The bulk of these families is malnourished due to their deplorable living circumstances. Families resort to coping tactics such as skipping meals and cutting non-food spending, often depending on their children having well-paying jobs.

Inadequate infrastructure, a lack of agricultural technology, limited purchasing power, and food insecurity are all common causes of famine in the country. This is due to significant post-harvest losses and environmental deterioration. Subsidies for agricultural inputs would progressively increase their availability and consumption, as well as the adoption of the most up-to-date suitable technology, assuring food security in the studied region. 2016 Agriculture Department Report When implemented, this intervention will aid local and national efforts to boost food availability and security, hence improving the health and nutrition of the people.

Malnutrition would be reduced, health would improve, healthcare expenditures would be reduced, and school-aged children's academic performance would improve as a result of food security. These aspects will help the local economy since less money will be spent on food, which can then be invested in or developed elsewhere. According to projections, 70% of a family's income would

be spent on food; hence, boosting food production, accessibility, and availability will aid in poverty reduction and free up family resources for investments and other reasons.

Every rural community's agricultural industry contributes significantly to the economy and helps inhabitants accomplish crucial developmental milestones. It furthers the broad economic goals defined in Kenya's Vision 2030, which is built on three pillars: economic, social, and political growth (Kenya Vision 2030, 2007). Most countries have passed fertilizer subsidies to encourage the excessive use of chemical and organic inputs. An examination of the relevant literature found that all agricultural stakeholders must actively engage in the planning, implementation, evaluation, and decision-making processes to guarantee that the programs of the different organs accomplish their goals for the development of sustainable food security.

Significant progress has been made since agricultural subsidies were established in most of this continent's governments, notably in Africa (Shively & Ricker-Gilbert, 2013).

2.8 Theoretical Framework

The Sustainable Livelihood Approach Theory, developed in 1991 by Robert Chambers and Gordon Conway, and the theory of performance were utilized in this study to assess how multiple factors interacted to affect the usage of government subsidy programs for food security.

The Sustainable Livelihood Approach (SLA) Theory is concerned with how individuals might enhance and maintain their means of subsistence while also increasing their own and future generations' quality of life. Furthermore, it investigates how these actions may ultimately influence people's lives locally, nationally, and worldwide (Chambers & Conway, 1991).

Dynamic, people-centered, and comprehensive are three of the seven adaptive SLA guiding ideas. Enhancing existing assets, promoting sustainability, cultivating micro- and macro-links, and creating new connections

Adopting an SLA strategy for poverty reduction raises several difficult methodological and practical issues, such as difficulties identifying the poor and "social connections of poverty," as well as how inequality and power dynamics perpetuate and reproduce poverty locally. Despite

these difficulties, the SLA technique has benefits in that it shows the variety of self-supporting jobs that people often combine. This is especially true for the poor, who often depend on various economic activities; the collective influence on the family economy is enormous (Chambers R., 1995). This is congruent with the findings of Nelson and Hussein (1998), who show that the causes of poverty go well beyond low wages and food insecurity (Holland & Blackburn, 1998).

The SLA approach also aids in understanding the various variables that directly or indirectly determine or restrict poor people's access to various resources/assets and thus their livelihoods; it aids in understanding the links between people's livelihood strategies, asset status, and use of readily available natural resources; and it aids in evaluating the efficacy of interventions. The SLA framework was used to determine the relationship between the availability of information about the government's farm subsidy program, farmer training on how to use agricultural subsidies, farm input provision, and agricultural subsidy distribution timing and the four main pillars of food security, namely availability, accessibility, stability, and utilization. The framework for sustainable livelihoods seeks to envision livelihoods holistically, considering their complexities and the opportunities and limits they encounter. Various elements impact these constraints and possibilities, including local norms and institutions, resources to which the family or person has direct access, and international or national patterns and structures over which people have little control and may be misled. The family's resources, money, and decision-making power are not distributed evenly among all members.

The SLA framework makes it easy to predict how legally available seeds, fertilizer, and agricultural mechanization services at significantly reduced rates might increase crop yields and revenue. According to the theory, Input subsidies are a kind of physical capital that, when combined with human, social, financial, and environmental capital, provides resources for alternative livelihoods that may boost income and improve food security. In this scenario, input subsidies are independent variables that may affect yields and revenues, which are dependent

variables. The regulations of the government and the private sector will act as intervening factors on the dependent variable.

2.9 Theory of Performance

The study was theoretically based on Don Elger's Theory of Performance (ToP), which states that exceptional performance may lead to achieving a value or desired goal. According to Reinelt and Roach, a performer might be an individual or a collaborative group. A person's level of performance reflects where they are in their quest to improve. Current performance is influenced by context, information level, talent identification level, human traits, and fixed variables. A few examples are taking on a performer's mindset, immersing oneself in an inspiring environment, and practicing reflectively. A person, group, team, or farmer structured to utilize resources more efficiently and create a higher-quality product in less time may carry out a complicated set of activities that combine abilities and expertise to achieve the desired result. When small-scale rice farmers accept farm input subsidies and a measure of return is favorable to the target group, the goal of increasing the number of subsidized fertilizers used in agricultural projects is to raise the amount of rice produced per hectare. In other words, it evaluates the effectiveness with which agricultural inputs such as seeds, fertilizer, and farm logistics are employed in an economy to produce a particular quantity of output within time and space restrictions. The physical relationship between the dependent variable Yield and the independent variable subsidized fertilizer will be shown using an input-output model (KNBS).

According to Don Elgar, products or services that beat stakeholder expectations cost less time or money to make or are produced at better performance levels. Farmers' incentives and independence increase as agricultural production grows.

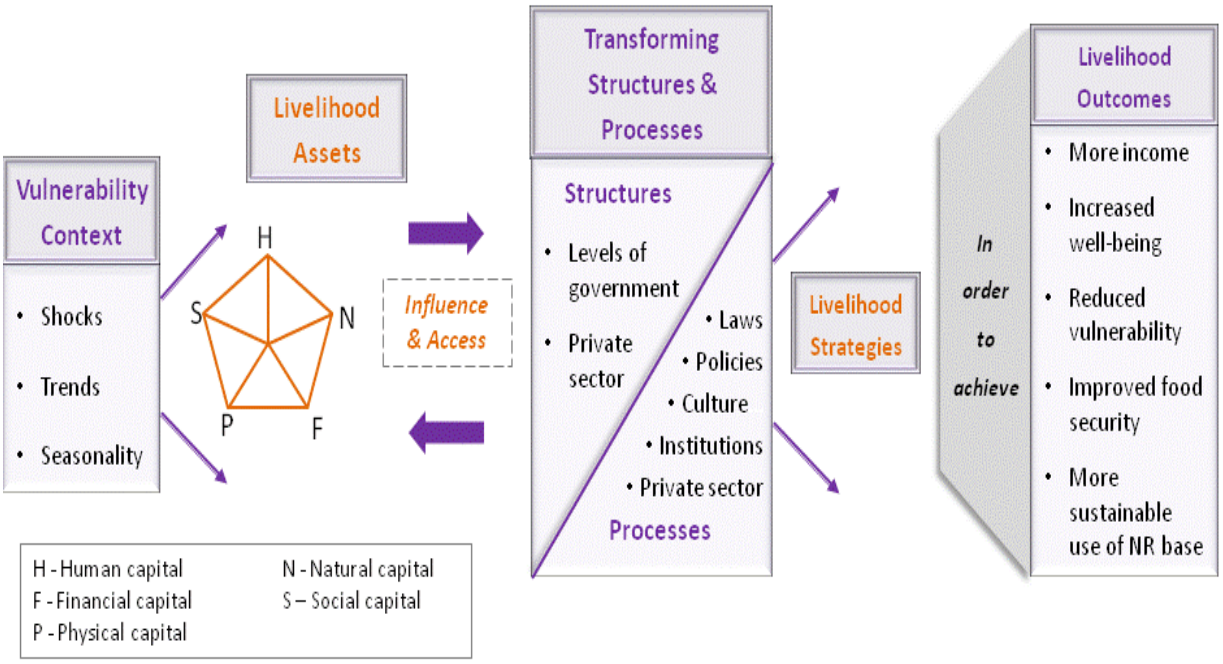

Figure 1: Theoretical Framework

2.10 Conceptual framework

According to (Mugenda & Mugenda, 2003), conceptual framework involves forming ideas about relationships between variables in the study and showing the relationship graphically. This study's conceptual framework was based on how independent variables which included: certified seeds, fertilizer and subsidized farm mechanization services influenced yields and incomes of smallholder farmers. Yields and income are dependent variables

The study was guided by the relationship between the variables as shown below:

