

**INFLUENCE OF SUBSIDIZED FARM INPUTS ON HOUSEHOLD  
INCOME IN MUTHAMBI DIVISION-MAARA DISTRICT  
(THARAKA NITHI COUNTY, KENYA).**

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**RESEARCH PROJECT SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENT FOR THE AWARD OF MASTER OF ARTS  
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## DECLARATION

This research project is my original work and has not been presented for an award of a degree in any other university

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## DEDICATION

This work is dedicated to my parents, brothers, sister and to all my friends. Thank you for your support and encouragement.

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## ABBREVIATIONS AND ACRONYMS

DAO	District Agricultural Officer
DAEO	Divisional agriculture extension officer
DDP	District Development Plan
EU	European Union
FEO	Frontline extension officer
FISP	Farm Input Subsidy Programme
FoSP	Food Security Pack
GDP	Gross Domestic Product
GOK	Government of Kenya
HA	Hectare
KG	Kilogram
KSHS	Kenya Shillings
LDCs	Less developed countries
MoA	Ministry of Agriculture
NAAIAP	National Accelerated Agricultural Inputs Access Programme
NCPB	National Cereal and Produce Board
NEPAD	New Partnership for Africa's Development
NGO	Nongovernmental organization
OECD	Market Effects of Crop Support Measures
PAM	Program against Malnutrition
SSA	Sub Sahara Africa
UN	United Nations
USAID	United States Agency for International Development
USD	United State Dollar
ZFSP	Zambia, Fertilizer Support Programme

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## ABSTRACT

Smallholder farmers are caught in the low productivity, low income vicious cycle resulting into food insecurity and poverty GOK (2007). The Kenya Government through the MoA has responded by providing the very resource farmers with subsidized farm inputs to enable the farm households to restart production and derive sufficient income. The study focused on assessing the influence of these subsidized farm inputs provided through NAAIAP programme using before-after programme approach on the household income and was guided by the following objectives; To find out how the type of subsidized farm inputs (planting, top dress fertilizer and certified maize seed) affect household income, determine whether, training on subsidized farm inputs affect household income, examine how the criteria used to select beneficiaries of subsidized farm inputs influence household income, establish whether the time when subsidized farm inputs affect household income.

Literature review on the four objectives was discussed and their influence on household income and gaps on knowledge of whether the interventions have an impact on the household well being identified. The respondents were selected purposively using stratified random sampling method from Gitije, Mitheru, Muthambi and Karimba locations in Muthambi division and 200 respondents selected as the sample size. Data was collected using questionnaires, documentary analysis, interview and observation research instruments. Data was analyzed using Statistical Package of Social Scientists (SPSS) and presented in form of tables and percentages. There was no direct link between the subsidy and income and instead, a three stage model was used by first estimating the productivity, then output and finally incomes to the respondents and from the findings, it was concluded that irrespective of the amount of subsidized fertilizers and maize seeds received there was an increase in the income generated from maize farming compared to previous year as a result of the inputs given. Further the criteria used to select subsidized farm inputs beneficiaries (vulnerability, land size and age) are not feasible for determination of the income of a household as a result of subsidized farm inputs. The time factor of when the inputs were supplied had an effect on the eventual income of the house hold. On the other hand training content had a positive effect on the income of the house hold income and thus no relationship of the training approach used on the house hold income.

## CHAPTER ONE

### INTRODUCTION

#### 1.1 Background to the study

Agricultural productivity growth is vital for stimulating growth in other sectors of the economy. Datt and Ravallian (1996, 1998) in his study in India, over 35-years period found that higher farm productivity reduces both absolute as well as relative poverty. Similarly, Loayza and Raddatz (2010) show for a cross sectional of developing countries that growth in more labour intensive sectors such as Agriculture has a larger impact on poverty reduction than less labour intensive sectors. Christiansen and Demery (2007) estimate that 1% per capital agriculture growth reduces poverty 1.6 times more than the same growth in industry and 3 times more than growth in service sector. Case studies confirm these cross –country findings for example Dercon and Christiansen (2005) estimate that among 15 villages in Ethiopia consumption per adult equivalent is 8.5% points higher if household uses inputs to increase productivity. According to Huang (1998), agricultural subsidies if in right quantities could be used to break the ‘vicious’ cycle of poverty on the farmers. This is because they help improve productivity which is at the heart of this cycle.

In developed nations like USA widespread subsidy began in 1930’s where farmers were offered subsidy to alleviate effects of great depression. Originally, the government intended subsidies to be temporal but they have remained in place decades after the depression (EU 2010). According to Young and Westcott (2000), subsidies have been widely used since and as much as US \$58 billion was spent by the United States (US) Government in 1997. Similarly, Borrell and Hubbard (2000), found that a huge allocation can also be seen under the Common Agricultural Policy (CAP) in the European Union (EU) representing 48% of the EU’s budget at €49 billion. Some Sub-Saharan Africa countries like Zambia, Malawi and Kenya have been actively involved in input support programmes (FAO Policy brief No. 3 2009). This is no surprise given that farmers on their own in sub-Saharan Africa use less fertilizer as compared to farmers of other regions leading to low food output. A study done by Crawford et al. (2005), revealed that Sub-Saharan Africa applied the least rates of fertilizer (9 kg/ha) among the other regions of the world’s average of 102 kg/ha in 2003<sup>27</sup>. Due to poorly developed infrastructure, the costs of transporting inputs to remote areas, particularly in land- locked countries, are very high. Banful (2010b)

suggests that around 50% of market fertilizer prices across SSA can be attributed to transaction costs compared with e.g. 20% in Thailand

Subsidies could only be effective under certain conditions such as complementing them and offering implementation support (Duflo et al. 2010). China, Malawi and some green revolution member countries are a few that have used subsidies effectively (Denning et al. 2009). According to (NSO 2005, 2006, 2009b), there is evidence that poverty incidence has fallen in Malawi from 52 per cent in 2004/05 to 40 per cent in 2007/08 and 2008/09. It is not possible to directly attribute this to the subsidy programme but, studies by Dorward (2010) on livelihood and labour market effects suggests that poor beneficiary and non-beneficiary households may have had increases in real income from 10 to 100 per cent and from 0 to 20 per cent, respectively, over the counterfactual no-subsidy situation. According to Denning et al. (2009), Sachs (2005)'s millennium development goals (MDGs) project is optimistic that it is possible to halve poverty with intensified use of subsidies. Reflecting on the success stories on Malawi of which they hope to turn into an "African Green Revolution", Sachs joins a group of other authors into rekindling the optimism from subsidy use.

To meet the Millennium Development Goal 1 (eradicate extreme poverty and hunger) and the vision 2030 that emphasizes the need to have highly productive, commercially oriented and competitive agricultural enterprises GOK (2007), the Kenya Government through the MoA responded by providing farmers with subsidized farm inputs. The intervention started in year 2007 through the National Accelerated Agriculture Input Access Programme (NAAIAP) that provide basic inputs to cover at least one acre (0.4 hectare) of land (50Kg planting and top dress fertilizer, 10kg maize seed), in order to enable the farm households to restart production and derive sufficient cash income to expand and sustain the production to other areas of the farm. It was intended to improve inputs access and affordability for target farmers, so as to uplift them out of the vicious cycle of poverty and participate in agriculture as a business enterprise. The beneficiaries are also trained and assisted to continue with economically viable enterprises. The main aim is to ensure that beneficiary farmers are able to access farm inputs the following and subsequent seasons after the subsidy. The programmes target the resource poor households but Women/child headed families are given preference vulnerable members of the society-persons with disability and HIV/AIDS affected member of society, farmers who have not received similar support in the past.

## 1.2 Statement of the problem

Strand of the development literature has revived the case for input subsidy programs, asserting that they can help poor farmers break out of a low input/low output poverty trap and kick start growth processes that can sustainably raise their incomes and assets even after they stop participating in the program (Dorward et al., 2004; Morris et al. 2007).

A few studies have tried to quantify the impact of the input subsidy in Malawi. Ricker-Gilbert and Jayne (2010) try to estimate the dynamic effects of the AISP. They find that a fertilizer subsidy significantly increases maize production within the same year, and there are some indications of positive effects on maize production in subsequent seasons but these are surrounded by greater uncertainty. On the other hand, they find little evidence of a long-term effect on household assets or general wellbeing. Holden and Lunduka (2010b) used plot-level data from households in central and southern Malawi to look at the impact of fertilizer subsidies on cropping decisions and fertilizer use efficiency. The authors find that maize area has decreased during the years of the subsidy while maize yield has increased over the same period. Chibwana, Fisher and Shively (2010) use plot level data from two districts in the central region of Malawi and find that the share of total area planted to maize and tobacco has gone up, while the share of area planted to other crops has gone down.

According to a research conducted by Njogu (2011) on impact of NAAIAP on maize production in Itabua sub location-Embu West district, maize yields improved from 2.6 bags per acre in 2006 to 3.3 bags per acre in 2007 a 23% improvement but impact was limited to short term immediately after harvest. Similarly, studies by Dorward *et al.*, (2004) and Smith & Urey,(2002) in India, suggest that during the early phases of the green revolution, payment of subsidies on inputs contributed to rapid expansion of production of cereals and thereby to poverty reduction, subsequently it is less clear that the subsidies have continued to do so.

According to Tibbotuwawa, (2010), Sri Lanka has subsidized the cost of fertilizer, with the intention of encouraging the use of fertilizers and off-setting the effects of low crop prices and high costs of production. A major question mark hangs over whether the benefits of the programmes have been enduring, in the sense that they have led to a sustained increase in incomes that would survive removal of the subsidy.

According to Gale et al. (2005); OECD, (2008) there has been a number of papers about China's great shift from a taxer of agriculture to a subsidizer, there are few papers that seek to understand

how the policy works on the ground. Are farmers actually receiving the subsidies? Who is receiving the subsidies? How are subsidies being allocated and given to farmers? Have productivity and income support objectives been achieved?

It is against this literature therefore the study intended to establish how the farm inputs subsidy in Muthambi division was implemented and if receipt of the subsidy had enduring influence on households production and incomes to give credence to the argument that subsidies can kick-start sustained growth processes.

### **1.3 Purpose of the study**

The purpose of the study was to establish the dynamic effects of input subsidy and if it provides enduring positive effects on poor households' incomes.

### **1.4 Objectives**

The study was guided by the following objectives;

1. To assess the influence of type of subsidized farm inputs (planting, top dress fertilizer and certified maize seed) supplied on household income in Muthambi division.
2. To examine the influence of the criteria used to select subsidized farm inputs beneficiaries on household income in Muthambi division.
3. To establish the influence of time when subsidized farm inputs are supplied on household income in Muthambi division.
4. To determine the influence of training on subsidized farm inputs use on household income in Muthambi division.

### **1.5 Research questions**

The study was guided by the following research questions;

1. What is the influence of the type of subsidized farm inputs (planting, top dress fertilizer and seeds) on household income in Muthambi division?
2. How do the criteria used to select subsidized farm inputs beneficiaries influence household income in Muthambi division?
3. What is the influence of the time when subsidized farm inputs are supplied on household income in Muthambi division?



4. What influence do training on subsidized farm inputs use has on household income in Muthambi division?

### **1.6 Significance of the study**

The study was significant at household level and at policy making level. The findings of the study provided information useful to farmers as it emphasized on some of the potential economic benefits that they can obtain from improved technology use. The study provided government policy makers and donor agencies with accurate estimates of the effects of fertilizer subsidies on key indicators of household well-being and how those benefits are either sustained or dissipated over time.

The Directorate of Agricultural Extension Services of the Ministry of Agriculture and other stakeholders in the extension service delivery needs such information to formulate policies that are profitable and sustainable.

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

This study was confined to farmers who participated in input subsidies in 4 locations of Muthambi division. The study involved beneficiaries of the subsidized farm inputs located in Muthambi division in Maara district. The division has a population of 34,682 people -17,237 Male and 17,445 Female according to Kenya population and housing census (2009). The rainfall pattern has a bi-modal with rains falling during the months of March to May (short rains) and October to December (long rains). The highest amount of rainfall can get to 2200 mm in the highlands, and averages 500 mm in the lower areas of the division. The average farm size for small scale farmers was 2 acres with an average household size of 4.4 and absolute poverty of 31.2% according to Maara district DDP (2008-2012).

### **1.8 Limitation of the study**

Some of the challenges that were encountered during the study included, locating the homes of the respondent. To overcome these challenge Frontline Extension Officers (FEOs), chiefs and sub chiefs were utilized. The second challenge was that the subsidy targets the poor and vulnerable and thus data collection took longer since most are illiterate. In addition questions about income seemed sensitive to the respondents. The study used before-after intervention approach that was problematic due to the cross sectional nature of data and the fact that farmers

rarely keep records and thus some respondents were unable to recall services received sales, costs, or profits and thus depended on their memory for their responses. This was counteracted by utilizing the baseline and impact surveys done by the MOA on subsidized farm inputs beneficiaries.

