INFLUENCE OF SOCIO- ECONOMIC STATUS ON THE ACCESS TO AGRICULTURAL FARM INPUTS BY SMALL HOLDER FARMERS IN YATTA SUB-COUNTY OF MACHAKOS COUNTY, KENYA

HUSSEIN JAY MUSYOKA

A RESEARCH PROJECT REPORT SUBMITTED FOR THE PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF ARTS IN PROJECT PLANNING AND MANAGEMENT OF THE UNIVERSITY OF NAIROBI

2017

DECLARATION

This research project report is my original work and I declare that it has not been Presented in any other university or institution for academic credit or award:

Signature: _____Date:_____

Hussein Jay Musyoka

Registration No: L50/70555/2011

This research project report has been submitted for examination with my approval as the University supervisor:

Signature: _____Date:_____

Dr John Mbugua

Lecturer Department of Open Learning

University of Nairobi

DEDICATION

This work is dedicated to my wife Dorcus and my daughters Precious and Victoria, to my parents Martin Musyoka and Joyce Martin and my siblings including; Stanley, Joy, Jimmy, Jakes and Sheila for their continued support and encouragement during this time of study.

ACKNOWLEDGMENT

I would like to acknowledge my supervisor, Dr John Mbugua for his commitment and professional guidance during the course of this research undertaking. To the research assistants who helped me in data collection namely; Januaries Mutuku, Stephene Muthama, Dorcus Muendo, Janet Ndunda, Carolyne Mutisya, Prisca Kavinya, Vincent Mutuku, Benson Munyasya and Shedrack Wambua. Lastly and not the least, I am indebted to appreciate the respondents including the sampled farmers in Yatta Sub-County, key informants from the Ministry of Agriculture in Machakos County namely; Veronica Kamwele (Ward Crops Officer), Julius Kigo (Sub-County Crop Officer) and Joseph Murungi (County Crops Director) others who availed and gave data that contributed towards completion of this research project.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

AGRA	Alliance for a Green Revolution in Africa
CI	Confidence Interval
ESR	Economic Survey Report
FAO	Food and Agricultural Organization
FFS	Farmer Field Schools
GOK	Government of Kenya
GSMA	Global System for Mobile Association
Ha	Hectare
HIV/AIDS	Human Immunodeficiency Virus and Acquired Immune Deficiency Syndrome
HYV	High Yielding Variety
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IFPRI	International Food Policy Research Institute
Ksh	Kenya Shillings
MA	Master of Arts
NAAIAP	National Accelerated Agricultural Access Program
NGO	Non-Governmental Organization
SPSS	Statistical Package for Social Scientists
SSA	Sub- Saharan Africa
UBoS	Uganda Bureau of Statistics
UNDP	United Nations Development Program
WDR	World Development Report

ABSTRACT

The purpose of this study was to establish the socio economic factors influencing the access to farm inputs by small holder farmers in Yatta Sub-County, Machakos County. The objectives of the study included; establishing how income level, education level, gender and access to credit influenced the access to farm inputs by small holder farmers in Yatta Sub-County of Machakos County, Kenya. The key problem informing this study was the realisation the consumption of modern farm input in the study area was very low despite the Government implementation of the National Input Access Programmes and subsidising fertilizer. A descriptive research design was employed with a mixed method approach of both the quantitative and qualitative data collection methods. The target population was the small holder farmers in Yatta Sub-county and with a sample of 384 farmers. A pilot study was conducted before the actual data collection with a sample of 20 farmers and the feedback from the research assistants was incorporated in the refinement of the data collection instruments. A multi stage sampling technique combining stratified random sampling and purposive sampling method was applied in this study. Data analysis was done by use of SPSS and presentation was done by analysis of the frequency distributions and inferential statistics was done using multiple regression analysis method. The findings of this study established that access to agricultural farm inputs by small holder farmers was at 31.8% and in terms of how the independent variables of the study influenced the access to agricultural farm inputs, it was established that a unit change in income level holding the other factors constant would lead to change in access to farm inputs by 0.807 units, a unit change in education holding the other factors constant would change access to farm inputs by 0.306 units, a unit change in gender holding the other factors constant would change access to farm inputs by -0.051 units and a unit change in access to credit holding the other factors constant would change access to farm inputs by 0.253 units. The recommendations of this study include; the need for the current input subsidy program on fertilizer to be expanded to cover other farms inputs, there is need to work towards improving the accessibility of the fertilizer and by extension all the other inputs to the local level by making sure that the mini depots which have been set at sub-county level are decentralised to ward and even village level, need for timely supply of the farm inputs to coincide with planting seasons and the packaging of inputs and especially for fertilizer to be done in smaller quantities to enable low income earners afford and use farm inputs and the need to mobilise farmers into groups in order to improve the farmer's negotiation power and inculcate the advantage of collective bargaining power. The study recommends further areas of research on other potential influencing factors in the access to agricultural farm inputs including; how climatic and weather conditions influences the access to farm inputs in arid and semi- arid lands.