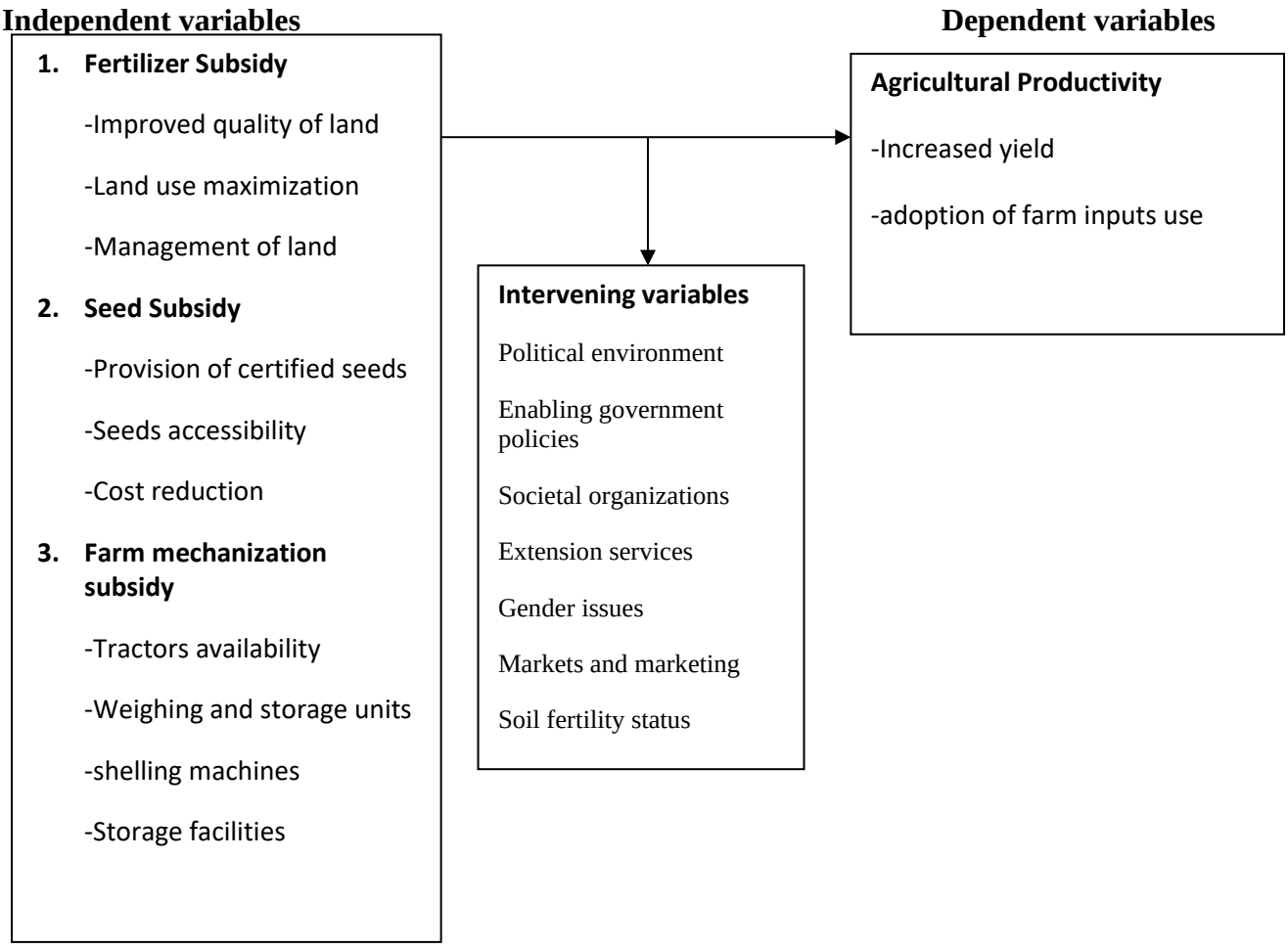

Figure 2: Relationship between variables

Explanation of variables

Figure 2 displays the study's variables' perceptions of the connection, demonstrating how the availability of certified seeds, fertilizer, and farm mechanization services, which are components of the independent variable, impact yields, and income, which are components of the dependent variable. Furthermore, it illustrates how moderating, and intervening factors impact the government's subsidy program's development and execution. Farmers with quick access to certified seeds should expect high-quality planting material and higher yields. Fertilizer will provide the necessary plant nutrients, guaranteeing healthy crop development. Subsidized

automated services make it easier to complete agricultural duties like land preparation on schedule, which is a critical component of good agronomic practices.

The term "independent variables" refers to features that are constant and unaffected by the other factors under consideration, such as fertilizer, certified seeds, and agricultural mechanization service subsidies. It is thought to be the reason. Increased yield, income, and input adoption are examples of dependent variables which exist because of other observable factors. These variables should change in response to an experimental change in the independent variable(s). It is the predicted outcome. Intervening factors, such as political backdrop, extension services, gender concerns, and marketing, are examples of intervening factors that relate to a fictitious variable designed to illustrate the link between two variables. Intervening impacts cannot be discovered by research or experiment. Randomization avoided these confounding factors in the research, which involved stratifying the population region into wards prior to selecting respondents using a simple random sample. In order to enhance coverage and reduce bias, 317 persons were polled. Furthermore, since they were asked about in the questionnaire, numerous intervening factors, such as gender-related obstacles, were included in the research. Extension service promotion and delivery All of these precautions were taken to reduce the impact of other factors. Dependent variable maize yield will be measured in kilograms while independent variables (seed, fertilizer) will be measured in kilograms. Independent variable THS will be in terms of acreage (acres). All the variables are valued in Kenya shillings.

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines and discusses the research methodology used to conduct the inquiry. This comprises the target population, sample design and technique, data collection tools, data collection methods, data analysis methodologies, and ethical considerations throughout the project's duration.

3.2 Study Area

The study was carried out in the Kenya Alego Usonga sub-county of Siaya County. Siaya County, one of the six counties that formed the former Nyanza Province, is currently included in Alego-Usonga, Gem, Bondo, Rarieda, Ugenya, and Ugunja. Siaya County has a total population of 993,183 people, with 471,669 men and 521,448 females, and a population density of 388, according to the 2019 Kenya Population and Housing Census (KPHC). There are around 199,034 households in the County. An average family farm has a land area of 1.02 hectares. (Department of Agriculture, Siaya County)

Siaya County is located in a diversified agroecological zone, UM1, LM1 to LM5, with an annual precipitation trend that ranges from 800 to 1,900 mm. The temperature ranges from 21 to 30 degrees Celsius, while the elevation ranges from 1124 to 1570 meters above sea level. The County has high atmospheric humidity, with yearly evaporation ranging between 1800 and 2000 mm. (Department of Agriculture, Siaya County)

Siaya County's three primary geomorphologic areas are Dissected Uplands, Moderate Lowlands, and Yala Swamp. They differ in geography, soils, and land use practices.

Alego Usonga hills includes Mbaga and Akara, Ugenya includes Odiado, Gem includes Regea, Rawalo, Nguge, Bondo includes Usenge and Ramogi hills, Got Abiero and Sirafuongo, and Rarieda includes Rambugu and Naya hills. The Nzoia and Yala rivers meet in Yala Swamp and flow into Lake Victoria. The attributes have an impact on the County's overall development potential. Higher altitude sites in the sub-counties of Ugenya, Ugunja, and Gem get more precipitation, making them excellent for cattle grazing and agricultural growth. Because of their

low heights and limited precipitation, Bondo, Rarieda, sections of Alego Usonga, and a piece of Gem Sub-Counties are good for cultivating cotton and other drought-tolerant crops.

Siaya County's geology may be divided into the following major groups based on their relative ages and lithologies, which span from the early Precambrian to the Quaternary. More Pleistocene to Recent strata, Precambrian intrusions, Nyanzian and Kavirondian system rocks, and other features may be found.

Alego Usonga Sub County, with a population of 214,541 people and an area of 605.8 km2, is divided into six wards: township, North Alego, South East Alego, Central Alego, West Alego, and Usonga (KPHC 2019)

3.3 Research Design

The study employed the survey research design, which is a method for investigating populations through sample selection, analysis, and the discovery of occurrences in order to provide numerical descriptions of a portion of the population as well as to describe and explain events as they are, as they were (Oso & Onen, 2008). This is the most efficient method for quickly collecting data for this research.

The research consisted of three sections: a review of pertinent publications and other material; fieldwork to gather primary data; and data analysis, discussions, and conclusions. Following this approach, data were collected by a home survey. To fill any gaps in the acquired baseline data, 8 to 15 participants engaged in intense group discussions on relevant themes. Opinion leaders, agricultural authorities, and community leaders were also questioned as crucial informants. During the survey, project participants were divided into sub county-based groups, from which samples were selected.

3.4 Target population

The study targeted 1878 farmers engaged in maize crop farming in the six wards namely; Usonga, West Alego, Central Alego, South East Alego, Township and North Alego in Siaya County that received the government free supplied input subsidies of 50Kgs bag of CAN fertilizer, 50Kgs of DAP fertilizer and 10Kgs of certified maize seeds and farmers who received government subsidized NCPB fertilizer vouchers in 2015. (Ministry of Agriculture report, 2015). The study

also targeted 1 Sub-County Agricultural Officer, 1 Ward Agricultural Officer and 4 extension officers.

3.5 Sample Size and Sampling Procedures

The sample size and sampling procedures were used in obtaining the study's samples from the population are described above.

Sample Size

The study utilized a sample size of 317 based on the (Krejcie and Morgan ,1970) sample size determination table and as cited by (Kasomo, 2007) a target population of 1878 farmers gave a sample size of 317. In addition, six (6) agricultural office personnel were also be interviewed. The population was stratified proportionately according to the six main regions in the sub county. This was done to provide every region with equal chances in the study.

Sampling Procedure

Sampling included choosing and evaluating a small sample of people to learn about the whole population from which they were chosen (Mugenda & Mugenda, 1999). The sample pool consisted of 1878 farmers from the target demographic. Because the target population was not homogenous and the goal of sampling was to discover the population value of a specific attribute, a representative sample of farmers from each area who receive government subsidies was constructed using proportionate stratified sampling. This method improves statistical efficiency and enhances the possibility of including any farmer receiving government agricultural subsidies in the sample (Kathuri& Pals, 1993). Total samples of 317 participants were randomly chosen from the population 1878 for the purpose of this study.

Proportional allocation method was used to keep the sizes of the samples from the different strata proportional to the sizes of the strata. If Pi represented the proportion of population included in stratum i, and n represented the total sample size, the number of elements selected from stratum I was n.P (Kothari, 2004). With the sample size (n) of 317 to be drawn from a population size (N) of 1878 which is divided into six strata of size N1=136, N2=322, N3=309, N4=463, N5=331 and N6=317

Table 3.1: Total and Proportion Sub -sample sizes of the population of study

Stratum	Total number of farmers	Proportion percentage of target population	Sample size
Usonga	136	7.3	23
West Alego	322	17.0	54
Central Alego	309	16.4	52
South East Alego	463	24.6	78
Township	331	17.7	56
North Alego	317	17.0	54
TOTALS	**1878**	**100**	**317**

Source; Department of agriculture extension report, 2016

Simple random sampling was then used to pick the samples from each stratum. With the defined population of 136,322,309,463,331 and 317 farmers, and the proportionate representative sample of 23,54,52,78,56 and 54 for stratum 1,2,3,4,5 and 6 respectively. A complete list of each stratum population was randomly generated for interviews.

3.6 Data Collection Instruments

3.6.1 Secondary Data collection

Secondary data collection was done especially on the background of the study area from the relevant institutions and government departments on areas of input access, extension and agricultural development.

3.6.2 Primary Data collection

Individual Survey (Questionnaires)

The surveys were performed using self-administered questionnaires for the literate and interview-administered questions for the academically challenged. They incorporated closed-ended and

open-ended questions to encourage responders to submit specific information. This instrument is popular because of its portability and affordability.

Focused Group Discussions

This was mainly used to collect qualitative data as they are particularly useful for getting the information behind participants' experience as they have the potential to pursue in-depth information around the topic. Standardized open ended discussions were shared with groups of between 8-15 participants. This was preferred due to the nature of the topic as it requires in depth information.