### 1.9 Assumption of the study

Various assumptions were made while carrying out this study i.e. the respondents would answer the questions asked correctly and truthfully and would recall all the basic information important for the study.

### 1.10 Definition of significant terms

<b>Household</b>	A household refers to a group of people, either related or unrelated, who are answerable to one person, often regarded as the household head. Household members share a dwelling unit or structure and have the same housekeeping arrangements.
<b>Input</b>	Sort of substance used by a producer for pest, disease control or for soil fertility management.
<b>Subsidy</b>	A benefit given by the government to groups or individuals usually given to remove some type of burden for example to reduce the cost of production.
<b>Farm</b>	An area of land used for growing crops and or keeping animals
<b>Income</b>	The money that a person earns from work, revenue from, from business etc
<b>Household income</b>	The total amount of money that members who share a dwelling unit or structure and have the same housekeeping arrangements earns from work, revenue from, from business etc

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1 Introduction

This chapter highlights some of the related studies that has been done over the years on input subsidy in relation to household income. The chapter is discussed under the following sub headings: type of inputs, criteria used to select subsidized farm inputs beneficiaries, training on input subsidy and time when subsidized input is given, research gaps identified and conceptual framework.

The argument for subsidies is attractive on several grounds. The siren call of subsidies continues to be hard to resist; they are politically attractive, seem easy to implement, and the problems they are intended to address remain compelling at both the national and international levels Crawford, Jayne & Kelly, (2008). Subsidies look as though they provide a ready solution to otherwise difficult problems of developing input markets and associated financial services to small farmers. While other ways of overcoming such problems are complicated, with success uncertain, a subsidy is a relatively straightforward measure to implement. Yet perhaps the greatest attraction lies in the apparent simplicity of a single measure, a subsidy, to meet a wide range of objectives: economic, social and political.

#### 2.2 Influence of type of subsidized farm input supplied on household income

Drawing from existing literature, gains from new agricultural technology have influenced the poor directly, by raising incomes of farm households, and indirectly, by raising employment, wage rates of functionally landless labourers, and by lowering the price of food staples (Pinstrup-Andersen et al., 1976; Hossain et al., 1994; Winters et al., 1998; de Janvry and Sadoulet, 1992, 2001; Irz et al., 2001). The finding of a survey done in Malawi revealed that smallholders reported receiving considerably less fertilizer from Fertilizer Support Program than reported having distributed directly to smallholders. Furthermore, many farmers did not get what they expected World Bank (2010). The objectives of FoSP are to provide a basic level of farm input to households that have lost the ability to source such inputs themselves, to encourage crop diversification, and to promote conservation-farming practices Ellis et al., (2009). In accordance with objective two above, the input pack received by beneficiaries was supposed to constitute 0.75 hectare (ha) of inputs, comprising 0.25 ha cereal seed, 0.25 ha pulse seed, and 0.25 ha cassava/sweet potato tubers, as well as fertilizer. However, this pack has never been delivered in its entirety. In the 2005/06 season, most beneficiaries received only maize seed and fertilizer

Ellis et al., (2009). Thus, the objective of crop diversification did not fully materialize. While implementing FoSP, objective, conservation farming, was not the center of activities. Consequently, FoSP enhanced maize cultivation with fertilizer use rather than encouraging crop diversification and conservation farming. This study sort to establish whether those beneficiaries of NAAIAP programme input subsidy were delivered the pack in its entirety (50Kg pack planting and top dress and 10Kg maize seeds)

### **2.2.1 Certified maize Seeds**

Seeds are basic agricultural input and more importantly, quality seeds of any preferred varieties are basis of improved agricultural productivity since they respond to farmers needs for both their increasing productivity and crop use Pelmer (2005). The use of improved seeds helped to overcome some of the farm-level constraints that hindered rice production in Nigeria Awotide et al., (2010). Those farmers that received the seed voucher got better yield and per capita income from rice production and household expenditure than those farmers that did not receive. Improved seed is an important input in all crop based farming system and is a key factor in determining the upper limit of yield and therefore the ultimate productivity of input such as pesticides, fertilizer and agricultural technology Maredia and Howard (1998); Cromwell (1990). According to Morris et al. (1999) of all inputs used in agriculture none has the ability to affect productivity more than improved seeds. If farmers can obtain seed of improved varieties that performs well under local conditions and also adopt it, the efficiency with which other inputs are converted into economically valuable outputs increases and productivity rises. A study to consider the seed component finds that nearly half of the yield gains from Malawi's input subsidy program come from increases in improved seed use Chibwana et al. (2012).

Whereas maize production has been generally fluctuating averaging 2 percent over the five years between 2001 and 2005, the marginal growth in production is driven more by use of productivity-enhancing technologies, than by increase in acreage Smale & Jayne (2003), MoA (2004). Among agricultural inputs, seed is recognized to have the greatest ability of increasing on-farm productivity since seed determines the upper limit of crop yields and the productivity of all other agricultural inputs (MoA 2004). This means that to sustain as well as increase production volumes, it will be critical to find mechanisms that guarantee farmers access to high yielding certified seed varieties. Moreover, such a mechanism is paramount for successful variety improvement for sustainable agriculture (Hellin 2007). A study comparing sales volumes for improved seed between 1997 and 2007 for countries in Eastern and Southern African

countries indicated that there was a decline in the amount of seed sold. The countries percentage decline included Angola(-7), Zimbabwe(-2) Kenya(-1) while Mozambique, Malawi, Ethiopia, Tanzania, Uganda and Zambia reported increased improved seed sales ranging from 2 – 50 percent (Langyintuo et al. 2008). The unmet need for improved maize seed is met by recycling grain as seed. According to Pixley & Banziger 2001 when farmers recycle grain they are faced by risk of declined yields of between 5 percent for open pollinated varieties (OPV) and 30 percent for hybrids.

### **2.2.2 Fertilizer**

Some World Bank publications have acknowledged that economic reforms in the 1980s and 1990s resulted in significant reductions in overall levels of fertilizer use and increased food insecurity among many rural households Morris et al., (2007). Recently, there has been considerable debate about the desirability of using fertilizer subsidies to achieve not only economic growth targets but also welfare goals. Some economists have admitted the political appeal of fertilizer subsidies, and they have realistically recognized that some African countries implemented fertilizer subsidies for their political popularity Morris et al., (2007). Aggregate trends of SSA may be unimpressive, but country level statistics show greater variation and some success stories, Kenya among them. Ariga et al. (2006) grouped countries in Africa by intensity of fertilizer use and percentage growth in fertilizer amount and found that of the four countries which use an average of 25 kilograms per hectare, three have had a growth rate of less than 30 percent over the 1990-2003 period (Swaziland, Malawi, and Zimbabwe) while one (Kenya) has had both high use and high growth. Fertilizer application rates in SSA are far below any other region in the world. Minot and Benson (2009) find that the average fertilizer application rate was only 13 kg/ha in 2008, compared with an average 94 kg/ha in other developing countries. Researchers provide a long list of reasons why this might be the case. Several articles divide potential reasons for low fertilizer use into demand and supply side factors Crawford et al. (2003) ; Morris et al. (2007). On the demand side, both perceived profitability and ability to pay are thought to contribute to low use. Profitability could be hindered by variability in prices (of fertilizer and output) and yield, agro- ecological conditions (i.e., soil characteristics and weather patterns), and lack of knowledge about how properly to use fertilizer. Ability to pay reflects both low income levels and lack of access to credit in many rural areas. On the supply side, having fertilizer available in appropriately sized packaged at the necessary time of year often prohibits access at the farm level Larson and Frisvold (1996). Kherallah et al. (2002) add that fertilizer costs are higher in Africa than other regions due to mostly, high transport costs making it more

difficult for poor to obtain. Similarly, they state that Africa does not have the irrigation infrastructure of many other regions which hinders the ability for plants to uptake nutrients in a timely manner. Most of these reasons, both on the demand and supply sides, have underlying structural determinants and often can be overcome with appropriate public sector interventions. In their review, Morris et al. (2007) found fertilizer use to be unprofitable in many parts of Africa due to high prices and transportation costs. Yanggen et al. (1998) find that while overall agronomic response to fertilizer in many parts of Africa is similar to other places in the world, the ratio of fertilizer price to output price is much higher, making it one of the least profitable places to purchase the input. Clearly, then, the price at which fertilizer can be procured is an essential component to its profitability and likely use.

The impacts of high fertilizer prices on poor rural economies have also been discussed by Dorward and Poulton (2008). Farmers are likely to be very exposed to high international fertilizer prices as most poor rural economies import fertilizers from the world market: they are then hurt by high fertilizer prices in terms both of the profitability of fertilizer use and the affordability of fertilizer purchases. Profitability problems may be offset by product price increases. However, while high input prices may increase the need for input subsidies, they also undermine their short term returns (as measured by cost benefit analysis) and undermine a nation's ability to afford them. In the 2007/2008 season, 69% of the sampled farmers did not get their inputs until after the start of the rains (World Bank, 2010). Another factor contributing to the limited impact was that the actual amount of inputs received was less than that of inputs distributed.

Several policy papers have come down on either side of the debate with some raising the question of whether or not subsidizing fertilizer is a sustainable strategy for growth (Harrigan 2008, GRAIN 2010). Others point towards Malawi's large logistical achievement of making subsidized fertilizer available to many farmers across the country, and the impact of the program on maize production (Dorward and Chirwa 2011). Dorward and Chirwa argue that the subsidy program should continue to be funded in order to help households break out of the low-maize productivity poverty trap. The intent of this study is to inform this debate by evaluating the benefits subsidies may have for recipient households.

Several recent studies address the farm level impacts of fertilizer subsidies. Holden and Lunduka (2010b) used plot-level data from households in central and southern Malawi to look at the impact of fertilizer subsidies on cropping decisions and fertilizer use efficiency. The authors find that maize area has decreased during the years of the subsidy while maize yield has increased over the same period. Chibwana, Fisher and Shively (2010) use plot level data from two districts in the central region of Malawi and find that the share of total area planted to maize and tobacco has gone up, while the share of area planted to other crops has gone down. Another study using experimental evidence from Kenya finds that offering small, time-limited fertilizer subsidies during harvest (while farmers have cash) can substantially increase fertilizer use the next season (Duflo, Kremer and Robinson 2009). The authors argue that small, timely discounts increase welfare more than large-scale fertilizer subsidies or laissez-faire. Two other papers (Dorward 2007, Dorward et al. 2008) use a set of household programming models to estimate the impacts of fertilizer subsidies on the rural economy, and household labor allocation decisions in Malawi. A key research issue associated with this topic is whether the benefits of receiving subsidized fertilizer last only one season or whether they are of a more enduring nature. This issue needs to be addressed empirically based on farm survey evidence.

The studies mentioned above are all confined to measuring contemporaneous impacts, but this study will target household-level to estimate the enduring or dynamic effects of receiving subsidized inputs. This study will utilize detailed recall data from beneficiaries that will allow measure how the inputs affects recipients' production and income over time. Moreover, while most previous studies measured impacts on farm input use and/or crop output, the study considered the broader impacts of the subsidy program on household-level incomes.

### **2.3 Criteria used to select subsidized farm inputs beneficiaries on household income.**

Targeting is one of the critical elements of the effectiveness of the subsidy and in achieving efficiency in resource use. To be "smart", subsidy programmes according to Minde et al, (2008); Tiba, (2009) should target specific farmers.

#### **2.3.1 The vulnerable**

Smart subsidies should be targeted specifically at farmers, who do not already apply agricultural inputs, as well as the poorest and most vulnerable households. This reduces the risks of displacing commercial (non-subsidized) input sales and promotes pro poor growth. Hence, the efficiency of a targeted programme depends on the extent to which errors of inclusion and exclusion can be minimized in the selection of beneficiaries. According to Coady et al. (2002)

errors of inclusion (leakage) occur when unintended households are included in the programme while errors of exclusion (under coverage) occur when the intended households are not included in the programme. Targeting the less-poor households risks undermining the effectiveness of the programme through displacement of commercial input sales, as these households are more likely to be able to finance input purchases on market terms. Evidence to this effect is mixed. A survey of ZFSP beneficiaries suggests that 50% of recipients of subsidized inputs bought inputs from private shops before receiving ZFSP support generating a strong potential for displacement. However, the same survey revealed that 43% continued to complement their subsidized package with inputs purchased on commercial terms from private suppliers. It is not clear whether these households reduced their purchases of private inputs, or to which extent the subsidized packages inspired farmers to adopt agricultural inputs more widely. The World Bank (2010) study concludes that displacement constituted at least 7% of subsidized sales, generated by the recipients who stopped purchasing commercial inputs. However, this number could be significantly higher if the remaining 43% commercial customers also purchased less than before.