CHAPTER ONE
INTRODUCTION

1.1 Background of the study

It has been established over time through empirical agricultural research efforts that agricultural productivity is one of the significant factors determining increase and sustainable agricultural growth in the world. (Adeleke et al., 2009).The promotion of smallholder farming has great role in poverty reduction in developing countries by contributing towards improvement of income from the farm enterprises of rural farmers and reducing expenditure on food, and thus have a direct impact in reducing income inequality among the rural population (World Bank, 2008). In this regards for agricultural sector to grow, it is imperative that farm inputs are made accessible by all, low cost accessible and of good quality and especially certified/high yielding seeds, fertilizer, and agro-chemicals which contribute towards improved farm productivity and in raising the incomes of the smallholder farmers (World Bank, 2007).

The consumption of modern agricultural inputs in Africa, particularly fertilizer, is comparatively very low and the situation of low access to agricultural input was not going change soon as Africa was consuming less than 3% of world's by the year 2012. In addition to this, it is worth noting over 50% of the population in most of the East African countries are located at more than five to the nearest input market provider or depot and as a result it has affected the access to agricultural farm input especially by small holder farmer a great deal. At the regional level the average application rates of fertilizer for crop farming in the region was estimated to be below the global average of 100kgs/ha per annum with an average of 30 kg/ha per annum in the East African Region(Wiggins and Jonathan,2010).

Kenya is categorized as an agro-based economy according to the World development report (WDR), of 2008, whereby agriculture represents 32 percent on average of the total GDP growth and 79 percent of the rural population depend on agricultural production for their livelihood. Despite this, the performance of the agricultural sector in Kenya has decreased from the 6.4 per cent in 2014 to 1.5 percent growth in 2015 which indicates a 4.9 percentage decrease. Some of the factors responsible for this decline include; the unconducive weather conditions in some regions, high cost of

agricultural inputs, high inflation rate has contributed significantly to the low production. Despite these challenges, the agricultural sector is deemed to play significant role in moving the country towards the achievement of vision 2030.

The use of farm productivity enhancing inputs such as fertilizer, certified/hybrid seeds and agro chemicals play and instrumental role in agricultural production and productivity world over as they constitute a significant component of the agricultural value chain. When these inputs are used properly under the right climatic conditions and proper farm management, high production is achievable. The role of agricultural farm inputs is based on the basic fact that for any output there must be an input (Ogang 2014)

The study was conducted in Yatta Sub-county in Machakos County, Kenya. According to (Kenya's population census 2009), Yatta Sub-county has a population of 147,579 with a population density of 140 km².The average acreage per framer Yatta is between 0.4 hectares(0.9 acres) to 2.0 hectares(4.9 acres).The sub-county covers an estimated area of 1057.3 km² and its altitude ranges from 500 to 1200 m above sea level. It is against this background that the study seeks to establish the socioeconomic factors influencing the access to agricultural farm inputs by small holder farmers in Yatta Sub-County of Machakos County in Kenya.