3.6.3 Pilot study

A pilot study was conducted in the Township ward by administering questionnaires to 20 farmers who benefitted from the government subsidy programme between 2011 to 2015 and 2 Agriculture personnel at the ward level. The 20 farmers were selected randomly giving any farmer a chance to be sampled in the pilot study. Piloting was done to check if randomization procedures were comprehensible to the research assistants, check reliability and validity of results and validate the research instruments before they are used to collect data for the actual study. The process was used to refine both the questionnaires and the interview schedules by testing their strengths and weakness followed by necessary adjustments. Pre-testing the questionnaire helped to iron out vague questions that may generate ambiguous responses, rephrase questions using comments by the respondents and to provide enough writing space. In addition to the pilot study, a few copies of the instruments were analyzed to ascertain the suitability of the methods of data analysis (Mugenda & Mugenda, 1999). The results of this process were used to identify potential practical problems in following the research procedures and to improve the design of the main study.

3.6.4 Reliability of instruments

The reliability of a research instrument is the frequency with which it produces the same findings across trials. Reliability is the degree of internal consistency or stability of measurement equipment across time (Borg & Gall, 1989). Tool validation proved this to be the case. A pretest sample of 20 randomly selected Township ward households was used to evaluate the instrument's reliability in the field. The Ward was chosen as one of the research areas where the Sub-input county's support

subsidy will be implemented. According to Kathuri and Pals (1993), twenty is the minimum number for which data analysis in a survey may provide relevant findings.

Questionnaires were pretested using a split-half analysis to achieve the desired reliability coefficient. The benefit of the split-half technique is that it eliminates random errors generated by varied test settings. A reliability value of at least 0.80 was deemed acceptable because, according to Mugenda & Mugenda, a reliability coefficient of 0.80 or above indicates a high degree of data credibility (2003).

3.6.5 Validity of instruments

Validity refers to the degree to which instruments measure what they claim to measure (Mugenda & Mugenda, 1999). Validation is accomplished by demonstrating that an instrument's items accurately reflect the abilities and characteristics it claims to measure. The authenticity of the research equipment guarantees the scientific validity of the results. Before administering the questionnaire in the field, the researcher will discuss the instruments' validity with their supervisor. This is essential since it ensures that any confusing, unclear, or imprecise questions are clarified or omitted and that any required changes and rephrasing are performed.

Using validity criteria, the instrument was examined to see how much easier it would be to gather data relevant to the topic and research objectives. We asked that a small group of colleagues and professionals in agricultural extension examine the questionnaire and its contents. The expert assessment criteria stressed the questions' ability to accurately describe the objectives and factors at hand and their flow and capability to elicit the necessary data and responses (content validity). Before administering the questionnaire in the final research, its content, structure, and sequence were modified in response to ideas and recommendations given by the first pilot assessment.

3.7 Data collection procedure

Upon receipt of clearance letter from the board of post-graduate studies and submission of copies of my thesis to JOOUST ethics review committee and getting clearance data was collected from the respondents with the help of research assistants after training them on data collection and questionnaire administration.

3.8 Data analysis

The Statistical Package for the Social Sciences (SPSS) version 19 was used to collect and analyze data. Data input started as soon as the questionnaires from the respondents arrived. First, the questionnaire data was thoroughly examined to guarantee its clarity, completeness, and usefulness. The data were reduced, collated, and tagged to allow for analysis and ensure the study's accuracy and relevance (Miles & Huberman, 1994). The data was examined using both quantitative and qualitative methodologies. In addition to traditional statistics such as frequency distribution tables and percentages, narrative analysis was utilized to evaluate the impact of the independent variable components on the dependent variable, agricultural productivity.

The acceptable statistical tools employed in this study are the logistic regression model, the spearman rank correlation to examine the nature of the link between two variables, and the chi-square test for independence.

3.8.1 Chi-square test.

The Chi-square statistic is often employed for examining the associations between two or more categorical variables. The null hypothesis of the Chi-Square test argues that there is no association between the population's category variables and any other factors (they are independent). As a result, if the P-value is less than the set alpha level, the null hypothesis has been rejected, and there is a link between the two categorical variables. This test was used for objective two and three which sought to test relationships between inputs and farmers' incomes and adoption level.

Suppose we wish asses relationship between variable X that has two levels, A and B, and variable Y that also has two levels, C and D. A table of their counts will be constructed, contingency table, Table 3.1 below. Where $O_{ij}$is the count of subjects that belong in the i^{th} category and j^{th}category

Table 3.1 below shows counts of different levels of variables

Table 3.1: contingency table

	Variable Y		
Variable	C	D	Total

A	O_{11}	O_{12}	$S1i = O_{11} + O_{12}$
B	O_{21}	O_{22}	$S2i = O_{21} + O_{22}$
Total	$Si1 = O_{11} + O_{21}$	$Si2 = O_{12} + O_{22}$	$S = S1i + S2i$

From the above table, the expected counts in each cell is computed to obtain the table of expected frequencies from which the chi-square statistic will be computed.

Table 3.2 below shows expected frequencies

Table 3.2: table of expected frequencies.

		Variable Y	
		C	D
Variable X	A	$E_{11} = \frac{S1i * Si1}{S}$	$E_{12} = \frac{S1i * Si2}{S}$
	B	$E_{21} = \frac{Si1 * S2i}{S}$	$E_{22} = \frac{Si2 * S2i}{S}$

The calculation of the Chi-Square statistic is quite straight-forward and intuitive. Given the above information the chi-square will be computed as;

$$x^2{}_{calc} = \sum \frac{(O_{ij} - E_{ij})^2}{E_{ij}}$$

Where;

$x^2{}_{calc}$- chi squared

O_{ij}-observed value

E_{ij}-expected value

The obtained is the calculated chi-square value which will be compared to the tabulated chi-square value. Chi-square in this study will be used to analyze the relationship of inputs subsidy and farmers' income levels of small-scale farmers and also in the analysis of the relationship of input adoption and the input subsidy on small scale farmers.

3.8.2 Logistic regression.

Binary logistic regression analysis was used to assess the relationship between the independent variables and the dependent variable in the study. The dependent variable in this case has to assume only two values (binary variable). Since the dependent variable of the study met this condition it was therefore appropriate to use the model for analysis to assess the relation between the variables of the study (Alfred DeMaris, 2013). The general model of this regression analysis took the form:

$$F(x) = \frac{e^{(\beta_0 + \beta_1 x_1 + \cdots + \beta_n x_n)}}{1 + e^{(\beta_0 + \beta_1 x_1 + \cdots + \beta_n x_n)}}$$

Where $x_1, x_2, x_3, \ldots, x_n$ are the independent variables of the study? $\beta_0, \beta_1, \beta_2, \ldots, \beta_n$ are the regression coefficients corresponding to each independent variableβ_0 is the constant coefficient of the regression model. To assess influence of farm inputs subsidy on agricultural productivity, input subsidies will be treated as the independent variables and agricultural productivity treated as dependent variable. This test was used for objective one by testing the influence of dependent against independent variable (yields vs inputs).

Where:

Y =expected maize yield in kilograms

x_1 =seed in kilograms

x_2 =fertilizer in kilograms

3.8.3 Spearman rank correlation coefficient.

The Spearman rank correlation test is a non-parametric test determining the relationship between two variables. The Spearman rank correlation test is the proper correlation analysis when the variables are assessed on a scale that is at least ordinal since it makes no assumptions about the data distribution.

The following formula was used to calculate the Spearman rank correlation:

$$\rho = 1 - \frac{6\sum d_i^2}{n(n^2-1)}$$

ρ=Spearman rank correlation

di= the difference between the ranks of corresponding variables

n= number of observations

This test was used in objective two and three to test nature of relationship or degree of association between inputs and incomes and adoption level

3.8.4 Cronbach alpha coefficient

Cronbach's alpha is a statistical process used to test the instrument's reliability during data collection. This strategy assures that survey data retains its value even if the questions are substantially altered. When the variable formed by such a series of queries consistently returns the same result, it is said to be reliable. The actual score on the concept explains variation in a measure of dependability known as Cronbach's alpha. The alpha coefficients, which range from 0 to 1, are used to evaluate the reliability of questions with two possible answers, surveys, and multi-pointed scales (for instance, a rating scale where 1 is awful and 5 is excellent). Taber contends (2018). Even though literature often uses lower standards, a dependability coefficient of 0.7 is adequate. This test was used on data collection tool (questionnaires) in order to ascertain its reliability in statistical data collection.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter presents data analysis and findings of the results of the study. The results of descriptive statistics of the demographic information of respondents and seed subsidy, fertilizer subsidy and farm logistics are presented. These are followed by results of descriptive statistics of the study variables, correlation analysis and cross tabulation as well as inferential statistics

4.2 Descriptive Statistics

This section presented and discussed the results of the descriptive statistics of demographic information of the respondents, seed subsidy, and fertilizer subsidy and farm logistics. It also presented descriptive analyses results of the study variables.

4.3 Demographic Information

This section describes the characteristics of the respondents used in the study. Demographic characteristics include features such as gender, age, education level and marital status. The demographic characteristics were studied in order to give an understanding of the respondents and their setting which was viewed as necessary to the analysis of the data obtained.

4.3.1 Gender Proportion

The research sought to find out the gender distribution of the respondents under study. From the findings in the table 4.1 below, majority of the respondents are female with a proportion of 55.5% followed by male (44.5%). This is clear depiction that majority of the people entangled with this activity involving the use of the farm inputs under study are female

Table 4.1 below summarizes the demographic information on gender of respondents.

Table 4. 1: table of proportion of gender.

Gender		Frequency	Percent	Valid Percent	Cumulative Percent
	Female	176	55.5	55.5	55.5
	Male	141	44.5	44.5	100.0
	Total	317	100.0	100.0	

4.3.2 Age Distribution

From the findings in table 4.2 below, it's clear that majority of the respondents are aged between 36-50 years. This is a clear depiction that majority of the respondents were mature and they amicably gave the response of what was happening hence accuracy of the information as expected.