Subsidies intended to benefit specified groups of farmers, or to stimulate particular crops, may be less effective than intended as leakages occur. For example: When subsidy programmes allow discretion to local officials and field workers in allocating subsidies inputs, there is the danger that they will use their power to extract bribes. The same local discretion may be used to divert subsidized inputs from intended beneficiaries to others, such as local elites and political supporters. In some cases this arises since field workers have different priorities to policy-makers. For example, in Malawi some field staff reportedly preferred allocating subsidy vouchers to farmers they considered most likely to make good use of the input, rather than those who cannot afford fertilizer at commercial prices Dorward and Chirwa (2011). SOAS et al (2008) in his study found 20-40 percent displacements of commercial fertilizer in the 2006/07 programme since the households that could afford fertilizers at prevailing market prices were erroneously included in the programme .Several studies have looked at how recipients of fertilizer subsidies are targeted. These studies generally find that subsidy programs have difficulty targeting resource poor beneficiaries who would otherwise be unable to purchase fertilizer at commercial market prices. Evidence suggests that in Malawi subsidized fertilizer often goes to wealthier households with better community and political connections (Holden and Lunduka 2010a, Chibwana et. al 2010, Ricker-Gilbert, Jayne and Chirwa 2011). Such evidence is supported by Chibwana et al (2010) who found that the most vulnerable and female-headed



households were less likely to receive vouchers, whereas long term residents of villages were more likely to be selected. However, there is lack of detailed analysis of how some of the most vulnerable households (female-headed, child-headed and elderly-headed) have participated in the subsidy programme. One exception is the analysis of gender issues in access to subsidy and in the use of subsidized fertilizers Chirwa et al., (2010 and 2011b). This was against the programme targeting guidelines that recognized vulnerable households as target groups that should be given special consideration in the allocation and distribution of agricultural input vouchers, defined as resource-poor Malawians who own a piece of land, resident in the village with special consideration to guardians looking after physically challenged persons and most vulnerable groups such as child headed, female-headed or orphan headed households and those households with infected or affected with HIV and AIDS GOM (2008).

The World Bank assessment report argues that the cost of FISP in Malawi was generally competitive when used to support food security in outlying areas, but not when used for commercial markets or for export World Bank (2010). The report contends that the objectives of FISP should be clearly defined as to whether the program should emphasize the promotion of agricultural growth or livelihood security. If the objective is growth, then targeting should focus on farmers with good market access and capacity to grow a maize surplus. If the program is to be more about livelihood support, then selection criteria should focus on farmers' poverty status World Bank (2010).

### **2.3.2 Land sizes**

Targeting small scale farmers, Dyer (1997) ,Havnevik and Skarstein (1997), argue that smaller farms enjoy higher land productivity in the short term, but over the long term land productivity tends to drop. They argue that this long term drop in land productivity results from over intensive cultivation of the land in order to maintain labour productivity, when more and more people need to survive on the same small area of farmland, and as the smaller farms are resource poor to invest in preserving soil fertility, soil productivity eventually becomes exhausted and land productivity drops. A similar reasoning is given by Hazell (2011) who also maintains that many of the advantages of smallholders disappear as countries develop. The reasoning given for this is that as the per capita income rises, the economy diversifies and workers leave agriculture and the wage rate goes up. It then becomes more efficient to have progressively larger and more mechanized farms. It has been hypothesized in some studies by Hazell (2011) that many of the advantages of smallholders disappear as countries develop and it becomes more efficient to have progressively larger and more mechanized farms. This type of change has been experienced in

western economies where economic transformation has been associated with an increase in the sizes of holdings

A recent study in Ghana by Banful (2010b), finds that the Ghana, Fertilizer Subsidy Programme (GFSP) allocation of vouchers was more closely correlated with political factors than efficiency or equity considerations. Specifically, he shows that districts, which the incumbent party lost in the previous election in 2004, received more vouchers than districts it won. Further, the number of vouchers allocated to a district increases with the vote margin, with which the district was lost. Banful (2010b) interprets this result as attempts of “vote-buying” by the government. The weaker the government is in a district, the more it is favoured by the subsidy programme.

As is summarized by Holmen (2005): Friss-Hansen (1994) mentions that in Tanzania, “a politically well-connected village could receive more than it demanded (of scarce hybrid maize seed), while other villages received only a fragment of their requirement”; The study by Pan and Christiaensen (2011) sets out to estimate the targeting performance of the 2008 Tanzania, National Agricultural Input Voucher Scheme (NAIVS) pilot programme relative to the programme’s two overall objectives, to increase overall maize and rice output, and to increase access to modern inputs among poor and vulnerable smallholders. The study provides three striking results: Firstly, the estimated targeting performance is very close to what would prevail if vouchers were allocated randomly between intended (poor or productive) and unintended (less-poor or less-productive) targets. Targeting towards the most productive households is slightly better than random, but targeting in favour of the poor is slightly worse. Secondly, the authors find clear evidence of what they refer to as elite capture. Specifically, they estimate that elected village officials receive about 60% of the distributed vouchers, and other indicators of political connectedness, such as access to TV, radio and internet or participation in public meetings or farmer’s associations, also significantly increases the likelihood of receiving vouchers. As the “political elite” tends to be less poor, this bias goes a long way to explain the poor targeting performance. Thirdly, the targeting performance relative to the poverty objective tends to improve with the number of vouchers available for distribution. This suggests that the bias in targeting resulting from elite capture can be reduced by ensuring a reasonable household coverage. Indeed, Pan and Christiaensen (2010) suggest that targeting the poorest households has a lower impact on crop production than benefiting the less poor. These findings suggest that it

may be necessary to decide whether the primary objective of the input subsidy programme is pro-poor growth or improved national agricultural production

Bazaara and Muhereza (2003) describe that in Uganda's agricultural programs, the main beneficiaries were politically connected people and political supporters "who had nothing to do with farming"; and Olayide and Idachaba (1987) describe a similar outcome of the agricultural interventions in Nigeria where credit and subsidized inputs were funneled to and captured by "absentee farmers, retired civil servants, and soldiers.

The problems of targeting social programmes are well-documented in the literature and include lack of information, high costs of acquiring information, and social stigma. The difficulties in targeting vulnerable households arise from applying the prescribed targeting criteria. Dorward et al. (2010) note that fundamental difficulties in targeting therefore arise because of ambiguities, tensions and contradictions among different targeting criteria, related to difficulties in clearly establishing measures for applying these criteria, both of these being related to large numbers of households apparently deserving of coupons relative to the number of coupons available. As a result there are many variations in the characteristics of beneficiaries of fertilizer subsidy coupons, and the better off households tend to dominate the vulnerable households.

The literature describes a number of alternative targeting methods in social programmes including using individual/household assessments based on socio-economic data, categorical targeting, self-selection and community-based targeting. These different methods have their own advantages and shortcomings (Morley and Coady 2003). Although more recently community-based targeting has been advocated as a participatory approach to identification of beneficiaries, as Morley and Coady (2003) note there is a danger of elite capture and variable interpretation of the programme beneficiary identification criteria. Dorward et al. (2010) and Chinsinga (2009), in the context of the input subsidy programme, note that the criteria for beneficiary identification remain wide and subject to different interpretations and communities tend to emphasize different vulnerable groups.

#### **2.4 Time subsidized farm inputs are supplied on household income.**

One of the factors behind the limited impact of FISP in Malawi (Fertilizer Support Program) was the late delivery of inputs. In the 2007/2008 season, 69% of the sampled farmers did not get their

inputs until after the start of the rains World Bank (2010). An evaluation of the 2000-2001 Targeted Inputs Program, in Malawi, Van Donge et al. (2001) conclude that “The production impact of TIP was negligible, primarily because inputs had arrived too late to be useful for the main farming season” Time of planting is one of the top factors affecting maize yields . Timely planting is critical as it allows the germinating seed to benefit from the nitrogen flux effect which occurs with the first rains. The germinating seed will also benefit from the warm soil temperatures and good aeration. Early planting enables the crop to escape pests and diseases which are common in late planted crops.

Dhital *et al.* (1997) in his study of grain legumes pointed out that planting dates influenced both yield and yield components. Early planting resulted in highest number of pods per plant (11) and late planting resulted in lowest number of pods per plant (5). Dhital *et al.* (1997) further concluded that the trend of number of seeds per pod followed the trend of pod formation. The number of seeds per pod was 12 in early planting and 6 seeds per pod in late planting. According to Dhital *et al.* (1997) planting date had a highly significant effect on seed yield. Crops from early planting produced high seed yield (1.6 t/ha) and late planting resulted in low yield (0.28 t/ha).

Input subsidies for rain-fed agriculture require complementary circumstances to reduce vulnerability, particularly because the amount and pattern of rainfall must be favorable for crop growth and maturation. When events are not so favorable, input subsidies are an expensive way to fund crop failure Ellis et al., (2009). As Morris et al. (2007) stated, the economic case for “fertilizer aid” rests on a number of key assumptions. The perception that poverty is caused by the dependence on rain fed agriculture is shared by Zambia’s major donors. For instance, a paper by a joint initiative of major donors on pro-poor growth contended that crop production was negatively affected by the severe droughts of 1992 and 1995, which could explain much of the increase in poverty that occurred between 1991 and 1996 Thurlow & Wobst (2004).

According to Banful (2009) the government of Ghana, began discussing with leading importers the possibility of subsidising fertilizer to counter the rising prices in March 2008, and in May it announced its intention to do so. However, it was not until early July that details of the programme were published. On 4 July 2008, the subsidy took effect, too late to benefit the major season. Factors leading to the bumper harvest of 2009/2010 were widely debated in Zambia.

Many in government attributed the production increase to the fertilizer subsidy program and the state's efforts to raise maize prices. Others argued that contributing factors were the adoption of conservation farming, and still others attributed it to favorable weather Burke et al., (2010). Burke et al. (2010) estimated that weather conditions contributed 47% of the maize yield growth, whereas 25% came from increased fertilizer use, and 23% from area expansion. The remaining 5% can be attributed to hybrid seed use. The government of Zambia and the World Bank gave contrasting assessments of the impact of FISP on increased maize production. The Zambian Ministry of Agriculture and Co-operatives (MACO) estimates that increased maize output for 2009/2010 could be attributed to several factors: increased fertilizer use (25–30% increase), the expectation of increased maize prices (10–28%), and increased use of hybrid maize seed (about 3%); the largest factor was deemed to be the weather (38–62%) (FSRP/ACF, MACO/Policy and Planning Department, 2010). Thus, the majority of the increase in yield was attributed by MACO to fertilizer and weather. Therefore, by promoting increased input use, FISP has contributed to increased use of fertilizer and hybrid maize seed, which, in turn, could lead to increased maize output. One important point missing from the Zambian government's assessment was that a combination of fertilizer subsidies and good weather resulted in a bumper harvest of maize in 2009/2010. Considering factors that contributed to the growth of maize production from 2009 to 2010 can be misleading because increased fertilizer use leads to a 25–30% increase in maize output only if other factors are equal. Increased fertilizer use enhanced by subsidies would have resulted in decreased maize output if the weather had been unfavorable (drought or flood). Another study using experimental evidence from Kenya finds that offering small, time-limited fertilizer subsidies during harvest (while farmers have cash) can substantially increase fertilizer use the next season (Duflo, Kremer and Robinson 2009). Input subsidies can be a way of funding crop failure when events such as weather are not so favorable.

## **2.5 Training on subsidized farm inputs use on household income.**

Training is the process of acquiring specific skills to solve a problem and perform a job better. Farmer training is education that most often takes place outside formal learning institutions. To adopt sustainable farming systems and adapt them to local conditions, farmers must have or be receiving training in observational, analytical, experimental, and communications skills. Without such training, farmers may be unable to properly manage the complex interactions of technologies and will give up when the results predicted by experts fail to materialize Halberg et al., (2006). Lee (2005) finds evidence that involving nongovernmental organizations, farmer-

based organizations, outreach programs, and extension services in providing information and training to farmers significantly increases the successful adoption of sustainable agricultural practices.

### **2.5.1 Training content**

Training contents have to be related to the setting familiar to participants Malkon (1989). This need can be fulfilled by letting participants choose trainings that reflect their own interests. Farmers can make appropriate choices of training contents and topics that have relevancy and harmony with their farming systems principle that, adults are relevancy-oriented; they must see a reason for learning something, Knowles et al. (2005). Stephen (2000) emphasized that, an effective training effort involves assessment of training needs of adults compared to children and teens. Adults have special needs and requirements as learners and their needs constantly change. Thus, it needs a constant identification of participants' needs and priorities. Shiferaw et al. (2009) note the importance of involving farmers in the selection and adaptation of relevant techniques. Bottom-up, participatory approaches give farmers a chance to experiment and adopt various practices at their own pace and modify techniques according to changing conditions.