1.2 Statement of the problem

Over the years since 1980s, the level of farm productivity has remained stagnant in much of Eastern Africa countries caused by a combination of factors the key ones being; low farm modern farm input use, limited irrigation, lack of perceiving farming as a business and use of recycled seeds from previous seasons according to Okello, (2012). In comparison with other countries both in developing and developed contexts, input use in Kenya is relatively very low with and average use of 44kgs of fertilizer per hectare as compared to India at 164kgs, South Africa at 62kgs and Brazil at 182kgs according to Kenya Market Trust (2016).In addition to this small holder farmers face poorly functioning input market. According to the Food Security Report by Kenya Agricultural Research Institute (2017), it was reported that prevailing food insecurity challenges were caused by several factors, including natural disasters like

lack of adequate rainfall which led to droughts in most parts of the country, high costs food production, high costs of agricultural inputs especially fertilizer, high food prices at global level and high poverty level for a greater portion of the Kenyan population.

A longitudinal household survey conducted by the Tengemeo Institute of Egerton University (1997, 2000, 2004 and 2007) reported that the use of fertilizer by farmers growing maize per agro-ecological zone rose from 26% in 1997 for the Eastern Lowlands to 48% in 2007.It is important to note Yatta Sub-county lies in the Eastern Lowlands of Kenya. The available data on farm input use in Yatta Sub-county suggests that the use of the agricultural input was low further as it was found out that the high prices and unreliable rainfall patter, unreliable input market, unavailability of inputs in rural retail shops and relative return of the inaccessible inputs prohibit fertilizer use among the small holder farmers in the sub-county (Freeman and Omit, 2003).In addition to this, after the end of the National Accereleted Agricultural Input Access Programme (NAAIAP) was implemented between 2008 to 2012,the central Government introduced an input subsidy but only focusing on fertilizer and not covering certified seeds and agro-chemicals although they are mutually inclusive.

A study was conducted in Machakos County with the objective of establishing the effect of input market access and use by small holder farmers in Machakos County, concluded that well-off farmers in terms of income and occupation were benefiting more from the access to modern agricultural farm input compares to small holder farmers and this also extended to their relative aggregate productivity where was favouring the well-off category of farmers (Kamara, 2004). In addition to this, the climatic condition in Yatta falls under the arid and semi-arid lands in Kenya with two crop seasons per year and the main agricultural input market is at Matuu and Kithimani towns whereby there are limited supplies of inputs and distribution to the remote locations such as Kinyaata, Kyua,Ndalani,Ikombe and Katangi due to poor infrastructure since most of the roads are inaccessible during rainy seasons thus resulting into high transportation cost and this impedes the access to input market.

The major farm inputs that may be of great concern to farmers in Yatta sub-county include the certified seeds (beans, maize), pesticides and fertilizer. In addition to this, the area being a semi –arid area with limited farming activities, there is no institution

that specializes in the supply of agricultural inputs. The major challenges in the access to the farm inputs according to a study conducted by (Joylep Consultants,2012) was found to include; limited input market opportunities, lack of stable credit support to agro-input dealers and also the inadequacy of training for agro-input dealers and farmers.

1.3 Purpose of Study

The study was aimed at establishing the influence of socio-economic factors on the access to agricultural farm inputs by small holder farmers in Yatta Sub-County.

1.4 Research Objectives

i. To establish how income level influences the access to agricultural farm inputs by small holder farmers in Yatta Sub-County.
ii. To establish how education level influences the access to agricultural farm inputs by small holder farmers in Yatta Sub-County.
iii. To establish how gender of the farmer influences the access to agricultural farm inputs by small holder farmers in Yatta Sub-County.
iv. To establish how access to formal credit influences the access to agricultural farm inputs by small holder farmers in Yatta Sub-County.