Table 4.2 below shows age distribution of respondents

Table 4.2: Age of the respondents

	Frequency	Percent	Valid Percent	Cumulative Percent
36-50 yrs	172	54.3	54.3	54.3
51-65 yrs	54	17.0	17.0	71.3
Above 65 yrs	14	4.4	4.4	75.7
Below 36yrs	77	24.3	24.3	100.0
Total	317	100.0	100.0	

4.3.3 Educational Level

From the findings in the table below, majority of the respondents had reached primary educational level (49.5%) followed by32.5% who had reached secondary level. This is a clear reflection majority had basic required level of education for understanding of what is expected. Research supports this by supporting or confirming that education improves people's knowledge and skills in decision making process.

Table 4.3 below shows education level of respondents

Table 4.3: Education level

		Frequency	Percent	Valid Percent	Cumulative Percent
	College	25	7.9	7.9	7.9
	No formal education	32	10.1	10.1	18.0
	Primary	157	49.5	49.5	67.5
	Secondary	103	32.5	32.5	100.0
	Total	317	100.0	100.0	

4.3.4 Farm Size

Based on the output of the analysis in table 4.4 below, it shows that majority of the farmers were engaged with their activities for farm size of below 3 acres (82.6%). Followed by 3-6 acres with a proportion of 17.0%

Table 4.4 below shows farm sizes owned by respondents

Table 4.4: Farm size

		Frequency	Percent	Valid Percent	Cumulative Percent
	3 to 6 acres	54	17.0	17.0	17.0
	Above 6 acres	1	.3	.3	17.4
	below 3 acres	262	82.6	82.6	100.0
	Total	317	100.0	100.0	

4.3.5 Land Ownership

Majority of the Land ownership is mainly by male with a proportion of 86.1%. This is reflected by the output of the analysis in table 4.5 below. This state may have been attributed to due state and nature of the culture of the residents in the region

Table 4.5 below shows land ownership by gender of respondents

Table 4.5: Farm Ownership

		Frequency	Percent	Valid Percent	Cumulative Percent
	Female	44	13.9	13.9	13.9
	Male	273	86.1	86.1	100.0
	Total	317	100.0	100.0	

4.4 Input Subsidy Influence Yields of Small-Scale Farmers

4.4.1 Use of Fertilizer

The researcher sought to find out how many of the respondents use fertilizer in their activities as well check its effect and relationship with crops yield. From the findings in table 4.6 below, it was clear that majority of the respondents (87.7%) do use fertilizer in their various activities**.**

Table 4.6 below shows fertilizer usage by respondents

Table 4.6: Fertilizer Use

		Frequency	Percent	Valid Percent	Cumulative Percent
	No	39	12.3	12.3	12.3
	Yes	278	87.7	87.7	100.0
	Total	317	100.0	100.0	

Further analysis on its effect on the yield of small-scale farmers was performed.

Table 4.7 shows chi square tests

Table 4.7: Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2-sided)	Exact Sig. (1-sided)
Pearson Chi-Square	44.694[a]	1	.000		
Continuity Correction[b]	41.029	1	.000		
Likelihood Ratio	31.006	1	.000		
Fisher's Exact Test				.000	.000

Table 4.8 below shows symmetric measures

Table 4.8: Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.375	.000
	Cramer's V	.375	.000
N of Valid Cases		317	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Correlation statistics are available for numeric data only.

4.4.2 Awareness of Fertilizer Subsidy

Despite the use of fertilizer by majority of the respondents as shown in table 4.6 above it's clear that most of them were also aware of existence of fertilizer subsidy in the region (Siele , 2018).

This might have also facilitated in increase in usage. The findings in table 4.9 below shows that the state of being aware had a positive impact to the yield in one way or the other.

Table 4.9 below shows level of awareness of existence of subsidy.

Table 4.9: Awareness of existence of fertilizer Subsidy

	Frequency	Percent	Valid Percent	Cumulative Percent
No	55	17.4	17.4	17.4
Yes	262	82.6	82.6	100.0
Total	317	100.0	100.0	

The findings in table 4.9 above show that, awareness of fertilizer subsidy had a positive and significant relationship with yield of small-scale farmers. This shows that increase in awareness of fertilizer subsidy leads to an increase in yield.

Table 4.10 below shows symmetric measures

Table4.10: Symmetric Measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.362	.000
	Cramer's V	.362	.000
N of Valid Cases		317	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Correlation statistics are available for numeric data only.

4.4.3 Effect of Fertilizer on Land Use

From the findings, we found that the use of fertilizer had positive and significant attribution to yield of small-scale farmers. Despite that, the findings in table 4.11 below shows that majority of the respondents (49.5%) concurs that it has greatly increase their land use as was indicated by previous study conducted by Willy et al 2019.

Table 4.11 below shows increase in land use among respondents

Table 4.11: Increase Land Use

		Frequency	Percent	Valid Percent	Cumulative Percent
		35	11.0	11.0	11.0
	No	125	39.4	39.4	50.5
	Yes	157	49.5	49.5	100.0
	Total	317	100.0	100.0	

4.4.4 Awareness of seed subsidy

The researcher sought to carry out analysis based on seed subsidy awareness and examine if it has influence on the yield of small-scale farmers. From the findings in table 4.12 below, its vivid that majority of the respondents (82.0%) were aware of existence of seed subsidy while minority were not informed of the same. Due to an increase in technology innovation in the world, people can now easily access information; therefore, farmers are well informed about any changes that happen in the ministry of agriculture (Dorward & Chirwa, 2011).

Table 4.12 below shows seed subsidy awareness

Table 4.12: Seed subsidy awareness

		Frequency	Percent	Valid Percent	Cumulative Percent
		1	.3	.3	.3
	No	56	17.7	17.7	18.0
	Yes	260	82.0	82.0	100.0
	Total	317	100.0	100.0	

The researcher further examined if the awareness of seed subsidy had an impact on the yield of small-scale farmers. From the output of their analysis in table 4.13 below it clear that seed subsidy awareness has strong and positive relationship with the yield which was statistically significant at $p=0.002<0.05$ hence increasing the awareness of seed subsidy to small-scale farmers is likely to contribute positively to increase in yield.

Table 4.13 below shows symmetric measures

Table 4.13: Symmetric Measures

			Value	Significane(p-value)
Nominal	by	Phi	.195	.002
Nominal		Cramer's V	.195	.002
N of Valid Cases			317	

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Correlation statistics are available for numeric data only.

4.4.6 Access to Seed Subsidy

Despite being aware and its positive contribution to the yield of small-scale farmers, the researcher carried out analysis to find out if the farmers could access the subsidized seeds, from the analysis in table 4.14 below, it reflects that majority of the farmers (82.6%) could access subsidized seeds and this is what has greatly enabled them to increase their production.

Table 4.14 below shows access to seed subsidy by respondents

Table 4.14: Access to seed subsidy

	Frequency	Percent	Valid Percent	Cumulative Percent
No	55	17.4	17.4	17.4
Yes	262	82.6	82.6	100.0
Total	317	100.0	100.0	

4.4.7 Awareness of issuance of farm logistics

The researcher sought to know the state of awareness of farm logistics to small-scale farmers in the region and if this farm logistics were having an impact in the yield of these farmers. The findings are shown in table 4.15 below, it's clear that majority of the farmers (87.1%) were aware of farm logistics in the regions.

Table 4.15 below shows farm logistics awareness

Table 4.15: Farm Logistics awareness

	Frequency	Percent	Valid Percent	Cumulative Percent
	3	.9	.9	.9
No	38	12.0	12.0	12.9
Yes	276	87.1	87.1	100.0

Total	317		100.0	100.0

Further, the findings in table 4.16 below shows that this awareness had a positive impact and it contribute positively and significantly ($p=0.001<0.05$) to the yield of these farmers. Hence an increase in awareness is likely to lead to an increase in the yield of small-scale farmers in the region.

Table 4.16 below shows symmetric measures

Table 4.11: Symmetric measures

		Value	Approx. Sig.
Nominal by Nominal	Phi	.208	.001
	Cramer's V	.208	.001
N of Valid Cases		317	
a. Not assuming the null hypothesis.			

Descriptive Statistics on Agricultural Extension Services.

4.4.8 Attendance to Agricultural Field Days

The researcher sought to know if the farmers have been attending agricultural field day actively, from analysis, majority of the farmers have not been attending the agricultural field days by a proportion of 64.4% while only 34.4% of the respondents agreed to have attended field days.

Table 4.17 below shows attendance to field days by respondents.

Table 4.17: Attendance Agricultural Field Days

		Frequency	Percent	Valid Percent	Cumulative Percent
		3	.9	.9	.9
	Don't know	1	.3	.3	1.3
	No	204	64.4	64.4	65.6
	Yes	109	34.4	34.4	100.0
	Total	317	100.0	100.0	

4.4.9 Frequency of Visit by Agricultural Service Providers

The research findings reflected that majority of the agricultural service providers visits the farmers once a month with a proportion of 35.5%while 24.6% of respondents agreed that they are rarely visited by Agricultural Extension Officers

Table 4.18 below show frequency of farm visits

Table 4.18: Frequency of Farm Visit

		Frequency	Percent	Valid Percent	Cumulative Percent
		6	1.9	1.9	1.9
	None at all	56	17.7	17.7	19.6
	Once a month	111	35.0	35.0	54.6
	Rarely	66	20.8	20.8	75.4
	Weekly	78	24.6	24.6	100.0
	Total	317	100.0	100.0	

4.5 Inferential Statistics

4.5.1 To determine the influence of input subsidy on the yields of small-scale farmers in Alego Usonga sub-county, Siaya County

The researcher to determine how input subsidy such a fertilizer, seed and farm logistics influences the yield of small-scale farmers**.**

4.5.1 (a) **Analysis of fertilizer subsidy, seed subsidy and farm logistics on yield of small-scale farmers.**

Subsidized fertilizer has a positive influence on agricultural productivity as the logistic regression suggests that keeping other variables a constant, for every unit increase in subsidized fertilizer there is a 24.471 increase in productivity. For every unit increase of subsidized seed while keeping other variables a constant, productivity increases by 1.030. subsidized farm logistic has the smallest influence on productivity as it only leads to a 0.982 increase in productivity.

The significance level has P-values 0.002 for subsidized fertilizer, 0.012 for the subsidized seeds, 0.019 for farm logistics and 0.000 for the constant coefficient which they are all less than the standard P-value 0.025 implying that all the coefficients are statistically significant and thus they have influence on agricultural productivity.