### **2.5.2 Training approach**

Experiential training approach emphasizes real or simulated situations in which the trainees will eventually operate, and the objectives and other elements of training are jointly determined by the trainers and trainees Rama et al., (1993). Holton (1996) describes that, experiential learning approaches have the dual benefit of appealing to the adult learners experience base as well as increasing the likelihood of performance change after training. Selecting an appropriate training method is perhaps the most important step in training activity once the training contents are identified. A training programme has a better chance of success when its training methods are carefully selected. Four major factors are considered when selecting a training method: the learning objective, the content, the trainees, and the practical requirements Wentling (1992). However, Zeleke (2000) noted that, all training methods in developing countries are based on common principles. However, training methods differ from one place to another. Some instructional methods may be theory-oriented, and others may be practical-oriented. Thus, training methods have to be selected based on training needs of specific target population.

In Kenya, De Groote et al. (2006) found a striking decline in access to extension services from 58 percent of maize growers in 1992 to only 30 percent in 2002, even as access to credit grew from 8 to 26 percent. General disenchantment with extension has led to many efforts to

fix 'public extension. One of the most influential of such efforts was the training and visit (T&V) model of organizing extension, supported by the World Bank from 1975 to 1995 in 27 countries of Africa. The T&V approach aimed to improve performance of extension systems by strengthening their management and formulating specific and regular extension messages (Anderson et al., 2006). T&V projects helped extension agencies reach greater numbers of farmers and sometimes spearheaded rapid adoption of maize technologies Cleaver (1993); Balcet and Candler (1981). However, where rigorous evaluations of impacts of T&V extension on productivity have been conducted as in Kenya, the results were disappointing Gautam (2002). In addition, the T&V system exacerbated fiscal sustainability and lacked real accountability to farmers Anderson, et al, (2006). By the early 1990s, a World Bank evaluation found that at least half of the extension projects in Africa were rated as —unsatisfactory due to the use of a top down rigid model with insufficient attention to heterogeneous production conditions and circumstances of farmers in rain fed areas World Bank (1994). Another approach was initiated by Sasakawa-Global 2000 (SG2000), an NGO, to demonstrate available yield-enhancing technology to farmers and policy makers in Ghana in 1986. SG 2000 has assisted public extension workers to conduct thousands of large (0.5 ha) demonstrations on farmers' fields to show the potential of a new technological package of seed and fertilizer in 14 countries in Sub-Saharan Africa (<http://www.saa-tokyo.org/english/country/>). Maize has been by far the major crop included in the SG2000 programs. The SG 2000 project in Ghana claimed the most success. The extensive coverage of on- farm demonstrations was undoubtedly a major factor in the wide adoption by Ghanaian farmers of maize seed-fertilizer technology. An even larger program in Ethiopia, initiated in the early 1990s under the Participatory Demonstration and Training Extension System, integrated extension with provision of seed, fertilizer and credit. Once scaled up, the program reached about 40 percent of the roughly 10 million farm households in Ethiopia over a 10-year period (3.6 million demonstrations in 1999 alone) and demonstrated that the adoption of seed–fertilizer technologies could more than double maize yields. Despite these efforts, adoption of maize technologies in Ethiopia is still low and a viable private sector input distribution system has yet to emerge Spielman et al., (2010).

Since the 1990s, a spectrum of other extension innovations have been introduced in Sub-Saharan Africa, with many systems moving to pluralistic approaches with different models often being used within a country Davis (2008). Uganda's National Agricultural Advisory Services empowered farmer organizations by providing them matching grants to contract NGOs and

private providers to deliver specific advisory services. This program significantly increased gross farm revenues from 2004 to 2007 but impacts have differed by region, and have been greater for high-value enterprises and male farmers, but also for poor farmers Benin et al., (2010).

One extension model is the Farmer Field School, originally designed as a way to introduce integrated pest management in Asia. The schools have been introduced, mostly on a pilot basis, in several African countries, and their scope has been broadened to other practices and technologies van den Berg and Jiggins (2007). Evidence of impacts, although still limited, suggests that the approach can significantly enhance farmers' knowledge of new options. In the pilot districts where the approach has been used in Kenya, Tanzania and Uganda, incomes rose by some 61 percent on average, and women farmers and farmers without formal schooling gained most Davis et al. (2010). Critical reviews of the evidence, most related to use of integrated pest management, suggest that Farmer Field Schools have not generated changes beyond local communities Davis (2006), tending to favor more privileged farmers within those communities Tripp, Wijeratne and Piyadasa (2005). Tripp, Wijeratne and Piyadasa, as well as van den Berg and Jiggins (2007) express concern that the assessment of FFS has been narrow, potentially biased, and focused on the short-term. In an econometric analysis based on comparison of changes between control and treatment groups, Feder, Murgai and Quizon found that the training had no statistically significant impact on the yields or the pesticide use among the participants or others in the same communities, raising questions concerning the high costs per participant and the financial sustainability of the approach. Evaluation of extension experiments is limited to date Anderson and Feder (2004). Still, a range of options are now available for improving the performance of extension systems. The challenge now is to scale up successful innovations and close out ineffective systems.

## **2.5 Research Gaps**

Various studies had been done on subsidized farm inputs but there were rare studies evaluating whether the benefits of receiving the subsidies last only one season or whether they are of a more enduring nature in increasing income



**Table 2.1: Research Gaps**

<b>Author</b>	<b>Research areas</b>	<b>Findings</b>	<b>Gaps</b>
Holden and Lunduka (2010b)	Impact of fertilizer subsidies on cropping decisions in Malawi	Maize area had decreased while maize yield has increased during the years of the subsidy	The farmers wellbeing in terms of income
Dorward 2007, Dorward et al. 2008	Impacts of fertilizer subsidies on the rural economy, and household labor allocation decisions in Malawi.	Economy improved	whether the benefits of receiving subsidized fertilizer last only one season or whether they are of a more enduring nature at farm level
Burke et al. (2010)	Factors leading to the bumper harvest of 2009/2010 in Zambia	Weather conditions contributed 47%, 25% from increased fertilizer use, and 23% from area expansion. 5% to hybrid seed use on maize	Contribution of trainings on income at house hold level
Njogu (2011)	Impact of NAAIAP on maize production in Itabua sub location-Embu West district	Maize yields improved from 2.6 bags per acre in 2006 to 3.3 bags per acre in 2007 a 23% improvement but impact was limited to short term immediately after harvest	The farmers wellbeing in terms of income

## 2.5 Conceptual framework

A graphical representation of the effect of influence of the type of subsidized farm inputs (planting, top dress fertilizer and certified maize seed), trainings on subsidized farm inputs the targeting criteria of subsidized farm inputs beneficiaries and the time when subsidized farm inputs are supplied is show on household income. The moderating variable was government policies and the intervening variable was the climatic conditions (figure 1).

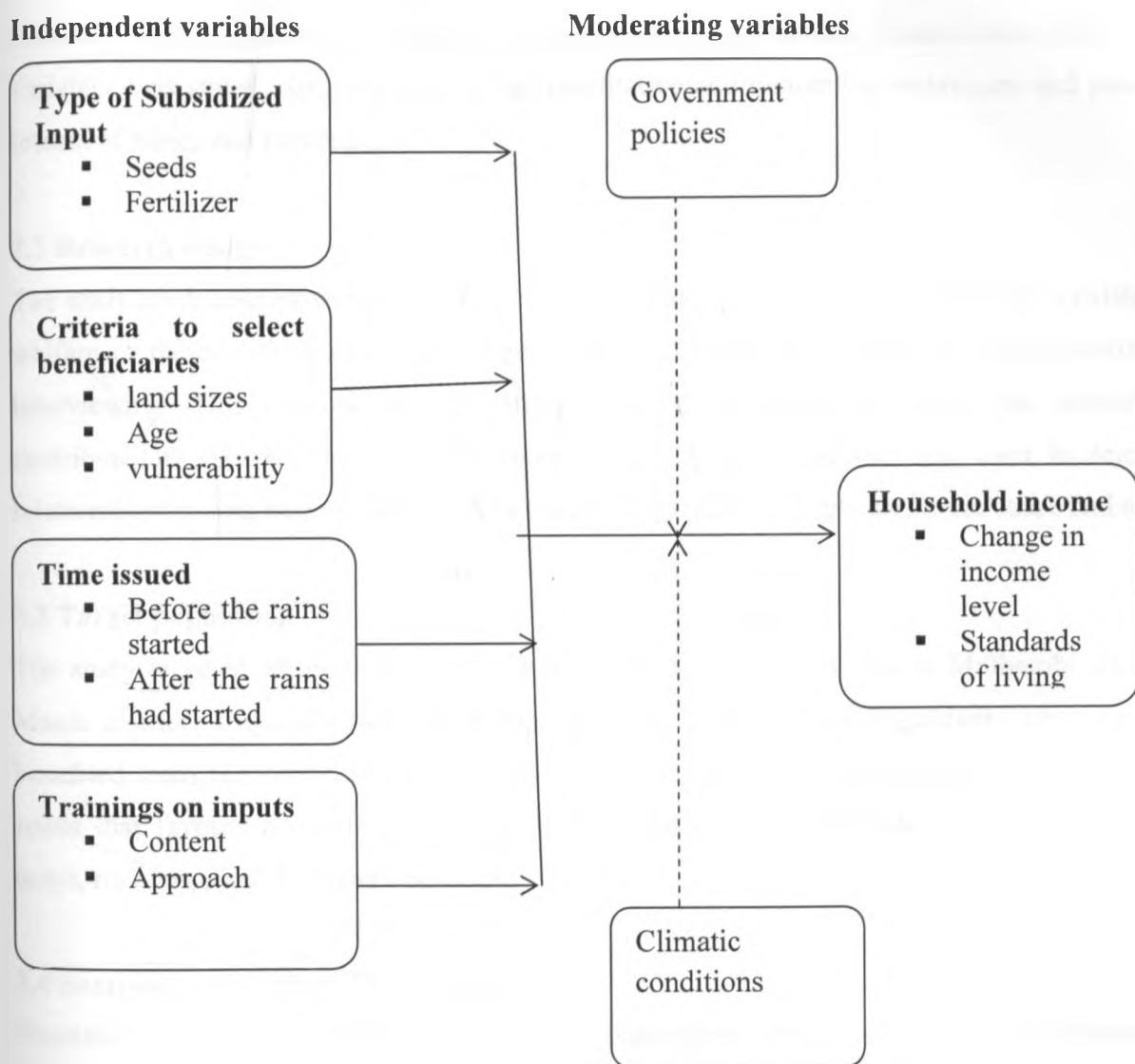


Figure 1: Conceptual framework

## **CHAPTER THREE**

### **RESEARCH METHODOLOGY**

#### **3.1 Introduction**

Research methodology entailed use of survey research design. The respondents were selected purposively, stratified and systematic random sampling method used. Data was collected using questionnaires, documentary analysis, interview and observation research instruments. The degree of consistency of the research instrument was measured using test-retest method and accuracy of the research instrument measured using pre-testing. Operational definition of variables was stated, data analyzed using quantitative and qualitative techniques and presented in form of tables and percentages.

#### **3.2 Research design**

The study used descriptive survey research design to describe the state of affairs as it existed-the welfare of the beneficiaries of farm input subsidy, through questioning i.e. questionnaires and interviewing. This ensured that the study revealed the extent to which the subsidy has contributed to the well being of the beneficiaries. Cross tabulation was used to determine relationships among two or more variables and to explore their implications for cause and effect.

#### **3.3 Target population**

The study targeted Mitheru ,Gitije, Muthambi and Karimba locations in Muthambi division - Maara district. The study selected a population of 2000 farmers purposively since they had benefited from the subsidized farm inputs .The division has a cross-section of agi-ecological zones that favours a number of agricultural enterprises like livestock, industrial crops, food crops, root crops and horticultural crops.

#### **3.4 Sampling procedure**

Probability and non probability sampling techniques were used. The population was heterogeneous in terms of the geographical areas and thus stratified random sampling technique was used to group the population into geographical areas (locations). Systematic random sampling was employed on each stratum, to give an equal chance to individual in the population. The list of beneficiaries were arranged in some systematic order (alphabetically and per the geographical locations) that made it easier to pick every 10<sup>th</sup> farmer. The sample of interest was

beneficiaries of the input subsidy and thus the respondent were selected purposively to utilize the cases that have the required information with respect to the objective of the study .To get the sample size the researcher used 10% of the accessible population which is acceptable according to Mugenda (1999).

**Table 3.1: Sample size**

<b>Geographical areas(locations)</b>	<b>Population</b>	<b>Sample size (10%)</b>
Mitheru	500	50
Gitije	1000	100
Muthambi	100	10
Karimba	400	40
<b>Total</b>	<b>2000</b>	<b>200</b>

**Source: Maara district Ministry of Agriculture annual report 2011/12.**

### **3.5 Methods of data collection**

Data was collected using questionnaires, documentary analysis, interview and observation. Questionnaires were be both structured and unstructured to get rich data and were administered by the researcher and research assistants. In documentary analysis a documentary analysis form was used to access relevant information from the District Agriculture officer (DAO) and Divisional agriculture extension officer (DAEO) that included project document, minutes, quarterly and annual reports, beneficiary lists. Interviews were also used to penetrate the thinking of the respondents (beneficiaries of the subsidy and MOA staff).Observation entailed use of an observation schedule that was utilized by the researcher and research assistants to get data on observable lifestyle of the household.