1.5 Research Questions

The study was designed to answer the following research questions:

i. How does the income level influence the access to agricultural farm input for small holder farmers in Yatta Sub-County?
ii. How does the education level of the farmer influence the access to agricultural farm input for small holder farmer in Yatta Sub-County?
iii. How does gender of the small holder farmer influences their access to agricultural farm inputs in Yatta Sub-County?
iv. How does access to formal credit influence the access to agricultural farm inputs by small holder farmers in Yatta Sub-County?

1.6 Significance of Study

This study may be useful in the implementation of Kenya's Vision 2030 blueprint which envisions to increase the value of agriculture and promote sustainable production systems through the efforts of raising the income from agriculture activities and supporting commercially oriented modern agriculture with a target of generating Ksh 80 Billion increase in GDP. This growth is expected to come from increased crop production in the arable lands and improved small holder capacity to produce more which will be influenced by the level and quality of access to farm inputs by small holder farmers who are the majority.

The research report may also be an instrumental document for reference by the Ministry of Agriculture in Kenya as well as the devolved County Government of Machakos in implementing a tailored solution to the challenges that may influence the achievement of not only the vision 2030 targets but also the Machakos County integrated Development plan of 2015 which prioritizes enhancement of food security for the population.

At the local level, farmers in Yatta sub-county may also benefit a lot from the findings of this study since the improved access to agricultural input has a direct influence on farm productivity which is important for many reasons including; improving household food security, improved competitiveness in the market and improved resilience during times of drought and famine. In addition, as the region agricultural production increased it also increase the famer's comparative advantage which implies that the region can produce products more cost efficiently as compared to other zones .As a result the area can create more demand for the products produced including more buyers for the quality products and quantities and the net effect of this is raising rural income and poverty reduction.

1.7 Basic Assumptions of the Study

The study was conducted with the assumption that the sample selected was representative and the selected respondents in the sample would answer the question posed honestly without withholding or exaggerating their responses. In addition to this, it was assumed that farmers would avail themselves for the administration of the

questionnaires and the key informants would be available for interviews. It was also assumed that the data collected was reliable enough to necessitate generalizations of the findings to the entire population.

1.8 Limitation to the Study

There were a few challenges faced in the course of executing this study .Some targeted respondents were not willing to respondent to the questions with some suspecting that the data collection process was linked to the political issues that were prevailing in Kenya at the time of conducting the study. The study was conducted during the rainy season whereby it was challenging to reach some remote villages due to poor road infrastructure.

The issue of some respondents not willing to respondent was settled by making it voluntary and only farmers who gave unconditional consent were interviewed and the issue of transport challenges was resolved by use of motorbikes to access the remote villages.

1.9 Delimitation to the Study

The study was delimited to the small holder farmers in Yatta Sub-County who were cultivating 5 acres or less for crop production. The study was only focused on the socio-economic factors which influenced the access to farm inputs by small holder farmers. The farm inputs under the scope of this study included access to fertilizer, certified seeds and agro-chemicals.

1.10 Definition of Significant Terms

Socio-economic Status: Socio-economic status refers to both economic and the sociological measure of a person or household's economic and social position in the society in comparison with and relative to others.

Income Level of the Small Holder Farmer: Income level can be defined using both household and individual context whereby income is referred to as the total sum of all the profits, wages, salaries, interest payments and any other forms of economic earning. In the context of this study income of the small holder farmer was categorised into two; namely; farm income and off-farm income sources.

Education Level of Small Holder Farmer: The education level is defined as social status derived from the process of transfer or acquisition of knowledge, developing the capacity of rational reasoning and judgment. In the context of this study it denotes a degree, level, or kind of schooling. e. g. primary education, secondary education university education etc.

Gender of the Small Holder Farmer: Gender of the farmer is the culturally and socially perceived distinction between men and women that may change under different location and time period. Gender and sex concept is different as 'sex' of the farmer denotes the biologically determined, thus unchangeable, difference between them.