Table 4.19 showing logistic regression of inputs

Table 4.19: logistic regression output

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Subsidized_fertilizer(1)	24.471	42.970	.000	1	.002	.000
	Subsidized_seeds (1)	1.030	.481	4.577	1	.012	.357
	Farm_logistics(1)	.982	.419	5.499	1	.019	.374
	Constant	-3.268	.404	65.511	1	.000	26.263

a. Variable(s) entered on step 1: Bd_Time_Received, Cc_times_access_seed subsidy.

From the logistic regression, a classification table was obtained. The classification table contains predicted values and the observed values as shown in Table 4.20 below. The accuracy is 90.36 implying that the independent variables; subsidized fertilizer, subsidized seeds and farm logistics account for 90.36% of the improved yield performance in agricultural productivity among small-scale farmers.

Table 4.20 showing model performance

Table 4.20: classification table for model performance

Observed			Predicted		
			improved_yield		Percentage
			0	1	Correct
Step 0	improved_yield	0	23	20	.0
		1	1	274	100.0
	Overall Percentage				90.36
a. Constant is included in the model.					
b. The cut value is .500					

4.5.2. To analyse the effect of inputs subsidy on the incomes of small-scale farmers in Alego Usonga sub-county, Siaya County

The researcher sought to establish the relationship between the input subsidy and the income. Chi-Square test was also used to measure the relationship between various variables under study as well as their strength was carried out as per input subsidy.

4.5.2 (a). Relationship between fertilizer subsidy and income levels of the small-holder farmers.

The Chi-squire test was carried out to establish if there is relationship between fertilizer subsidy and the income of small holder farmers and well as the nature of the relationship between the two variables. The findings on table 4.21 below shows that there is a significant association between fertilizer subsidy and income with a p value of 0.004 which is less than 0.05 hence the two depends on each other.

Table 4.21 showing chi-square test

Table 4.21: Chi-Square Tests

	Value	Df	Sig.(p-value)
Pearson Chi-Square	1.040[a]	2	.004
Likelihood Ratio	1.021	2	.600
Linear-by-Linear Association	.370	1	.543
N of Valid Cases	317		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is 13.31.

The researcher sought to find out the nature of the relationship between the fertilizer subsidy and the income levels by looking at their correlation. The results in table 4.22 below shows that there is a strong positive relationship between the two which was statistically significant at $p=0.001<0.05$

Table 4.22 showing symmetric measures

Table 4.22: Symmetric Measures

		Value	Asymp. Std. Error[a]	Approx. T[b]	Significance. (p-value)
Nominal by Nominal	Phi	.057			.004
	Cramer's V	.057			.004
Interval by Interval	Pearson's R	-.034	.057	-.608	.014[c]
Ordinal by Ordinal	Spearman Correlation	-.024	.057	-.428	.019[c]
N of Valid Cases		317			

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

4.5.2 (b). Relationship between Seed subsidy and income levels of the small-holder farmers.

The Chi-squire test was carried out to establish if there is an association between fertilizer subsidy and the income of small holder farmers and well as the nature of the relationship between the two variables. The findings on table 4.23 below shows that there is a significant association between seed subsidy and income with a p=0.005<0.05 which implies that the two variables depend on one another.

Table 4.23 showing chi-square test

Table 4.23: Chi-Square Tests

	Value	df	Significance (p-value0
Pearson Chi-Square	14.968[a]	4	.005
Likelihood Ratio	16.468	4	.002
Linear-by-Linear Association	11.518	1	.001
N of Valid Cases	317		
a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is .36.			

The researcher sought to find out the nature of the relationship between the seed subsidy and the income levels by looking at their correlation. The results in table 4.24 below shows that there is a strong positive relationship between the two which was statistically significant at p=0.005<0.05

Table 4.24 showing symmetric measures

Table 4.24: Symmetric Measures

		Value	Asymp. Error[a]	Std.	Approx. T[b]	Sig. (p-value)
Nominal by Nominal	Phi	.217				.005
	Cramer's V	.217				.005
Interval by Interval	Pearson's R	.191	.049		3.452	.001[c]
Ordinal by Ordinal	Spearman Correlation	.189	.052		3.425	.001[c]

N of Valid Cases	317
a. Not assuming the null hypothesis.	
b. Using the asymptotic standard error assuming the null hypothesis.	
c. Based on normal approximation.	

4.5.2 (c). Relationship between Farm logistics and income levels of the small-holder farmers.

The Chi-squire test was to find out if there is a relationship between farm logistics and the income of small holder farmers and well as the nature of the relationship between the two variables. The findings on table 4.25 below shows that there is a significant association between farm logistics and income with a $p=0.000<0.05$ which implies that the two variables depend on one another.

Table 4.25 showing Chi-square test

Table 4.25: Chi-Square Tests

	Value	df	Sig. (p-value)
Pearson Chi-Square	95.216[a]	4	.000
Likelihood Ratio	99.836	4	.000
Linear-by-Linear Association	82.450	1	.000
N of Valid Cases	315		
a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.45.			

The researcher sought to find out the nature of the relationship between farm logistics and the income levels by looking at their correlation. The results in table 4.26 below shows that there is a strong positive relationship between the two which was statistically significant at $p=0.000<0.05$.

Table 4.26 showing symmetric measures

Table 4.26: Symmetric Measures

		Value	Asymp. Error[a]	Std.	Approx. T[b]	Sig.(p-value)
Nominal by Nominal	Phi	.550				.000
	Cramer's V	.550				.000
Interval by Interval	Pearson's R	-.512	.046		-10.557	.000[c]
Ordinal by Ordinal	Spearman Correlation	-.504	.046		-10.315	.000[c]
N of Valid Cases		315				

a. Not assuming the null hypothesis.

b. Using the asymptotic standard error assuming the null hypothesis.

c. Based on normal approximation.

4.5.3 To examine the contribution of input adoption and the input subsidy on small scale farmers in Alego Usonga sub-county, Siaya County.

The researcher sought to examine the contribution of input adoption and the input subsidy on small scale farmers by looking at the current relationship and at their strength so as to make necessary measures pertaining the situation. The researcher carried out the Chi-square test and correlation test to see if there exists a relationship and see the nature of the relationship that's prevailing respectively.

Respondents were asked to state if there is any challenge with the input subsidy program. From the findings in table 4.27 below, 74.8% of the respondents concurred that there are challenges with the adoption of the current input subsidy program. This is in concurrence by study done by Dhar et al., 2018. Hence there is need for the challenges to be addressed.

Table 4.27 showing challenges with input subsidy

Table 4.27: Challenges with input subsidy

		Frequency	Percent	Valid Percent	Cumulative Percent
		74	23.3	23.3	23.3
	No	6	1.9	1.9	25.2
	Yes	237	74.8	74.8	100.0
	Total	317	100.0	100.0	

The researcher wanted to carry analysis and find out if the inputs the farmers receive are the right quality and quantity. From the findings in table 4.28 below, it's clear that majority of the farmers (65.3%) were amicably satisfied with quality and quantity of the inputs they do receive.
Table 4.28 showing acceptance of right quantity and quality of inputs received

Table 4.28: Acceptance of quantity and Quality of inputs received.

		Frequency	Percent	Valid Percent	Cumulative Percent
		89	28.1	28.1	28.1
	No	21	6.6	6.6	34.7
	Yes	207	65.3	65.3	100.0
	Total	317	100.0	100.0	

Respondents were asked to state if the inputs distribution is timely and if there is any challenge, majority of the farmers argued that these input subsidies are not distributed in time. This depicts a great challenge in relation to adoption of this subsidy by theses farmers as presented in table 4.29 below.

Table 4.29 showing timely distribution of inputs

Table 4.29: Timely Distribution

		Frequency	Percent	Valid Percent	Cumulative Percent
		72	22.7	22.7	22.7
	No	187	59.0	59.0	81.7
	Yes	58	18.3	18.3	100.0
	Total	317	100.0	100.0	

From the findings in table 4.29 above it was found that majority of respondent farmers said that inputs distribution is not done at the right time making them not maximize on output. In particular was late availing of farm logistics (farm mechanization services), subsidized seeds and fertilizer when rains have started thus compromising crop yields due late land preparation and late planting. This has a net negative effect on yields and productivity.

4.5.3 (a). Test for relationship between input adoption and input subsidy

From the findings in table 4.30 below, its vivid that there is an association between input adoption and input subsidy despite the existence of challenges as reflected in the findings which is statistically significant at $p=0.000<0.05$.

Table 4.30 showing Chi-square test

Table 4.30: Chi-Square Tests

	Value	df	Sig. (p-value)
Pearson Chi-Square	160.146[a]	8	.000
Likelihood Ratio	157.894	8	.000
N of Valid Cases	317		

a. 0 cells (0.0%) have expected count less than 5. The minimum expected count is .02.

4.5.3 (b). Test for the Nature of relationship between input adoption and input subsidy

The researcher found out that there is a strong and positive relationship between input adoption and input subsidy. The association between the two is statistically significant. This implies that an increase in supply of subsidy leads to increase in adoption of input subsidy.

Table 4.31 showing symmetric measures

Table 4.31: Symmetric Measures

		Value	Sig. (p-value)
Nominal by Nominal	Phi	.711	.000
	Cramer's V	.503	.000
N of Valid Cases		317	
a. Not assuming the null hypothesis.			

CHAPTER FIVE: DISCUSSION

5.1 Introduction

The chapter discusses the results and findings of the research

5.2 Demographic data

According to the data collection findings, most respondents are female (55.5%), followed by men (44.5%). This demonstrates that the great majority of agricultural employees are women. According to the figures shown above, it is projected that in Alego Usonga, more women than males participated in subsidized agricultural activities. In rural regions, women are more likely to engage in agriculture, while men are more likely to seek employment in urban areas. Because women have less buying power than males, the Agriculture Department, acting on behalf of the government, provides them free or heavily discounted farm products more often than men. Unlike most males, the majority of women support rural development programs.

African women produce 90% of food crops, household water, and fuel, 80% of the labour involved in storing and transporting food, 90% of the hoeing and weeding, and 60% of the harvesting and selling, according to FAO research (Food Agricultural Organization, 2004). The research outcomes indicated that gender had a significant role in subsidy allocation. There were 55.5% females among small-scale farmers. 44.5 per cent of their male friends shared their enthusiasm for small-scale farming. This was because, unlike women with less buying power, most men moved from rural to urban regions to pursue employment and did not support programs that encouraged rural communities.