### **3.6 Reliability of the research instrument**

To measure the degree of consistency of the research instrument, test-retest was used. A questionnaire was administered to 20 respondents who have previously benefited from the subsidized farm input but outside the target area i.e. Kiraro sub location and emerging themes noted and after some times administered the same questionnaire to the same respondents and the comparison of the emerging themes were noted to agree thus the research instrument taken as reliable.

### **3.7 Validity of the research instrument**

To measure accuracy of the research instrument pre-testing was done on 20 farmers who have previously benefited from the subsidized farm input but are outside the target area i.e. Kiraro sub location before the main study.

### **3.8 Operational definition of variables**

The different type of variables were identified from the objectives, indicators, assigning of what was measured, the instrument used for data collection, level of scale, approach and type of data analysis.

**Table 3.2: Operationalization definition of variables table**

<b>Objective</b>	<b>Type of variable</b>	<b>Indicator</b>	<b>Measure</b>	<b>Data collection method</b>	<b>Level of scale</b>	<b>Approach of analysis</b>	<b>type of analysis</b>
To assess the influence of type of subsidized farm inputs (planting, top dress fertilizer and certified maize seed) supplied on household income.	independent (type of subsidized farm inputs)	Fertilizer  Certified maize Seeds	No. of Kgs of top dress fertilizer  No. Kgs of seeds given	Questionnaire  Interview	Ordinal  Ratio	Qualitative  Quantitative	Descriptive and  Inferential
To examine the influence of the criteria used to select subsidized farm inputs beneficiaries on household income.	independent (criteria used to select subsidized farm inputs beneficiaries)	Vulnerability  Age  Land size	Orphaned or widowed  No of years of beneficiaries  No. of acres	Questionnaire  interview	Ordinal  Nominal  Ratio	Qualitative  Quantitative	Descriptive and  Inferential
To establish the influence of time subsidized farm inputs are supplied on household income.	independent (subsidized farm inputs are supplied )	Before rains  When rains have started	Time of the season supplied with inputs	Questionnaire  interview	Ordinal  Nominal	Qualitative  Quantitative	Descriptive and  Inferential
To determine the influence of training on	independent (training on	Content	Areas trained on	Questionnaire	Ordinal  Nominal	Qualitative  Quantitative	Descriptive and

<b>Objective</b>	<b>Type of variable</b>	<b>Indicator</b>	<b>Measure</b>	<b>Data collection method</b>	<b>Level of scale</b>	<b>Approach of analysis</b>	<b>type of analysis</b>
subsidized farm inputs use on household income.	subsidized farm inputs use)	Approach	Kind of methodology used	Interview			Inferential
	Dependent (Household income )	Standards of living of the household  change in income levels	Improvement on type of food, clothing, housing, medical, transport and educational facilities.  % change in income	Interview  Observation	Ordinal  Nominal  Ratio	Qualitative  Quantitative	Descriptive and Inferential

### **3.7 Methods of data analysis**

After collecting the data, it was edited to familiarize with the data, checked for completeness and accuracy. It was organized in terms of research instruments questionnaires, documentary analysis, interviews and observation research, arranged in terms of various research questions to facilitate analysis. Qualitative and quantitative data analysis techniques were used. The data was analyzed using Statistical Package of Social Scientists (SPSS). Cross tabulation analysis done to determine relationships among the dependent and independent variables within the objectives guiding the study and to explore their implications for cause and effect. It was presented in form of tables and percentages and meaning attached in reference to the literature reviewed.



## CHAPTER FOUR

### DATA ANALYSIS, PRESENTATION AND INTERPRETATION

#### 4.1 Introduction

This chapter deals with data analysis, presentation and interpretation of findings. It provides the overall findings based on primary and secondary data which was collected from the field using both open and close ended questionnaires, interviews and focused group discussions. The data analysis was mainly descriptive using percentages, tables and frequency distribution and cross tabulation to determine the relationship between independent and dependent variables.

#### 4.2 Instrument response rate

A total of 200 questionnaires were administered and were all completed. The researcher and research assistants administered the questionnaires themselves by visiting the household and thus 100% response rate achieved.

#### A. Descriptive analysis

#### 4.3 General information on respondents

It involved presenting the general characteristics of the respondent which included gender, age, education level, household head status, size of the household, source of household income and average monthly to understand their background and relate it to subsidized farm inputs and income.

##### 4.3.1 Gender distribution

The research findings revealed that the majority of respondents were male, 69.5% while 30.5% were female as illustrated in table 4.1.

**Table 4.1: gender distribution**

Gender	Frequency	Percent
Male	139	69.5
Female	61	30.5
<b>Total</b>	<b>200</b>	<b>100.0</b>

##### 4.3.2 Age of household head

The data sought to establish the age of the household head.

**Table 4.2: Age of household head**

Age (years)	Frequency	Percent
Less than 35	33	16.5
36-45	32	16.0
46-55	49	24.5
56 and above	86	43.0
<b>Total</b>	<b>200</b>	<b>100.0</b>

The findings in table 4.2 indicated that majority of the respondent 43% were aged 56years and above, 24.5% of the respondents were aged 46-55 years, 16% of the respondents were aged 36-35 years while the youth accounted for the least percentage (below 35years) 16.5% of the respondents . This means that the intervention targeted the older people more rather than the younger.

#### 4.3.3 Household head education level

The data sought to establish the education level of the household head.

**Table 4.3: Education level of the household head**

Education level	Frequency	Percent
No education	9	4.5
Primary	124	62.0
Secondary	62	31.0
Tertiary	5	2.5
<b>Total</b>	<b>200</b>	<b>100.0</b>

The findings in table 4.3 illustrated that the majority of the household heads 62% of the respondents had attained primary level of education ,31% of the respondents attained secondary level , 2.5% of the respondents attained tertiary level and 4.5% of the respondents had never had any formal education. The literacy level implied that 95.5% beneficiaries could get the trainings offered on input use and take farming as business which was the intended objective of the intervention.

#### 4.3.4 Household head status

The data sought to establish the status of the household head.

**Table 4.4: Status of the household head**

Household head status	Frequency	Percent
Male headed	151	75.5
Female headed	38	19
Child headed	11	5.5
<b>Total</b>	<b>200</b>	<b>100</b>

The findings of the research in table 4.4 showed that majority of the house holds 75.5% were male headed, 19% of the house holds were female headed and 5.5% of the households were child headed.

#### 4.3.5 Special case of household head if any

The data sought to establish whether there were cases of widows or orphans.

**Table 4.5: Special case of household head**

Special case	Frequency	Percent
Orphaned	14	7
Widowed	43	21.5
None	143	71.5
<b>Total</b>	<b>200</b>	<b>100</b>

The findings showed that 57 of the respondents had special cases. This represented 28.5% of the respondents. 7% of the respondents were widowed and 21.5% orphaned as illustrated in table 4.5.

#### 4.3.6 Distribution of household size

The household members in the study included the total members with the same cooking arrangement.

**Table 4.6: Distribution of household size**

Household size	Frequency	Percent
1-3	15	7.5
4-6	99	49.5
7-9	65	32.5
10 and above	21	10.5
<b>Total</b>	<b>200</b>	<b>100.0</b>

The research findings in table 4.6 showed that 7.5% of the respondents had households of 1 to 3 members, 49.5% of the households had 4 to 6 members, 32.5% of the households had 7 to 9 members while 10.5% of the households had 10 members and above.

#### 4.3.7 House hold source of income

The data sought to establish the respondents' sources of income.

**Table 4.7: House hold source of income**

Income source	Frequency	Percent
Farming only	165	82.5
Farming and business	12	6.0
Farming and casual work	20	10.0
Farming and professional	3	1.5
<b>Total</b>	<b>200</b>	<b>100.0</b>

Findings from research as indicated in table 4.7 showed that 82.5% of the households obtained income from farming, 6% from a combination of farming and business, 10% from farming and casual work and 1.5% from farming and professional work.

#### 4.3.8 Average monthly household income

The data sought to establish the average monthly income of the household.

**Table 4.8 Average monthly household income**

Household income in Kshs.	Frequency	Percent
1000-10000	180	90.0
10001-20000	11	5.5
30001-40000	9	4.5
<b>Total</b>	<b>200</b>	<b>100.0</b>

As illustrated in table 4.8, majority of the household monthly income was Kshs. 1000-10000 constituting 90% of the respondents, while 5.5% of the respondents earned Kshs.10001-20000.4.5% of the respondents earned Kshs. 30001-40000.This implied that majority of the households had low level of income to meet basic needs and invest in procuring inputs since they are capital intensive.

#### 4.4 Type of subsidized farm inputs given

This section involved presenting the findings of the different type of subsidized farm inputs supplied that included certified maize seeds, planting and top dress fertilizers.

##### 4.4.1 Certified maize seed.

The data sought to establish the quantities of maize seeds given.

**Table 4.9: Amount of certified maize seeds given**

Amount	Frequency	Percent
less than 3Kgs	4	2.0
3-6 Kgs	29	14.5
7-9Kgs	19	9.5
10Kgs	148	74.0
<b>Total</b>	<b>200</b>	<b>100.0</b>

Research findings showed that 2% of the respondents received less than 3Kgs of maize seeds, 14.5% of the respondents received 3-6 Kgs, 9.5% of the respondents received 7-9Kgs while the majority of the respondents 74% received 10Kgs of certified maize seeds as shown in table 4.9.

##### 4.4.2 Planting fertilizer

The data sought to establish the quantities of planting fertilizer given

**Table 4.10: Amount of planting fertilizer given**

Amount (Kgs)	Frequency	Percent
11-20	5	2.5
21-30	20	10.0
31-40	29	14.5
41-49	17	8.5
50 Kgs	129	64.5
<b>Total</b>	<b>200</b>	<b>100.0</b>

The research findings showed that 2.5% of the respondents received 11-20Kgs, 10% received 21-30Kgs, 14.5% of the respondents received 31-40 Kgs, 8.5% of the respondents received 41-49Kgs while the majority of the respondents 64.5% of the respondent received 50Kg of planting fertilizer as illustrated in table 4.10.

##### 4.4.3 Top dress fertilizer

The data sought to establish the quantities of planting fertilizer given

**Table 4.11: Amount of top dress fertilizer given**

Amount (Kgs)	Frequency	Percent
11-20 Kgs	4	2
21-30 Kgs	19	9.5
31-40 Kgs	29	14.5
41-49 Kgs	18	9
50 Kgs	130	65
<b>Total</b>	<b>200</b>	<b>100.0</b>

Research findings showed that 2% of the respondents received 11-20Kgs, 9.5% received 21-30Kgs, 14.5% of the respondents received 31-40 Kgs, 9% of the respondents received 41-49Kgs while the majority of the respondents 65% of the respondent received 50Kg of planting fertilizer as illustrated in table 4.11.

#### 4.4.4 Production achieved with subsidized farm inputs

The data sought to establish the quantities of maize in 90Kg bags produced when the respondents received the subsidized farm inputs

**Table 4.12: production level in 90kgs bag with subsidized farm inputs**

Production (90Kg) bags	Frequency	Percent
Less 5 bags	41	20.5
6- 10 bags	92	46.0
11-15 bags	51	25.5
16 - 20 bags	16	8.0
<b>Total</b>	<b>200</b>	<b>100.0</b>

The findings in table 4.12 showed that 20.5% of the respondents produced less than 5 bags, 46% of respondents produced 6- 10 bags, 25.5% of the respondents produced 11-15 bags and 8% of the respondent produced 16 - 20 bags of maize.

#### 4.5 Criteria to select subsidized farm inputs beneficiaries.

The data sought to establish whether the criteria used to select subsidized inputs (vulnerability, land size) had any effect on income.

##### 4.5.1 Size of respondents' farms in acres

The data sought to establish the size of respondents' farm in acres.

**Table 4.13: Size of farm in acres**

Size in acres	Frequency	Percent
less than one acre	91	45.5
1 acre and above	109	54.5
<b>Total</b>	<b>200</b>	<b>100.0</b>

The research found that 45.5% of the respondents reported to own less than one acre of land while majority of the households 54.4% owned more than one acre of land as illustrated by table 4.13.

#### 4.6 Time inputs were supplied

The data sought to establish the time when the respondents were given the subsidized farm inputs.