Access to Farm Inputs by Small Holder Farmers: In this contest of this study, access to farm input is defined as the resources that are used in farm production, such as fertilizer, seeds and agro-chemicals. The proxy indicator for access to farm inputs in the context of this study will be the farmer's ability to acquire and use the key farm inputs (fertilizer, chemicals and hybrids seeds).

Small Holder Farmers: Smallholder farmers in the context of the study are defined as farmers falling under the category of subsistence farmers and semi-commercial farmers. Small holders cultivate 2.02 hectares and less (≤5 acres) of land for crop production.

Access to credit by Small Holder Farmers: Access to credit refers to the process in which an interested borrower is able to acquire resources in form of capital which may be both monetary or in kind, irrespective of the willingness to honor the repayment terms from the particular source of capital.

1.11 Organization of the Study

Chapter one comprises of background of the study, statement of the problem, research objectives, research questions, significance of the study, basic assumptions to the study, limitations to the study, delimitation to the study and definition of significant terms used in the study. Chapter two contains the literature review with sections which include and introduction, literature on the concept of small holder farmer, income level and the access to farm inputs ,education level and the access to farm inputs, gender and the access to farm inputs and access to credit, conceptual framework and the explanation of the variables of the study. Chapter three has the research design, target population, sample size, sampling procedure, data collection instruments, methods of data analysis and operationalization of variables. Chapter four include; the data analysis, presentation and interpretation and chapter five contains the summary of findings, conclusions and recommendations and areas recommended for further research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

The chapter involves a detailed review of relevant literature from what other researchers have written on the subject of access to farm inputs by small holder farmers at the global, regional, national and local level. The first review was on the concept of small holder to give an overview on what it means in the context of the study and this was combined with presenting literature regarding the issue of access to farm inputs and especially the challenges faced by small holder farmers. A review was also done touching on each research objective for this study and this include; how income, education, gender and access to formal credit influences their access to farm inputs.

2.2 Concept of Access to Agricultural Farm Inputs by Small Holder Farmers

The concept of smallholder farmers has been defined different by different researcher in the agricultural sector. However, the major point of convergence is the classification based definition which is determined by the size of the farm land and the purpose of production. The purpose of production could be for subsistence use that is for own household consumption or for commercial purpose. Machethe et al. (2004) argues low access to farm input and demonstrated by the limited purchased input and use of actual technologies is often associated with small holder farmers who engage in subsistence kind of farming which characterises small holder farmers. However, it is important to point out that smallholder farmers operate in contexts which vary across regions and agro-ecological zones with some based in urban and other in rural areas and from developed or a developing country. Small holders are characterised by common issues that define them including land scarcity, purpose of production, low use of farm input and found mainly in the rural areas .

According to a study carried out by Rwanda Ministry of Agriculture (1991) on agricultural production, the definition of a small holder farmer was based on the size of land and thus small holder farmer were considered to be the ones with a small acreage of land which was unable to produce sufficient quantities of food for the household use. As a result and a coping mechanism for the food insecurity the small holder farmer has to engage in other economic activities including being employed as

casual labourer by the well-of farmer to supplement their household income and buy food items that they may be lacking.

Farmer in Sub-Saharan Africa have been found to produce 1 tonne of cereal per hectare which is less than half of farmers in India produce and also less than a fourth of what a Chinese farmer produces. The African countries need to draw lessons and experiences from Asian countries which are prone to land scarcity by appreciation of the fact that Asian Green Revolution was focused on small holder transformation through the necessary incentives which have a direct bearing in poverty reduction, food security and sustained economic growth. (World Bank, 2007).

The political stability of Sub-Saharan Africa (SSA is largely depended on the availability of employment opportunities for the youth and human welfare and since majority of the small holder farmers are in their productive age, it is important to focus a countries development strategy and plan on how to transform the access to inputs for increased farm productivity and consequent economic growth (Delgado,1998).According to Dr Sigha (2016), Asian countries area highly populated with low to very low per capita landholdings and this in effect is a great impediment to mechanized agriculture .In addition to this, the issue of small holding is responsible for relative inefficiency in production interns of time and cost per unit area of production and above all the adoption of scientific methods and technologies is impractical for in small holdings.