54.3% of farmers, according to the data, were between the ages of 36 and 50. This is because, by this age, most of them have established families and, due to unemployment, have turned to farming as a source of revenue. However, there were few farmers younger than 36. This is because these young people are either still in school or actively seeking employment. Most of them were childless and saw farming as a filthy occupation, so they did not consider it a source of income. This indicates that most respondents were mature adults who responded calmly to the situation,

resulting in the information being as anticipated (Rosi et al., 2019). According to the results (Deck, 2012), adults make sensible judgments. Using a range of Rural Young Agricultural Programs, the Ministry of Agriculture acknowledges the significance of agricultural education for its youth. 62% of Kenya's population is classified as young, or between the ages of 18 and 35, constituting more than half of the overall population. Despite having a somewhat good literacy level and being open to new ideas, youngsters make up 24.3% of the target sample group because they avoid the curriculum combining basic knowledge with local farming approaches. Consequently, agriculture is now a testable subject in primary and secondary schools in Kenya.

To boost productivity and guarantee food security, the researchers also analyzed the respondents' educational backgrounds affecting their readiness to accept subvention farming. Low agricultural growth and food insecurity in underdeveloped nations are mostly attributed to a lack of information. Education is essential for the sustainable expansion of rural income. Farmers with a higher education degree are better able to manage resources and acquire the adaptable skills necessary for knowledge-intensive agricultural operations. Education improves analytical reasoning, problem-solving, and comprehension of the link between agricultural inputs and outputs. 2004 World Food and Agriculture Organization. Most respondents had completed elementary education (49.5%), while 32.5% had graduated from high school. This is an unmistakable indication that the majority has just the bare minimum of knowledge essential to comprehend what was anticipated (Dressel, 1981). The study of Aboagie et al. (2014) validates this since education increases people's decision-making skills and knowledge. According to research conducted by Nompozolo (2000) and Bari (1987), education is the cornerstone of all successful agricultural endeavours. According to the research, a farmer's odds of success increase with his or her level of education. Both studies revealed that education enhanced management skills by assisting farmers in developing and executing farm plans and teaching them how to increase product marketing. A solid education may aid in fostering intrinsic talent and provide a platform for wise decisions (Oeffle & Koelle, 2003).

According to the survey, the majority of farmers getting government subsidies (82.6%) had fewer than three acres of land. (Genet,2020). This demonstrates that farming is difficult for most farmers, restricting their capacity for growth. While men hold the bulk of land (86.1%), most agricultural

labourers are female. This may have a detrimental effect on agricultural output and impede farm-level decision-making.

5.3 Influence of farm inputs subsidy on agricultural productivity

If all other factors remain constant, a 24.471% increase in agricultural production is projected for each unit increase in subsidized fertilizer. When all other factors remain constant, each additional unit of subsidized seed increases crop productivity by 1.03 percent. Farm logistics subsidies enhance production by 0.982%, making them the least effective component.

All the coefficients are statistically significant and influence agricultural productivity since their P-values are less than 0.025 for the constant coefficient, subsidized fertilizer, seeds, farm logistics, and all other variables. P-values of 0.002 for subsidized fertilizer, 0.012 for seeds, 0.019 for farm logistics, and 0.000 for the constant coefficient indicate the significant threshold. The classification table analysis has an accuracy of 90.36 percent, indicating that independent factors such as subsidized fertilizer, subsidized seeds, and farm logistics account for 90.36 percent of the superior yield performance among small-scale farmers. This beneficial impact is supported by the results of (Davidova et al., 2015), who found that subsidized fertilizer increased the daily available kilocalories per capita. Subsidies for agricultural inputs encourage more farmers to use them, boosting the output of small-scale producers. 2018 Jayne and colleagues (Jayne et al.). (Jayne and colleagues) Chibwana and his colleagues undertook an extensive study (2010). Beneficiary farmers' maize yields rose by 447 kg/ha (about 42%) as a consequence of the program; fertilizers contributed slightly more than half of this increase (249 kg/ha), while better seed contributed the rest. Such output increases are within Dorward et al. expected.'s range (2010).

Farmers transferred land from alternative food crops such as cassava or sweet potato to maize as a result of input subsidies, according to Chibwana et al. (2010), changing cropping patterns. Because fertilized maize produces more food, this change boosts food production. The research discovered a link between fertilizer use and agricultural productivity (Sanou, 2017). Further research shows a strong and positive relationship between yield and fertilizer usage as an input subsidy. This demonstrates how fertilization boosts crop output. Farmers accept subsidized agricultural inputs such as fertilizer and seeds to increase their productivity, according to Darko and Ricker-Gilbert (2013). Input subsidies reduce the financial and economic barriers to boosting the production of critical foods (Dorward & Chirwa, 2011). According to (L. Sibande et al., 2015),

boosting input utilization raises labor and land productivity, improving food security for low-income families via increased income and lower food expenditures (Kansiime et al.,2018). According to food security criteria, most families will run out of sufficient food from their output before the following harvesting season. (Dorward et al. 2008), on the other hand, found that establishing a subsidy program increased family food security by 8%. Teaching farmers about agricultural inputs, according to Abubakari and Abubakari (2014), Subsidies will raise farmers' awareness and need for them, ultimately leading to an increase in agricultural output.

5.4 Effect of inputs subsidy on incomes of small holder farmers

The p-value for the correlation between income and fertilizer subsidies is less than 0.05, indicating that the two are interdependent. By analyzing their relationship, the research aimed to shed new light on the connection between income levels and fertilizer subsidies. Statistical analysis reveals a statistically significant positive correlation between the two variables, with p=0.001. The Chi-Squire test was used to examine the link between seed subsidies and the revenue of small-scale farmers. The p-value of 0.005 between income and seed subsidies indicates that the two factors are interrelated. 2016 Sibande (Sibande) (Sibande) (Sibande). According to Jayne et al., farmers encounter extra obstacles, such as delays in assistance program design and implementation (2013). Government and implementing agencies cannot enforce clearly stated program goals due to the politicization of programs. When farmers get input subsidies, they are more likely to utilize more land and spend more money on agricultural supplies, according to Sibande (2016). They will have the ability to raise earnings and sales. Consequently, agricultural input subsidies substantially influence farmer income (Ferrer et al., 2019).

5.5 Influence of farm logistics subsidy on incomes of small holder farmers

The Chi-square test revealed the existence and nature of a link between farm logistics and the revenue of small-holder farmers. The results indicate a substantial link between farm logistics and revenue, with a p-value of 0.000 indicating a connection between the two variables. The correlation between farm logistics and income levels, which the researcher applied to determine the nature of the link, demonstrates a strong positive association that is statistically significant at p=0.000

5.6 Contribution of farm inputs subsidy on adoption

The researcher used the correlation and Chi-square tests to see whether a link exists and what kind of association is now predominant. The input subsidy program was addressed, and respondents were questioned about any problems. 74.8 per cent of respondents said that the present input subsidy scheme is difficult to implement. This is consistent with the 2018 research by Dhar et al. Consequently, and the concerns must be resolved.

Despite obstacles, the results reveal a statistically significant relationship between input adoption and subsidy (p=0.000).

The study uncovered a robust and advantageous link between input adoption and subsidy. A statistically significant relationship exists between the two. This suggests that a greater acceptance of input subsidies follows an increase in the availability of subsidies.

The majority of farmers favour subsidized agricultural inputs like seeds, fertilizers, and farm equipment, according to the poll (Yawson et al., 2010). Some essential elements, including expertise and cheap access to the region's subsidized agricultural supplies, accelerated the adoption of farm inputs (Dorward & Chirwa, 2011). The research indicates that 65.3% of respondents were highly happy with the amount and quality of agricultural inputs. Consequently, most farmers used agricultural inputs primarily to reduce the associated costs (Dorward et al., 2008).

CHAPTER SIX: SUMMARY, CONCLUSION AND RECOMMENDATION

6.1 Introduction

This chapter provides a summary of the main findings of the study and presents significant conclusions to the study. It also captures the contribution the study has made to the body of knowledge and gives recommendations on the influence of input subsidies by the government on agricultural productivity. The chapter closes by giving suggestions for further research.

6.2 Summary of findings

The study mainly focused on the influence of inputs subsidy on agricultural productivity and incomes as well as input adoption of small-scale farmers in Alego Usonga Sub County in Siaya County. The specific objectives of the study were summarized below:

6.2.1 To determine the influence of inputs subsidy on the yields of small-scale farmers in Alego Usonga sub-county, Siaya County.

According to the findings concerning fertilizer subsidy, majority of the farmers (87.7%) in this area uses fertilizers in their various farm activities This was due to the fact that majority of them were well aware concerning the existence of fertilizer subsidy in the region. Thus, the findings show that awareness increases the use of land in the area leading to an increase in the yields from the farm. Therefore, around (49.5%) of the farmers believe that the use of the subsidized fertilizers has greatly increase their land use.

The results indicate that most farmers (82.0%) were well aware about seed subsidy in the region, whereas the minority had no consent concerning the same.82.2% of the farmers in this region were able to access and purchase the subsidized seeds. Thus, due to farmers' awareness and easy access of the subsidized seeds, it is believed that it's the main contributors of a positive increase in farm produce of these small-scale farmers in Alego region.

The findings also show that majority of the farmers (87.1%) were aware of the farm logistics in the area. Therefore, an increase in awareness concerning farm logistics has a positive impact on the yields in Alego Usonga.

From the results it is evident that inputs subsidy has influence on yields as the values are statistically significant. Farm inputs (seed, fertilizer, farm mechanization) do contribute to increase in yields and thus agricultural productivity The significance level has P-values 0.002 for subsidized fertilizer, 0.012 for the subsidized seeds, 0.019 for farm logistics and 0.000 for the constant coefficient which they are all less than the standard P-value 0.05 implying that all the coefficients are statistically significant and thus they have influence on agricultural productivity.

This positive influence is consistent with the findings from (L. Sibande, Bailey, & Davidova, 2015) where subsidized fertilizer was found to have positive effects on the kilocalories available per capita per day. Input subsidy mitigates the affordability and profitability constraints to increased staple food productivity (Dorward & Chirwa, 2011)

6.2.2 To analyze the effect of input subsidy and small-scale farmer's income levels of small-scale farmers in Alego Usonga sub-county, Siaya County

The findings show a significant relationship between fertilizer subsidy and farmers income. This is because both variables had a p value of 0.004 which is less than 0.05, thus proving that the two variables greatly depend on each other.

Concerning the relationship between seed subsidy and income levels of the farmers, it was found that there is a significant association between seed subsidy and income with a $p=0.005<0.05$ which implies that the two variables are dependent on each other.