**Table 4.14 :Time given subsidized farm inputs**

Time	Frequency	Percent
Before the rains started	88	44.0
After the rains started	112	56.0
<b>Total</b>	<b>200</b>	<b>100.0</b>

From the research findings, table 4.14 indicated that majority of the respondents received inputs after the rains had stated 56% while 44% of the respondents received inputs before the rains started. The focused group discussion revealed that most of those who received after the rains started, received the subsidized inputs 2-3 weeks after the rains started and thus the beneficiaries were not able to have maximum use of the rains. Interviews from the MOA attributed this to the lengthy process of identifying the beneficiaries and voucher issuance, redemption and the late disbursement of funds to facilitate operations.

#### 4.7 Training on subsidized farm input.

##### 4.7.1 Training on the respondents

The data sought to establish whether the respondent attended training when supplied with inputs.

**Table 4.15 : Training attendance**

If trained	frequency	Percent
Yes 129	64.5	
No 71	35.5	
<b>Total 200</b>	<b>100.0</b>	

Findings from research revealed that 64.5% of the respondent participated in training when they received the subsidized inputs while 35.5% of the respondents did not participate in training when they received the subsidized farm inputs as illustrated in table 4.15.

#### 4.7.2 Relevance of training Content

The data sought to establish whether the training content given was relevant and need based

**Table 4.16 : Relevance of training Content**

Training content	Frequency	Percent
Yes	95	47.5
No	91	45.5
No Answer	14	7.0
<b>Total</b>	<b>200</b>	<b>100.0</b>

The findings of research found that majority of the respondents 47.5% revealed that the training content was relevant and need based while 45.5% of the respondent reported that the training content was not relevant and not need based. 7 % of the respondents did not answer as illustrated in table 4.16.

#### 4.8 Influence of subsidized farm inputs on income

It involved presenting the influence of subsidized farm inputs on the respondents' household income.

##### 4.8.1 Effect of subsidized inputs on income

The data sought to establish the effect of subsidized inputs on income as compared to the previous year's

**Table 4.17 : Effect of subsidized inputs on income**

If income was high	Frequency	Percent
Yes	154	77.0
No	46	23.0
<b>Total</b>	<b>200</b>	<b>100.0</b>

The findings of research found that majority of the respondents 77% reported that their income increased while 23% revealed that their income did not increase as shown in table 4.17.

##### 4.8.2 Increase in income

The data sought to establish the increase in income.



**Table 4.18. Increase in income**

Amount (Kshs.)	Frequency	Percent
less than 5000	112	56.0
5001-10000	70	35.0
10001-15000	18	9.0
<b>Total</b>	<b>200</b>	<b>100.0</b>

The findings of research found that majority of the respondents 56% revealed that their income increased by less than Kshs. 5000, while 35% revealed that their income increased by Kshs.5001-10000 while 9% of the respondents revealed that their income increased by Kshs.10001-15000 as shown in table 4.18

#### 4.8.3 Ability to do something new.

The data sought to establish whether the respondents were able to invest their

**Table 4.19: Ability to do something new**

ability to do something new	Frequency	percent
Yes	153	76.5
No	43	21.5
No answer	4	2.0
<b>Total</b>	<b>200</b>	<b>100.0</b>

The findings of research in table 4.19 found that majority of the respondents 76.5% reported that they were able to do something new, while 21.5% were not able to do something new. 2% of the respondents did not answer.

#### 4.8.4 Ability to do something new without the subsidized farm inputs.

The data sought to establish whether the respondents could do something new without the subsidized farm inputs.

**Table 4.20: Ability to do something new without subsidized farm inputs.**

ability to do something new	Frequency	Percent
Yes		13.5
No	173	86.5
<b>Total</b>	<b>200</b>	<b>100.0</b>

The findings of research found that majority of the respondents 86.5% revealed that they would not have done something new without the subsidized inputs, while 13.5% of the respondents

revealed that they would have done something new even without the subsidized inputs as illustrated in table 4.20.

### B. Inferential analysis - cross tabulation.

This section used cross tabulation to analyze variables in the objectives.

#### 4.9 Influence of type of subsidized farm inputs supplied on household income

The data sought to establish how planting, top dress fertilizer and maize seeds influenced household income.

##### 4.9.1 Influence of subsidized top dress fertilizer on income

**Table 4.21: influence of subsidized top dress fertilizer on income**

**Cross tabulation**

		Increase in income		
		Yes	No	Total
Amount in kgs of subsidized top dress fertilizer given	Count	3	0	3
	11-20 % amount Kgs of subsidized top dress given	100.0%	0.0%	100.0%
	Count	23	9	32
	21-30 % amount Kgs of subsidized top dress given	71.9%	28.1%	100.0%
	Count	20	8	28
	31-40 % amount Kgs of subsidized top dress given	71.4%	28.6%	100.0%
	Count	3	2	5
	41-49 % amount Kgs of subsidized top dress given	60.0%	40.0%	100.0%
	Count	105	27	132
	50 Kgs % amount Kgs of subsidized top dress given	79.5%	20.5%	100.0%
Total	Count	154	46	200
	% amount Kkgs of subsidized top dress given	77.0%	23.0%	100.0%

Irrespective of the amount (Kgs) of subsidized top dress fertilizer received the majority of the respondents 77% reported an increase in the income and due to better production while 23 % reported that their income did not increase as shown in table 4.21. We can thus conclude that there was a positive influence on the subsidized input received on the eventual income of the farmers.

**Table 4.22: Increase in income from top dress fertilizer**

		increase in income			
		less than 5000	5001-10000	10001-15000	Total
	Count	1	2	0	3
11-20	% amount Kgs of subsidized top dress	33.3%	66.7%	0.0%	100.0%
	Count	15	15	2	32
21-30	% amount kgs of subsidized top dress	46.9%	46.9%	6.2%	100.0%
<b>Amount in Kgs of subsidized top dress fertilizer</b>	Count	19	9	0	28
	31-40 % amount Kgs of subsidized top dress	67.9%	32.1%	0.0%	100.0%
	Count	5	0	0	5
	41-49 % amount Kgs of subsidized top dress	100.0%	0.0%	0.0%	100.0%
	Count	72	44	16	132
	50 kgs % amount Kgs of subsidized top dress	54.5%	33.3%	12.1%	100.0%
<b>Total</b>	<b>Count</b>	<b>112</b>	<b>70</b>	<b>18</b>	<b>200</b>
	<b>% amount Kgs of subsidized top dress</b>	<b>56.0%</b>	<b>35.0%</b>	<b>9.0%</b>	<b>100.0%</b>

A majority of those respondents who received subsidized top-dress fertilizer reported an increase in the eventual increase in income less than 5000 Kgs .This represented a total of 56% of the farmers interviewed. Further all the respondents who got 44-49Kgs of subsidized top-dress fertilizer had an income of less than Kshs 5000 as shown in table 4.22. We thus conclude from

the information here that top-dress fertilizer had a positive impact on the farmers eventual income.

#### 4.9.2 Influence of subsidized planting fertilizer on income.

The data sought to establish the influence of subsidized planting fertilizer on household income.

**Table 4.23: influence of subsidized planting fertilizer on income.**

##### Cross tabulation

		Increase in income		Total
		yes	No	
	Count	3	2	5
11-20	% Kgs of subsidized planting fertilizer given	60.0%	40.0%	100.0%
	Count	18	2	20
21-30	% Kgs of subsidized planting fertilizer given	90.0%	10.0%	100.0%
<b>Kgs of subsidized planting fertilizer given</b>	Count	22	7	29
	31-40 % Kgs of subsidized planting fertilizer given	75.9%	24.1%	100.0%
	Count	8	9	17
41-49	% Kgs of subsidized planting fertilizer given	47.1%	52.9%	100.0%
	Count	103	26	129
50 kgs	% Kgs of subsidized planting fertilizer given	79.8%	20.2%	100.0%
	<b>Count</b>	<b>154</b>	<b>46</b>	<b>200</b>
<b>Total</b>	<b>% Kgs of subsidized planting fertilizer given</b>	<b>77.0%</b>	<b>23.0%</b>	<b>100.0%</b>

From table 4.23, 77% of those farmers who received planting fertilizer reported an increase in the amount of income realized from maize farming. Specifically 90% of those farmers who received between 21-30 Kgs of subsidized planting fertilizers had a positive difference in their

income, this result cannot be ignored and thus we conclude that farm inputs had a positive influence on the household income.

**Table 4.24: Increase in income resulting from planting fertilizer**

**Cross tabulation**

		Increase in income					Total
		Below 10000	10001- 20000	20001- 30000	30001- 40000	above 40000	
<b>Kgs of subsidized planting fertilizer given</b>	Count	1	4	0	0	0	5
	11-20 % Kgs of subsidized planting fertilizer given	20.0%	80.0%	0.0%	0.0%	0.0%	100.0%
	Count	6	3	5	6	0	20
	21-30 % Kgs of subsidized planting fertilizer given	30.0%	15.0%	25.0%	30.0%	0.0%	100.0%
	Count	13	11	1	1	3	29
	31-40 % Kgs of subsidized planting fertilizer given	44.8%	37.9%	3.4%	3.4%	10.3%	100.0%
	Count	4	6	7	0	0	17
	41-49 % Kgs of subsidized planting fertilizer given	23.5%	35.3%	41.2%	0.0%	0.0%	100.0%
	Count	34	65	18	10	2	129
	50 Kgs % Kgs of subsidized planting fertilizer given	26.4%	50.4%	14.0%	7.8%	1.6%	100.0%
<b>Total</b>	<b>Count</b>	<b>58</b>	<b>89</b>	<b>31</b>	<b>17</b>	<b>5</b>	<b>200</b>
	<b>% Kgs of subsidized planting fertilizer given</b>	<b>29.0%</b>	<b>44.5%</b>	<b>15.5%</b>	<b>8.5%</b>	<b>2.5%</b>	<b>100.0%</b>

Like noted in the result above there was a general increase in income resulting from subsidized top-dress fertilizer on the eventual income of maize production, similarly here, majority of the respondents 44% of those farmers who received subsidized planting fertilizer also recorded an increase in income of maize harvest amounting to between Kshs 10,000 and Kshs 20,000 as illustrated in table 4.24

### 4.9.3 Influence of subsidized maize seeds on income

**Table 4.25: Influence of subsidized maize seeds on income**

Cross tabulation

			Increase in income		Total	
			Yes	No		
<b>Kgs of subsidized maize seeds were you given</b>	less than 3Kgs	Count	4	0	4	
		% Kgs of subsidized maize seeds	100.0%	0.0%	100.0%	
	3-6 Kgs	Count	21	10	31	
		% Kgs of subsidized maize seeds	67.7%	32.3%	100.0%	
	7-9	Count	18	10	28	
		% Kgs of subsidized maize seeds	64.3%	35.8%	100.0%	
	10Kgs	Count	3	2	5	
		% Kgs of subsidized maize seeds	60.0%	40.0%	100.0%	
			Count	101	31	132
				76.5%	23.5%	100.0%
	<b>Total</b>	<b>Count</b>		<b>154</b>	<b>46</b>	<b>200</b>
		<b>% Kgs of subsidized maize seeds given</b>		<b>73.5%</b>	<b>26.5%</b>	<b>100.0%</b>

Like noted in the result on fertilizers, there was an increase in income resulting from subsidized maize seeds on the eventual income of maize production, similarly here, majority of the respondents 73% of the farmers recorded an increase in income while only 26% recorded a decrease in income realized as compared to previous year's as illustrated in table 4.25.

### 4.10 Influence of the criteria used to select beneficiaries on household income

The study sought to establish the criteria used to select beneficiaries on household income (vulnerability, land size and age of the household head).

#### 4.10.1 Influence of vulnerability of beneficiaries on income

The study aimed to establish whether there was any influence of beneficiaries' vulnerability on income.

**Table 4.26: influence of vulnerability of inputs beneficiaries on income**

##### Cross tabulation

			Increase in income		
			Yes	No	Total
	orphaned	Count	10	4	14
		% special cases of house hold head	71.4%	28.6%	100.0%
special cases of household head	widowed	Count	31	12	43
		% special cases of house hold head	72.1%	27.9%	100.0%
	None	Count	113	30	143
		% special cases of house hold head	79.0%	21.0%	100.0%
Total	<b>Count</b>		<b>154</b>	<b>46</b>	<b>200</b>
	<b>% within special cases of house hold head</b>		<b>77.0%</b>	<b>23.0%</b>	<b>100.0%</b>

As shown in table 4.26, 72% of the respondents who were widowed reported a positive growth in their income after receiving subsidized farm input, a further 71% of the orphaned reported a positive growth in the income. Still some more 79% of those farmers who didn't have any disability still had a positive difference in income generation after receiving subsidized farm inputs. We thus do not see any relationship on the nature of presence or absence of a special case in the income of a household; hence we conclude that the choice of special cases in a household didn't have any effect on the eventual income of a household.

##### Ability of the vulnerable to do something new

The data sought to establish whether out of the increased income the vulnerable were able to do something new.