As per the Machakos County Development Plan (2015), it was stated that there was increased farmer interest towards engaging in other non-farm enterprises and less motivated to engage in crop farming. County experiences a consistent decline in arable land and the trend of farmers opting to engage in other commercial activities while abandoning farm based agricultural activities. It is worth noting that the average farm size under small scale farming is 1.8 Acres while that under large scale farm it was 24 Acres (Machakos County integrated Development Plan 2015).

2.3 Income level and the access to farm inputs by small holder farmers

The universal input access subsidy programmes were implemented from 1960's up through 1980's by many of the African countries including; Kenya, Tanzania, Malawi, Zimbabwe and Zambia. The model was a government controlled input market whereby farmers were given the agricultural inputs at a subsided price and also a subsidized credit system (Dorward, 2009).However there were mixed experienced form these programs across the countries were it was implemented even though it was generally agree that its contribution towards improved farm productivity was significant. The inputs were expensive and majority of the low income farmers could not afford even the subsidized price and it ended up benefiting the well-off farmer who could use even their non-farm income and ability to access credit to access the inputs. Some of the subsides inputs such as fertilizer was characterized by inefficiencies in terms of the operational costs, used as tools of political manipulation during election times and cementing Government's monopoly in the supply chain (Banful, 2010b).Later on in the 1990's the structural adjustment programmes were implemented and thus dismantling the input subsidy programmes and adopting a liberalized input market which was hoped to improve the access to inputs but this was not the case as the both input use and agricultural productivity declined significantly(Crawford et al, 2006).

The determinants of input commercialization using socio-economic characteristics of the farmer such as farm size and livestock owned was found to be a key factor influencing the amount of farm input demanded and its consequent use in Ethiopia. On average farmers who had 4.8 acres of farm land and at least five livestock had more purchasing power in the access to fertilizer, certified/hybrid seeds and agro-chemicals (pesticides, insecticides and herbicides).This findings imply that the bigger the size of farm land and the more the number of livestock owned has a direct and significant influence on level of access to agricultural inputs. As a matter of fact income generated from the livestock sale proceeds enhances the capacity of farmers to access inputs for crop production. Direct purchase of the inputs was dominant by 68% of the farmers compared to the 32% of the farmers who applied for credit in order to purchase inputs. (Chala Hailu et al 2017).

A similar study conducted in Ethiopia as well found out that off -farm income significantly contributes towards livelihood of rural populations and especially for household engaged in subsistence production. Off-farm income contributes to livelihoods in two ways, by directly contributing towards income at household level and having a direct influence on agricultural production and this has a great influence to policy making as well. Kuiper.et al., 2007).In addition to this off farm income contributes towards increased farmer's access agricultural farm inputs and to cater of additional production costs such as hired labour, innovation and improved and technologies(Woldehanna,2000).

Much of the scientific studies in agricultural productivity have been focused on farm inputs which are resource based including capital and labour. This approach was premised on the basic production function which presents labour and capital as key factors of production. According to Ekborm (1998), there is a positive and significant correlation between labour and capital input per farm productivity. He used the value of domestic animals as proxy for capital and off farm income to conclude that they were positively correlated to productivity. It is therefore follows that availability of capital and labour is imperative in the efforts of promoting improved agricultural productivity for small holder farmers.

A study on the determinants of access to fertilizer and certified seeds in Kenya revealed the role of access to capital had a positive and significant influence on the level of adoption for fertilizer and improved seeds and fertilizer. Farm households having access to capital had improved sources of income and thus had a 22 % and 25 % higher probability of acquiring and adopting fertilizer and improved seed varieties when compared to farmers who had low access or no access to capital. This was due to the fact that some farm inputs such as technology based and improved seeds are resource intensive. As a matter of fact money in needed to purchase the modern farm inputs which is usually more expensive than the conventional and traditional farm inputs and complementary inputs such as fertility for maximum crop yields (James O Ouma et al, 2006).