From the findings, farm logistics and income had a $p=0.000<0.05$ showing that both variables had a significant association, hence the two variables depend on one another.

Generally, the findings above indicate that, farm input subsidy such as fertilizer, seed and farm logistics have a significant association with farmers' income of small-scale farmers in Alego area. Hence, the relationship between them will positively impact the level of their income.

The findings shows that there is a significant association between fertilizer subsidy and income with a p value of 0.004 which is less than 0.05. The findings shows that there is a significant association between seed subsidy and income with a $p=0.005<0.05$. The Chi-square test found out that there is an association between farm logistics and the income of small holder farmers as well

as the nature of the relationship between the two variables. Sibande, (2016), found out that when farmers get the subsidized farm inputs, it will encourage them to increase land use hence increasing farm inputs. Thus, they will be able to sell the surplus produce and increase their income. Therefore, farm input subsidy has a significant impact on the farmers' income (Ferrer et al., 2019).

6.2.3 To examine the contribution of input adoption and input subsidy on small scale farmers in Alego Usonga sub-county, Siaya County.

There is various input adoption that the study focused on, these include; fertilizer, seeds and farm logistics. Majority, approximately 88%, of the farmers in this study used fertilizer in their crop production and over 82.0% of the farmers receive subsidized fertilizer. The reason as to why majority of the farmers depend on the subsidized fertilizer is insufficient funds to afford the usual market price. However, there exist a detectable direct relationship between fertilizer use and existence of subsidy. There is also a direct relationship between use of subsidized seeds and existence of its subsidy. Farm logistic showed a fairly weak positive relationship between farm logistic and subsidy. This implies that an increase in supply of subsidy leads to increase in adoption of input subsidy. This is concurrence by study done by Dhar et al., 2018. An increase in farm input adoption was accelerated by some notable factors such as awareness, and easy access of the subsidized farm inputs in the region (Dorward & Chirwa, 2011). The study found out that most farmers prefer farm inputs such as fertilizers, seeds and farm machinery with subsidized costs (Yawson et al., 2010).

6.3 Conclusions

The study concluded that more female farmers of age 36 – 50 years benefitted from the free government distributed farm subsidies. It was evident that the higher the education level the of the farmer, the lesser the likelihood that the farmer, if at all, benefitted from these subsidies as small holder farming attracted less educated people. Majority of farmers had less than 3 acres of land. This presents farm mechanization challenges and further land subdivision will make it even worse. Farm ownership is highly dominated by males. Farmers majorly received certified seeds and fertilizers but in meagre quantities without regard to the farm sizes and competing farmer interests. These inputs were never distributed to the farmers on time to cash in on the rains at the onset of the planting season.

Agricultural subsidies accelerate the use of quality fertilizer and seeds and also minimizes time spent in field preparation thereby promoting overall agricultural production. The use of fertilizer, seed subsidies and use of farm machinery at a subsidized cost were found to significantly improve crop production.

Farm inputs subsidy has contributed to easy access to quality farm inputs by farmers at the right time and at affordable costs making scale of production to increase drastically. This increase in acreage under production coupled with increased productivity per unit area results to higher yields both for food security as well as surplus for sale. This eventually improves incomes of small holder farmers

From the findings it is evident that adoption of farm inputs use is influenced by the subsidy program. This is as a result of awareness creation, easy access, and adequate trainings. Because of inputs availability there is increased acreage under production in alego usonga.

Over all, the study concluded that, whereas input subsidy which was introduced by ministry of Agriculture in collaboration with County Government as a food security project, there is need for an integrated approach to promote effective management and control of sustainable and competitive agriculture in terms of agriculture technology, provision of support training through extension and regulatory services for agricultural development in order to attain food security for all Kenyans. Given an appropriate situation and adequate support, farmers in Alego Usonga can create, adopt and adapt information on production and distribution of goods and services, making it the focal point and engine for rapid agricultural growth thus realizing food security and enhancing their livelihoods. In summary all the three null hypotheses were disapproved as there were statistically significant influence of input subsidy on farm yields, significant relationships between inputs subsidy and incomes and significant relationship between inputs adoption and inputs subsidy among small-scale farmers in alego usonga.

6.4 Implication of the findings

Farm inputs subsidy plays an important role in enhancing food security through improved yields.

6.5 Recommendations

The study recommended that to support smallholder farmers sustainably adopt farm inputs use, efforts should be made towards enabling them to timely acquire or access quality farm inputs and services, technical, socio-economic, management and institutional factors known to promote sustainable adoption of inputs utilization.

Specifically, the Government (through the County Government) and other development agencies should support smallholder farmers to have timely access to farm inputs such as; high yielding seed varieties, adequate quantities of appropriate fertilizers, high quality organic manure, extension services, profitable marketing outlets, and functional farmers' association.

6.6 Suggestions for further research

Further research is needed in the following areas; establish the influence of farm labor on agricultural productivity, determine youth's inclusion in agriculture potential to enhance agricultural growth and determine the influence of existing marketing system to agricultural productivity and incomes.

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APPENDICES

Appendix 1: Work Plan

Activities	Year 2018/2019											
	D	J	F	M	A	M	J	J	A	S	O	N
Concept writing and departmental defense												
Literature review												
Thesis writing correction and faculty defense												
Thesis submission to Graduate school, instrument validation and pre-testing												
Pilot testing & field data collection												
Data entry, analysis & interpretation												
Thesis writing& publishing of paper												
Thesis defense, correction & submission of final thesis to Graduate school.												

Appendix 2: Budget

Phase	Particulars	Quantity	Unit cost (KSh)	Total KSHs)
Phase 1	**Thesis writing**			
	Stationery			
	printing papers	2 reams	@800Ksh	1600
	Flash disks	2 pcs	@1000Ksh	2000
	Ruled papers	2 reams	@500Ksh	1000
	Pens	1 packet	@450Ksh	450
	Internet and E-mail			5000
	Printing and binding			8000
	Research thesiss	200	@3Ksh	600
	Printing			7000
	questionnaires			
	Printing and binding			**25650**
	Subtotal			
Phase 2	**Preparation of**			
	study Sample frame		5 days @1000Ksh	5000
	Subsistence		5 days @3000Ksh	15000
	Accommodation		5 days @1500Kshs	7500
	Transport Cost			10,000

	Subtotal			**37,500**
Phase 3	**Pilot study**			
	Pre testing of questionnaire	3 people	1 day @1000Ksh	3000
	Subsistence	3 people	1 day @1000Ksh	3000
	Accommodation	3 people	1 day @500Kshs	1500
	Transport Cost			**5,000**
	Subtotal			**12,500**
Phase 4	**Main study**			
	Collection of data			
	Subsistence		10days@3000Ksh	30000
	Accommodation		10days@1000Ksh	10000
	Transport		10days@500Kshs	5000
	Field visits		2 days@5000Ksh	20000
	Subtotal			**65,000**
	Totals			**140,650**

.

Appendix 3: Approval to Conduct Research

JARAMOGI OGINGA ODINGA
UNIVERSITY OF SCIENCE AND TECHNOLOGY

DIVISION OF RESEARCH, INNOVATION AND OUTREACH
JOOUST-ETHICS REVIEW OFFICE

Tel. 057-2501804
Email: erc@jooust.ac.ke
Website: www.jooust.ac.ke

P.O. BOX 210 - 40601
BONDO

OUR REF: JOOUST/DVC-RIO/ERC/E2

28th October, 2020

Eliakim Bonyo Ombajo
SAFS
JOOUST

Dear Mr. Ombajo,

RE: APPROVAL TO CONDUCT RESEARCH TITLED "INFLUENCE OF AGRICULTURAL INPUTS SUBSIDY ON AGRICULTURAL PRODUCTIVITY BY SMALLSCALE FARMERS IN ALEGO USONGA SUB-COUNTY, SIAYA COUNTY, KENYA"

This is to inform you that JOOUST ERC has reviewed and approved your above research proposal. Your application approval number is **ERC/28/10/20-20.** The approval period is from 28th October, 2020 – 27th October, 2021.

This approval is subject to compliance with the following requirements:

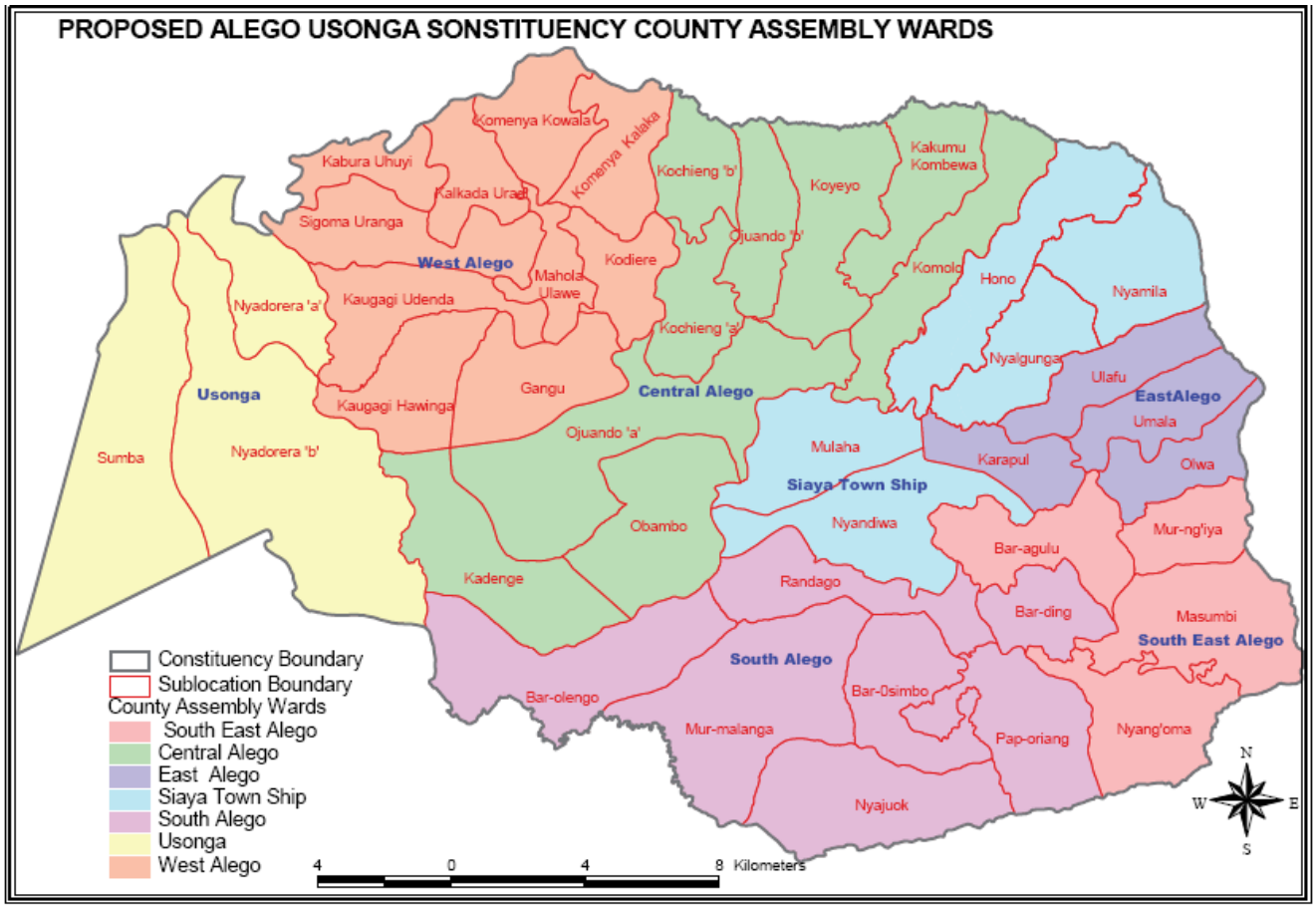
i. Only approved documents including (informed consents, study instruments, MTA) will be used.
ii. All changes including (amendments, deviations and violations) are submitted for review and approval by JOOUST IERC.
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to NACOSTI IERC within 72 hours of notification.
iv. Any changes, anticipated or otherwise that may increase the risks of affected safety or welfare of study participants and others or affect the integrity of the research must be reported to NACOSTI IERC within 72 hours.
v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to JOOUST IERC.