**Table 4.27: Ability of the vulnerable to do something new**

**Cross tabulation**

		Ability to do something new			Total	
		yes	no	no answer		
special cases of	orphaned	Count	13	1	0	14
		% within special cases of house hold head	92.9%	7.1%	0.0%	100.0%
house hold head	widowed	Count	25	14	4	43
		% within special cases of house hold head	58.1%	32.6%	9.3%	100.0%
None		Count	115	28	0	143
		% within special cases of house hold head	80.4%	19.6%	0.0%	100.0%
Total		Count	153	43	4	200
		% within special cases of house hold head	76.5%	21.5%	2.0%	100.0%

Some 92% farmers who were orphaned were able to do something new with increased earning from maize farming indicating improvement in living standards, moreover, 58% of those farmers who were widowed were able to do something new out of an increased earning, still of the 80% of the farmers who didn't have any disability, they reported to have as well done something new resulting from more income from maize farming as illustrated in table 4.27. Thus we conclude that having disability or not did not have any effect on personal development coming from an increased income realized from subsidized maize farming. Hence the criterion of choosing special cases in the community did not have any effect on the eventual income of a household.



**Table 4. 28: Ability of the vulnerable to do something new without subsidized inputs**

**Cross tabulation**

			<b>Ability to do something without subsidized inputs</b>		
			<b>yes</b>	<b>No</b>	<b>Total</b>
<b>special cases of house hold head</b>	orphaned	Count	4	10	14
		% special cases of house hold head	28.6%	71.4%	100.0%
	widowed	Count	10	33	43
		% special cases of house hold head	23.3%	76.7%	100.0%
	None	Count	13	130	143
		% special cases of house hold head	9.1%	90.9%	100.0%
<b>Total</b>	<b>Count</b>	<b>27</b>	<b>173</b>	<b>200</b>	
	<b>% within special cases of house hold head</b>	<b>13.5%</b>	<b>86.5%</b>	<b>100.0%</b>	

As shown in table 4.28, 71% farmers who were orphaned would not have done something new without the subsidized inputs indicating improvement in living standards, moreover, 76% of those farmers who were widowed would not have done something new out of an increased earning, still of the 90% of the farmers who did not have any disability, reported they would not have done something new without the subsidized inputs .Thus we again conclude that having disability or not did not have any effect on personal development as a result of an increased income realized from subsidized maize farming. Hence the criterion of choosing special cases in the community did not have any effect on the eventual income of a household.

**4.10.2 Influence of age of subsidized farm inputs on beneficiaries on income**

The data sought to establish whether age of beneficiaries had influence on household income.

**Table 4.29: influence of age of beneficiaries on income**

**Cross tabulation**

			<b>Increase in income</b>		
			<b>yes</b>	<b>No</b>	<b>Total</b>
age bracket in years	less than 35	Count	30	3	33
		% age bracket	90.9%	9.1%	100.0%
	36-45	Count	25	7	32
		% age bracket	78.1%	21.9%	100.0%
	46-55	Count	40	9	49
		% age bracket	81.6%	18.4%	100.0%
	56 and above	Count	59	27	86
		% age bracket	68.6%	31.4%	100.0%
	<b>Total</b>	<b>Count</b>	<b>154</b>	<b>46</b>	<b>200</b>
		<b>% within age bracket</b>	<b>77.0%</b>	<b>23.0%</b>	<b>100.0%</b>

90% of those farmers who received subsidized inputs and aged less than 35 years reported that the amount of income realized was higher than previous year's, further to this 78% of those farmers aged between 36-45 years noted an increase in income, generally, all the age groups noted a positive difference in the amount of income realized as a result subsidized farm inputs. On average 77% of these farmers realized a positive difference as shown in table 4.29. We thus do not associate age bracket to increased income due to subsidized inputs on a household.

**Table 4.30: influence of age on ability to do something new****Cross tabulation**

		ability to do something new			Total	
		yes	No	No answer		
age bracket	less than 35	Count	24	9	0	33
		% age bracket	72.7%	27.3%	0.0%	100.0%
	36-45	Count	22	6	4	32
		% age bracket	68.8%	18.8%	12.5%	100.0%
	46-55	Count	41	8	0	49
		% age bracket	83.7%	16.3%	0.0%	100.0%
	56 and above	Count	66	20	0	86
		% age bracket	76.7%	23.3%	0.0%	100.0%
	<b>Total</b>	<b>Count</b>	<b>153</b>	<b>43</b>	<b>4</b>	<b>200</b>
		<b>% age bracket</b>	<b>76.5%</b>	<b>21.5%</b>	<b>2.0%</b>	<b>100.0%</b>

On average and in tandem with previous results majority of the respondents 76% were able to do something new. 72% of those farmers who were able to do something new as a result of subsidized farm inputs were aged less than 35 years. A further 68% of those who had a positive difference were aged between 46-55 years as shown in table 4.30; in general age difference did not have any effect on personal growth attributed to increased income from subsidized farm inputs.

#### 4.10.3 Influence of size of farm on income

The data sought to establish whether the size of the farm had any influence on income.

**Table 4.31: influence of size of farm on income**

**Cross tabulation**

			Increase in income		
			Yes	No	Total
size of farm	less than 1	Count	71	20	91
	acre	% size of farm in acres	78.0%	22.0%	100.0%
in acres	1 acre and	Count	83	26	109
	above	% size of farm in acres	76.1%	23.9%	100.0%
		Count	154	46	200
<b>Total</b>		<b>% size of farm in acres</b>	<b>77.0%</b>	<b>23.0%</b>	<b>100.0%</b>

From table 4.31, 78% of those farmers who reported an increase in income compared to the previous year had less than one acre of land, a further 76% of those who had more than one acre still reported an increase in income from the previous year, thus we note that size of the farm did not necessarily have an impact on whether a farmer would get more income or not, hence we conclude again that the size of the farm as a criterion for determine the income of an household is not feasible.

**Table 4.32: Size of land and income increase**

**Cross tabulation**

			Increase in income			Total
			less than 5000	5001-10000	10001-15000	
size of farm	less than	Count	50	32	9	91
	one acre	% size of farm	54.9%	35.2%	9.9%	100.0%
in acres	1 acre and	Count	62	38	9	109
	above	% size of farm	56.9%	34.9%	8.3%	100.0%
		<b>Count</b>	<b>112</b>	<b>70</b>	<b>18</b>	<b>200</b>
<b>Total</b>		<b>% size of farm in acres</b>	<b>56.0%</b>	<b>35.0%</b>	<b>9.0%</b>	<b>100.0%</b>

From table 4.32, 54% of the farmers who had less than one acre of land reported to have an increase in income of less than Kshs5000 compared to previous years. Whereas 56% of those farmers who had more than one acre of land reported to have received a similar amount. This can

be attributed to the fact that these very same farmers were using fertilizer in the previous year for farming and the difference only was the cost of inputs. We thus conclude that the size of the farm as criterion for choosing the beneficiary did not have any effect on the household income.

**4.11 influence of time subsidized farm inputs were given on income**

The data sought to establish the influence of time subsidized farm inputs were given on income as compared to previous year

**Table 4.33: influence of time subsidized farm inputs were given on income**

**Cross tabulation**

			<b>Increase in income</b>		
			<b>yes</b>	<b>no</b>	<b>Total</b>
<b>Time given subsidized farm inputs</b>	before the rains	Count	102	12	114
		% time given subsidized farm inputs	89.4%	10.6%	100.0%
	after the rains started	Count	23	63	86
		% time given subsidized farm inputs	26.7%	73.3%	100.0%
<b>Total</b>			<b>125</b>	<b>75</b>	<b>200</b>
			<b>58.0%</b>	<b>42.0%</b>	<b>100.0%</b>

89 % of those farmers who received subsidized farm inputs before the rains noted an increase in income than the previous year. 10 % of them noted a decrease in the amount of income generated compared to the previous one. A smaller percentage 26% of those farmers who received farm inputs after the rains however, noted an increase in income compared to the previous year. A majority 73% did not note an increase in income as a result of delayed inputs as shown in table 4.33. We thus note that the time factor of when the inputs were supplied had an effect on the eventual income of the house hold.

**Table 4.34: Ability to do something new**

**Cross tabulation**

			ability to do something new			
			yes	no	no answer	Total
time given subsidized farm inputs	before the rains	Count	65	23	0	88
		% time given subsidized farm inputs	73.9%	26.1%	0.0%	100.0%
farm inputs	after the rains started	Count	20	88	4	112
		% time given subsidized farm inputs	17.6%	78.9%	3.6%	100.0%
<b>Total</b>	<b>Count</b>		<b>85</b>	<b>111</b>	<b>4</b>	<b>200</b>
	<b>% time given subsidized</b>		<b>45.7%</b>	<b>52.5%</b>	<b>1.8%</b>	<b>100.0%</b>
	<b>farm inputs</b>					

73 % of those farmers who received subsidized farm inputs before the rains were able to do something new. A smaller percentage 17% of those farmers who received farm inputs after the rains however did something new compared to a majority 78% who did do anything new as a result of delayed inputs as illustrated in table 4.34. We thus note that the time factor of when the inputs were supplied had had an effect on the eventual income of the house hold.

**4.12 Influence of training on subsidized farm inputs on income**

The data sought to establish how training content and approach influenced income.

**4.12.1 Influence of training content on income**

The data sought to establish how training content influenced income.

**Table 4.35: Influence of training content on income**

Cross tabulation

		<b>Increase in income</b>		<b>Total</b>
		<b>yes</b>	<b>no</b>	
	Yes	Count 76	Count 19	Count 95
		% Relevance of training content 80.0%	% Relevance of training content 20.0%	% Relevance of training content 100.0%
Relevance of training content	No	Count 12	Count 2	Count 14
		% Relevance of training content 14.3%	% Relevance of training content 87.7%	% Relevance of training content 100.0%
	No answer	Count 25	Count 66	Count 91
		% Relevance of training content 27.5%	% Relevance of training content 72.5%	% Relevance of training content 100.0%
<b>Total</b>		<b>Count</b> 113	<b>Count</b> 87	<b>Count</b> 200
		% Relevance of training content 40.0%	% Relevance of training content 60.0%	% Relevance of training content 100.0%

80% of those farmers who received training received an increased earning as compared to the previous year; a further 72% of those farmers who were not satisfied with the training content received did not realize a difference in earnings as shown in table 4.35, this could be attributed to ignorance in implementing farming procedures received. We thus can conclude that training content had a positive effect on the income of the house hold income.

#### 4.12.2 Influence of training approach on income

The data sought to establish the influence of training approach on income

**Table 4.36: Influence of training approach on income**

**Cross tabulation**

			<b>Increase in income</b>		
			<b>Yes</b>	<b>no</b>	<b>Total</b>
<b>training approach used</b>	classroom lecture	Count	34	7	41
		% training approach	82.9%	17.1%	100.0%
	visiting	Count	6	7	13
		% training approach	46.2%	53.8%	100.0%
	demonstration field	Count	36	6	42
		% training approach	85.7%	14.3%	100.0%
	field practice	Count	10	1	11
		% training approach	90.9%	9.1%	100.0%
	farmer to farmer learning	Count	68	25	93
		% training approach	73.1%	26.9%	100.0%
N/A	Count	154	46	200	
	% training approach	77.0%	23.0%	100.0%	
<b>Total</b>	<b>Count</b>	<b>154</b>	<b>46</b>	<b>200</b>	
	<b>% training approach</b>	<b>77.0%</b>	<b>23.0%</b>	<b>100.0%</b>	

Some 90% of the farmers who noticed a positive growth in the income as a result of subsidized farm input prefer farmer to farmer learning as the best method of farming where a further 85% of those farmers who noted an increase in income increase preferred field practice while a further 82% preferred a more theoretical classroom learning as shown in table 4.36, we thus can conclude that there is no relationship on the approach of training on the effect of house hold earning.



## CHAPTER FIVE

### SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMENDATIONS

#### 5.1 Introduction

This chapter presented the summary of findings, discussions conclusion and recommendations of the study findings. The aim of the study was to analyse the influence of subsidized farm inputs on household income.

#### 5.2 Summary of findings

Table 5.1 presents the findings of the study based on specific objectives of the study and type of analysis.