Low income farmers in developing Countries are usually limited in terms of cash and thus have low access to far modern farm inputs such as certified/hybrid seeds and fertilizer. This goes along with the inability of access external capital for small holder farmers (Morris et al., 1999). In Kenya, the institutions that were empowering small holder farmers such as the cooperative societies are longer functioning to improve the famer's purchasing power. In view of this there is need to explore alternative strategies of empowering small holder farmers especially those found in the rural areas. It has been proved that the amount of organic fertilizer applied has a positive correlation with the use of certified/hybrid seeds. In addition to this the frequency of extension visits to the farmers determined the adoption rate of the modern farm inputs.

A study in the major rice producing areas In Tanzania focusing in the analysis of the socio-economic influencing factors for the utilization of farm inputs revealed that the regression coefficient for farm income had a positive influence for the utilization of modern agricultural inputs. Similar findings were documented by Barret (2003) and Binder (2006) which found out that the higher the gross income from farm production the higher the chances there was in the access to farm inputs for small holder farmers. Farmer are able to re-invest the income generated from crop sales for the access to modern inputs and the necessary technology for improved production and thus amplifying the importance of demonstrating to the farmer farming as a business (Tesfaye et al., 2013 and Asamlu 2006).It is important to note that in regard to the influence of the number of livestock owned by farmers it had negative influence for the acquisition and utilization of farm inputs for rice farmers. However, these findings contradict the findings by Chiputwa et al (2011) and Endale (2010) in their study on the use of fertilizer in Ethiopia which established that livestock owners influenced the use of fertilizer significantly.

Further studies conducted to establish the role of livestock in influencing the access farm inputs found that the direct impact of owning livestock is that farmers can raise money to purchase the inputs in the market as well as the indirect impact of enabling farmers to use them as collateral in the access to capital from institutions offering credit. Nevertheless, the findings support the argument that famers who keep more animals had an effect in reducing the demand for use of modern inputs and

conservation based agriculture since crop production stop becoming the primary enterprise and characterized by limited investment in this area. In other dimensions, findings show that off-farm income is influential in compensating for the additional financial resources associated with new intonations and technologies. In addition to this, off-farm income is regarded as supplementary income derived from extra income generated from non-farm activities which in one way may affect the desire to invest or discourage investment in new varieties of farm inputs including technology and innovations (Gregory and Sewando, 2013). A coefficient analysis run on the effect of nonfarm and the access to farm inputs established that it had positive and negative effect for the use of farm inputs by small holder farmer in maize and rice farming respectively. It implies that non -arm income has a negative effect and insignificant for maize farmers and this supports the finding by Tesfaye et al., 2013; Yuan et al., 2010 and Beyene, 2008 which attributed the higher return on rice farming to non-farming income since when non-farm enterprises perform well the famers are motivated to invest in farm based inputs for crop production.

2.4 Education level and the access to farm inputs by small holder farmers

Through the studies conducted regarding the role of education and a factor in labour productivity, it has been established that education may have both non-cognitive and cognitive impact upon labour productivity. The cognitive aspects of formal schooling include the transfer of specific information and the formation of proficiencies and technical skills. The non-cognitive aspects of education include the transformation of attitudes, habits and beliefs. Improved literacy and numeracy may assist farmers in comprehending agricultural related information and be able to calculate and apply the right quantities of farm inputs as recommended .In addition to this, the transformation in the way people think, attitudes, belief and practices may lead to increased willingness to face risks, higher adoption rate to technology and innovations, Inculcate saving culture for sustainable production practices. Education is vital as it may either improve the chances of a farmer to access information disseminated externally of enhance the capacity to access information through interaction with new technology. This may be a complement for famers experience in production whereby the schooling play a role in enabling the farmer to learn on the job more effectively (Rosenzweig 1995).