Prior to commencing your study, you will be expected to obtain a research permit from National Commission for Science, Technology and Innovation (NACOSTI) https:oris.nacosti.go.ke and also obtain other clearances needed.

Yours sincerely,

Prof. Francis Anga'wa
Chairman, JOOUST ERC
Copy to: Deputy Vice-Chancellor, RIO Director, BPS Dean, SAFS

Appendix 4: Map of study area



Appendix 5: Questionnaire

FARMER QUESTIONNAIRE FARM INPUTS ACQUISITION IN SIAYA COUNTY.

Instructions: Kindly take a little time to complete this questionnaire as honestly as possible. Any information given will be kept confidential. You need not reveal your name to the study if you do not wish to.

Name of Interviewer _____ Date: _____

1. Farmer's Details

Name of the farmer **……**

Telephone Number **……**

Ward ----------

Sub County----------

County----------

PART A: PERSONAL DETAILS

a. What is your Gender?

1. Female ☐
2. Male ☐

b. What is your age?

1. Below 36yrs ☐
2. 36-50yrs ☐
3. 51-65yrs ☐
4. Above 65yrs ☐

c. What is your highest level of education attained?

1. No formal education ☐
2. Primary ☐
3. Secondary ☐

4. College

5. University degree and above

d. What is your marital status?

1. Single ☐

2. Married ☐

3. Widowed

4. Others, Specify_____

e. What is the size of your farm?

1. 3 acres and below ☐

2. 3 to 6 acres ☐

3. 6 acres and above

f. Who owns the farm that you practice your farming?

1. Female ☐

2. Male

PART B: INFLUENCE OF FERTILIZER SUBSIDY

a. Have you ever used fertilizers on your farm?

1. Yes ☐
2. No ☐

b. **If No, why?**

……

……

c. Are you aware that the government is giving out fertilizers subsidy at a reduced cost?

1. Yes ☐
2. No ☐

d. How many times have you received fertilizer subsidy

1. Once ☐
2. Twice ☐
3. Thrice ☐
4. Four times ☐
5. Five times ☐

e. When you use fertilizer do you increase land use?

1. Yes ☐
2. No ☐

f. Indicate your agreement level in the table above

	Strongly	**Agree**	**Neutral**	**Disagree**	**Strongly**
Benefited from fertilizer subsidy					
Fertilizer subsidy improved crop production					
Maximize on land management when using fertilizer subsidy					

PART C: INFLUENCE OF SEED SUBSIDY

a. Are you aware of seed subsidy provision?

1. **Yes** ☐
2. **No** ☐

b. If yes in a, above do you get the right number of bags for your farm?

1. **Yes** ☐
2. **No** ☐

c. How many times have you accessedseed subsidy

1. Once ☐
2. Twice ☐
3. Thrice ☐
4. Four times ☐
5. Five times ☐

d. Indicate your agreement level in the table above

	Strongly	**Agree**	**Neutral**	**Disagree**	**Strongly**
Benefited from seed subsidy					
When using seed subsidy number of bags of crop production increases					
The seed is given at a reduced cost					

PART D: INFLUENCE OF FARM LOGISTICS

a. Are you aware of issuance of farm logistics?

1. **Yes** ☐
2. **No** ☐

b. Indicate your agreement level in the table above

	Strongly	Agree	Neutral	Disagree	Strongly
Benefited from farm machinery during farm preparation					
Farm machinery available and reliable during land preparation					
Are the machines efficient and effective in terms of operations					
Are Farm logistics affordable in terms of bagging, weighing and transportation					

PART E: AGRICULTURAL EXTENSION SERVICES

a. Have you attended agricultural field days in your area?

1. Yes ☐
2. No ☐

b. If yes in a above, when was the last field day that you attended?

2. Within the last half year ☐
3. Within the last one year ☐

4. Within the last two years

c. Who are the agricultural service providers you work with in this area?

1. Government Departments ☐
2. NGOs ☐
3. CBO ☐
4. Commercial Enterprises ☐
5. Farmers' Cooperatives ☐

d. How often does the agricultural service providers visit your farm?

1. Weekly ☐
2. Once a month ☐
3. Rarely. ☐
4. None at all ☐

e. Tick (✓) to indicate the level you agree with the following statements

	Strongly	Agree	Neutral	Disagree	Strongly
Extension visits play a significant role in influencing the use of fertilizers.					
Farmers who adopt the improved agricultural practices realize higher yields.					

f. Do Extension workers help farmers do the following tick (✓) where appropriate

ITEM	Yes	No
Calculate their farm input needs?		
Identify where to buy their inputs		
Organize group transport		
Obtain credit		
Save		

g. How do you access information about government's agricultural subsidy program in your area?

1. Through National coordination and Interior Security (provincial administration) ☐
2. Mass media (radio, TV) ☐

3. Social interaction

4. IEC Materials (posters, brochures)

h. How accessible is the information about government's agricultural subsidy program in your area?

1. Very accessible ☐
2. Accessible ☐
3. Less accessible ☐
4. Not accessible ☐

i. Do you have a provision of giving feedback to the government agency in charge of the program?

1. Yes ☐
2. No ☐

j. If yes, give the frequency of giving feedback?

1. Very frequent ☐
2. Frequent ☐
3. Less frequent ☐
4. Not frequent ☐

k. Where do you get your inputs from?

1. County Govt. offices ☐
2. N.C.P.B ☐
3. Stockists/agro vet shops ☐
4. Other farmers ☐
5. Other sources (specify) ……

l. Which type of other input have you received as an agricultural subsidy from the government? _____

m. How often do you receive such inputs?

1. More often ☐
2. Often ☐
3. Less often ☐

n. Are the inputs always in right quantity and quality?

1. Yes ☐
2. No ☐

o. Explain the contribution of farm inputs to food security in your area

……

……

……..

p. Are the subsidies distributed on time during the planting season?

1. Yes ☐
2. No ☐

q. In your opinion, do you think that the inputs program has improved your overall yields?

1. Improved ☐
2. Worsened ☐
3. Remained the same ☐

r. Give a reason to you answer (5 g) above.

……

……

……

s. What type of crops do you grow?

……

……

……

t. Do you sell any of the farm produced crops?

1. Yes ☐
2. No ☐

u. As a result of use of subsidized farm inputs from county have you realized any increase in income from sales of farm produce?

1. Yes ☐
2. No ☐

v. In addition to farming, what else do you do for your living?

1. Fishing ☐
2. Trading ☐
☐
☐
☐

3. Office Work

4. Livestock production

5. Other

w. Are there any challenges with this input subsidy program?

1. Yes ☐

2. No ☐

If Yes, specify

……

……

……

……

If No, give reasons

……

……

……

……

x. Please give your comments on how you think the program should be implemented to serve you better?

……

……

……

……

……

Thanks for your time and for participating in this study!

Appendix 6: Interview schedule

THEMATIC AREAS

1. Access to subsidized farm inputs

2. Affordability of farm inputs

3. Impact on using subsidy farm inputs

4. Challenges for the inputs program

5. Proposed way forward

Thank you for taking part in this discussion.

Appendix 7: Sample determination table.

Krejcie and Morgan Table for Determining Sample Size from a Given Population

N	S	N	S	N	S
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	100000	384

NOTE:

N-Population size

S-Sample size

Appendix 8 : Data Reliability

The researcher sought to carry out the reliability test for items under study in each subsidy measure so as to assess their measure of internal consistency. Reliability is the measure of the extent to which data collection techniques and analysis procedures yields similar findings and outcome by prior researchers. This provides consistency in the measurement of variables. Internal consistency reliability is the most commonly used psychometric measure of assessing survey instruments and scales (Zhang, Waszink, &Wijngaard, 2000). Cronbach alpha is the basic formula for determining the reliability based on the measure of internal consistency (Kim & Cha, 2002). Therefore, the construct for study for the fertilizer subsidy, seed subsidy and farm logistics were tested for internal consistency using Cronbach Alpha test as depicted in the table 4.19 below. According to Nunnally (1978) and Malhotra (2004) the standard minimum value of alpha is 0.7. Thus, the values of 0.784, 0.813 and 0.835 are sufficient confirmation of data reliability for the three independent variables.

Table 4.19 below shows reliability of variables

Table 4.19: Reliability Statistics

Variables	**Number of items**	**Cronbach's Alpha(α)**	**Comments**
Fertilizer Subsidy	3	0.784	Accepted
Seed subsidy	4	0.813	Accepted
Farm Logistics	4	0.835	Accepted