**Table 5.1: Summary of findings**

Objectives	Type of analysis	Main Findings
To assess the influence of type of subsidized farm inputs (planting, top dress fertilizer and certified maize seed) supplied on household income.	Descriptive Inferential	A majority of those respondents who received subsidized top-dress fertilizer reported an increase in the eventual increase in income .This represented a total of 56% of the farmers interviewed,77% of those farmers who received planting fertilizer reported an increase in the amount of money realized from maize farming. Similarly majority of the respondents 73% of the farmers who received subsidized maize seeds recorded an increase in income
To examine the influence of the criteria used to select subsidized farm inputs beneficiaries on household income.	Descriptive Inferential	72% of those farmers who were widowed reported a positive growth in the income after receiving subsidized farm input, a further 71% of the orphaned reported a positive growth in the income. Still some more 79% of those farmers who didn't have any disability still had a positive difference in income generation after receiving of subsidized farm inputs On average of the 77% of the farmers who realized a positive difference72% of them were aged less than 35 years old

Objectives	Type of analysis	Main Findings
		Of the 71% of those farmers who reported an increase in income compared to the previous year had less than an acre of land, a further 76% of those who had more than an acre still reported an increase in income
To establish the influence of time when subsidized farm inputs are supplied on household income.	Descriptive Inferential	89 % of those farmers who received subsidized farm inputs before the rains noted an increase in income than the previous year.10 % of them noted a decrease in the amount of income generated compared to the previous one. A smaller percentage 26% of those customers who received farm inputs after the rains however noted an increase in income compared to a majority 73% who did not note an increase in income as a result of delayed inputs.
To determine the influence of training on subsidized farm inputs use on household income.	Descriptive Inferential	80% of those farmers who received training received an increased earning from those of the previous year; a further 72% of those farmers who were not satisfied with the training content received did not realize a difference in earnings  Some 90% of the farmers who noticed a positive growth in the income as a result of subsidized farm input prefer farmer to farmer learning as the best method of farming where a further 85% o those farmers who noted an increase in income increase preferred field practice while a further 82% preferred a more theoretical classroom learning.

### 5.3 Discussions of Findings

The following findings were got from the study.

### **5.3.1 Influence of type of subsidized farm inputs supplied on household income.**

Irrespective of the amount (Kgs) of subsidized top dress fertilizer received there was an increase in the income generated from maize farming compared to previous year. A total of 77% of those respondents who had received subsidized top fertilizer reported an increase in income while 77% of those farmers who received planting fertilizer reported also an increase in income. 73% of the farmers who received maize seeds also recorded an increase in income realized as compared to last year. A majority of the respondents 56% who received subsidized top-dress fertilizer reported an increase in the eventual increase in income of less than Kshs. 5000; while majority of the respondents 44% of those farmers who received subsidized planting fertilizer also recorded an increase in income of maize harvest amounting to between Kshs. 10,000 and 20,000. This means that planting fertilizer had more returns.

### **5.3.2 Influence of the criteria used to select subsidized farm inputs beneficiaries on household income.**

72% of those farmers who were widowed reported a positive growth in the income after receiving subsidized farm input, a further 71% of the orphaned reported a positive growth in the income. Still some more 79% of those farmers who didn't have any disability still had a positive difference in income generation after receiving of subsidized farm inputs. Some 92% farmers who were orphaned were able to do something new with increased earning from maize farming indicating improvement in living standards, moreover, 58% of those farmers who were widowed were able to do something new out of an increased earning, still of the 80% of the farmers who didn't have any disability,.

On average 77% of these farmers realized a positive difference, we thus do not associate age group to increased income due to subsidized inputs on an households. 72% of those farmers who were able to do something new as a result of subsidized farm inputs were aged less than 35 years old.

71% of those farmers who reported an increase in income compared to the previous year had less than an acre of land, 78% of those farmers who reported an increase in income compared to the previous year had less than an acre of land, a further 76% of those who had more than an acre still reported an increase in income. 54% of the farmers who had less than an acre of land reported to have an excess of income over that of previous year by less than Kshs 5000, where the 56% of those farmers who had more than one acre of land reported to have received a similar amount. It can be deducted that land size has no significant influence on income

### **5.3.3 Influence of time when subsidized farm inputs are supplied on household income.**

89 % of those farmers who received subsidized farm inputs before the rains noted an increase in production than the previous year. 10 % of them noted a decrease in the amount of income generated compared to the previous one. A smaller percentage 26% of those customers who received farm inputs after the rains however noted an increase in income compared to a majority 73% who did not note an increase in income as a result of delayed inputs. We thus note that the time factor of when the inputs were supplied had had an effect on the eventual income of the house hold.

73 % of those farmers who received subsidized farm inputs before the rains were able to do something new. A smaller percentage 26% of those customers who received farm inputs after the rains however did something new compared to a majority 78% who did do anything new as a result of delayed inputs. We thus note that the time factor of when the inputs were supplied had had an effect on the eventual income of the house hold. This could be because most beneficiaries depend on rain fed agriculture.

### **5.3.4 Influence of training on subsidized farm inputs use on household income.**

80% of those farmers who received training received an increased earning from those of the previous year; a further 72% of those farmers who were not satisfied with the training content received did not realize a difference in earnings, this could be attributed to ignorance in implementing farming procedures received. We thus can conclude that training content had a positive effect on the income of the house hold . Some 90% of the farmers who noticed a positive growth in the income as a result of subsidized farm input prefer farmer to farmer learning as the best method of farming where a further 85% o those farmers who noted an increase in income increase preferred field practice while a further 82% preferred a more theoretical classroom learning, we thus can conclude and say that there is no relationship on the approach of learning on the effect of house hold earning as a result of increased income.

## **5.4 Conclusion**

Irrespective of the amount of subsidized fertilizers and maize seeds received there was an increase in the income generated from maize farming compared to previous year as a result of the maize seeds, planting and top dress fertilizers given. Further the criteria used to select subsidized farm inputs beneficiaries (vulnerability, land size and age) are not feasible for determination of the income of a household as a result of subsidized farm inputs. The time factor of when the inputs were supplied had an effect on the eventual income of the house hold. On the

other hand training content had a positive effect on house hold income and there was no relationship of the training approach used on house hold income.

## **5.5 Recommendations**

This study has led to a number of recommendations on what the government and farmers should do to improve household income by subsidized farm inputs.

### **Recommendations on future subsidized inputs**

1. The programme should be extended for more than one season so that it exits when the resource poor farmers reach a threshold income level to be sustainable.
2. The guideline on the criteria used to select beneficiaries is revised to be in line with the intended objective of the programme
3. Inputs should be availed before the onsets of rains since late recipient of inputs really affect income.

### **Farmers**

4. Farmers should continually strengthen their groups and link with buyers and input suppliers to have bargaining power and enjoy from economies of scale to be able to reduce cost of production and maximize profits for sustainable commercial farming when subsidies are not provided.

### **Recommendations for policy makers**

5. Policy makers should formulate complementary policies and investments: subsidy programme are highly dependent on a range of complementary investments and policies promoting infrastructure development, staple market development and stability, integrated soil fertility management and improvement, agricultural research and extension, and economic diversification in rural areas. To improve marketing investment in public goods for agricultural development, especially roads, irrigation and drainage, research and extension is essential.
6. The farmers are continuously supported to increases agricultural productivity to be able to move from subsistence to commercial farming.

### **Recommendations for further research**

For further research, the study recommends that the following studies be carried out.

1. A research be carried out to establish the extent to which input subsidies displaces commercial input sales, if recipients would have bought agricultural inputs in the absence of subsidies if the objective of the subsidy is to promote use of agricultural inputs.
2. Whether access to subsidy leads to increased demand for commercial inputs among the beneficiary smallholder farmers on recipients who were not previously using the farm inputs.

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## APPENDICES

### Appendix 1: Letter of transmittal

**Beatrice Mugure Mathenge**

**P.o Box 326,**

**CHOGORIA.**

**12<sup>th</sup> May 2012**

**To Whom It May Concern:**

**(District Agriculture Officer-Maara)**


Dear sir/madam,

**RE: REQUEST FOR COLLECTION OF DATA**

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I am a student at University of Nairobi pursuing a master degree in project planning and management. In fulfilment for the requirement of the award of a master's degree, I am conducting a research on the influence of subsidized farm inputs on household income on and targets to collect data from the beneficiaries in your district.

I request that you provide all the information requested and I assure you that the information obtained will be treated confidentially and purely used on academics.

  
Yours Faithfully,  
Beatrice Mathenge

## Appendix 2: Data Collection Instruments

### Questionnaire

#### Section (A): Personal details

1. Gender of respondent: Male [ ] Female [ ]
2. Age bracket of household head :  
Less than 35 years [ ] 46-55 years [ ]  
36-45 years [ ] 56 and above [ ]
3. Education level of household head :  
No education [ ] Secondary [ ]  
Primary [ ] Tertiary [ ]
4. Household status: Male headed [ ] Female headed [ ] Child headed [ ]  
Other (Specify) .....
5. Special circumstances of household head if any :  
Handicapped [ ] Widowed [ ]  
Orphaned [ ] on medical grounds [ ]  
Other (Specify) .....
6. No. of members in the household:  
1-3 members [ ] 7-9 members [ ]  
4-6 members [ ] 10 and above members [ ]
7. Sources of family's incomes:  
Farming only [ ] Farming and business [ ]  
Farming and casual work [ ] Farming and professional work [ ]  
Other (Specify) .....
8. Indicate the monthly income (Kshs.) from sources stated above:  
1000-10,000 [ ] 10,001-20,000 [ ]  
20,001-30,000 [ ] 30,001-40,000 [ ]  
41,000 and above [ ]

#### Section (B) :Type of subsidized farm inputs

1. (a).What amount of certified maize seeds (Kgs) were you given?  
Less than 3 Kgs [ ] 7-9 Kgs [ ]

3-6 Kgs [ ]    10 Kgs [ ]

(b). What amount of planting fertilizer (Kgs) were you given?

Less than 10Kgs [ ]    21-30Kgs [ ]

11-20 Kgs [ ]    31-40Kgs [ ]

41-49 Kgs [ ]    50 Kgs [ ]

(c). What amount of top dress fertilizer (Kgs) were you given?

Less than 10Kgs [ ]    21-30Kgs [ ]

11-20 Kgs [ ]    31-40Kgs [ ]

41-49 Kgs [ ]    50 Kgs [ ]

2. What was your production level in 90Kg bag?

Less than 10 bags [ ]    20-30 bags [ ]

11-20 bags [ ]

3. What was your production level in 90Kg bag the previous year (before supplied the subsidized inputs)?

Less than 10 bags [ ]    20-30 bags [ ]

11-20 bags [ ]

4. What was the level of income in Kshs?

1000-5000 [ ]    6000-10000 [ ]

11000-15000 [ ]    16000 and above [ ]

5. What was the level of income in the previous year (before supplied the subsidized inputs)?

1000-5000 [ ]    6000-10000 [ ]

11000-15000 [ ]    16000 and above [ ]

**Section (C): Criteria to select subsidized farm inputs beneficiaries**

1. Do you think the beneficiaries selected were the needy household in your locality?

Yes [ ]    No [ ]

2. Before you were supplied with the subsidized farm inputs, could you afford could you afford these basic inputs?

Yes [ ]    No [ ]

3. What is the size of your farm in acres?

Less than one acre [ ]    one acre and above [ ]

**Section (D): Time subsidized farm inputs were supplied**

1. When was the subsidized farm inputs supplied?

Before the rains started [ ]                                  After the rains had started [ ]

2. Tick the item which describe the time you were issued with the subsidized farm inputs?

Appropriate [ ]                                  Neutral [ ]                                  Inappropriate [ ]

3. What intervention did you take if the subsidized farm inputs were supplied late?.....  
.....

**Section (E): Training on subsidized farm inputs**

1. Did you participate in any training when you were supplied with subsidized farm inputs?

Yes [ ]                                  No [ ]

2. Was the trainings content relevant and need based?

Yes [ ]                                  No [ ]

3. Which method(s) of training was used during the training?

Class room lecture [ ]                                  Visiting demonstration fields [ ]

Field practice and practical demonstration [ ]                                  Farmer to farmer learning [ ]

**Section (F): Influence of subsidized farm inputs on income**

1. Did your income increase after using subsidized inputs as compared to the previous years?

Yes [ ]                                  No [ ]

2. If yes, what was the increase in income?

Less than 5000 [ ]                                  5001-10000[ ]                                  10001-15000 [ ]

3. Were you able to do something new?

Yes [ ]                                  No [ ]

4. Could you have done something new without the subsidized farm inputs?

Yes [ ]                                  No [ ]



### **Documentary analysis**

1. Project documents on subsidized programmes
2. Voucher issuance, distribution and redemption
3. Documented process of beneficiaries identification
4. Beneficiary's lists
5. Progress, quarterly, semi-annually and annually reports on subsidized inputs
6. Baseline survey (farmers) reports
7. Records kept i.e. at household level

### **Observation schedule**

1. Wellbeing of the household in terms of clothing, housing

### **Interview schedule at household level**

1. Type of food, clothing, medical, educational facilities and transportation means used by the household.
2. Monthly household expenditure.
3. Knowledge about optimum use of inputs
4. lessons learnt and being implemented after receiving the input subsidy

### **Interview schedule for MOA staff**

1. Criteria used in targeting beneficiaries of various subsidies provided.
2. Time inputs are supplied before ,after of during rains
3. Whether involved in training farmers after supplying subsidized farm inputs.
4. Approach and content of trainings

### **Focused group discussions**

1. Time inputs are supplied before ,after of during rains
2. Whether involved in training farmers after supplying subsidized farm inputs.
3. Approach and content of trainings