A study conducted in Nigeria examining g the effects of farmer's education in agricultural production through a household survey in 12 villages of Odisha District established that there was a positive relationship between the level of farmer's education and the level of productivity. The level of education by extension has an effect in the access to farm inputs whereby the study revealed that variation in farm productivity increased with proportionate increase in the level of education .Based on these findings(Atal Bihari Das 2012) suggested that since the important of education in rural development was reflected in agricultural production, the eventual investment in education including the planning and delivery need to be deliberately integrated in rural areas where majority of famers are found. In the effective realization of this outcome both the Government and Non-Governmental Organizations (NGOs) have a role to play in encouraging increased investment in the education sector in ethnic dominated districts Odisha.

A link between education and agricultural output has been identified through the production function approach which has produced evidence in developing country literature. It was noted by Hussain and Byerlee (1995) that evidence is mounting that returns to education in agricultural production may be as high in the rural areas of Asia as in the urban areas.

Similarly, according to Lockheed, Jamison and Lau (1980 upon a review of 18 studies in Asia established that there was significant positive effect of education on agricultural output in the Asian countries even though the findings were mixed. The greatest effect was reported to have significant effect in areas where farmers were engaged in modernized agriculture characterized by use of modern technology. However, other studies concerned with the effect of education in conventional agriculture found that an increase attributable to a four years of formal schooling was only contributing 1.3% in average when compared to 9.5% for other regions engaged in modernized agriculture.

Elsewhere a study conducted by (Phillips, 1994) regarding the influence of education in agricultural production found that four years of formal education was contributing an average of 10.5 percentage in agricultural output .It is important to note that the study was conducted in a geographically diverse context and it shows that under

certain conditions the influence of education were strong in Latin America and Asia, the degree of modernization notwithstanding. This findings have an impact in the potential applicability of the findings in the Asian context to the African context.

In other survey conducted to establish the link between education and agricultural production found that there that education was not significant. It was found in a study conducted in Kenya and upon reviews of other studies conducted in Africa which found out that schooling and agricultural output was not significant although in some contexts its can vary indicating that there was substantial variation in returns to education between the areas studied. Several factors were attributed to the lack of significance one of the being the issue of using smaller samples in the analysis, possible errors on how to measure farm production and by extension the large variation in the effect of education on the output in agricultural production under different context and agro- ecological zones. These findings indicated the need to conduct focused research to establish the effect of education on agricultural production in Africa. (Appleton and Balihuta1996)

Evidence suggests that education may have a direct effect on agricultural productivity through various avenue including the one already pointed in this study. However, education may have an indirect effect in the increase in agricultural productivity output through interaction with other variables such as institutional issues and government policy. For instance formal education may supplement or substitute for the improved access to financial capital and credit by equipping farmers with the necessary skills to access gainful employment and as a result work towards generating financial resources to invest in the access to modern inputs for improved agricultural production. Remittances from those in the diaspora educated by households may serve the function of facilitating their household access farm inputs (Appleton and Balihuta 1996). Collier and Lal (1986).It was further pointed out by Phillips and Marble (1986) that educated farmers were in a better position to access information regarding available credit facilities and how to position themselves to benefit as they can be able to keep records and demonstrate basic financial management skills to potential providers of capital

In comparative terms a farmers is considered to be cost-efficient if he/she is able to raise farm output without a proportionate increase in farm input. The inefficiency may arise from poor timing of improper method in input application attributable to lack of information and limitation in the input supply side. In addition to this, when the cost of production is minimized as reflected in the equality of the ratio of output versus input allocative efficiency is realized. A farmer may be termed to be allocatively inefficient if the selected input and output combination leads to higher costs or failure or maximize profits going by the prevailing prices of products. The potential caused on allocative inefficiency may include; poor selection of the right mix of inputs which would lead to cost efficiency, lack of proper and timely information, unreliable input market and supply and other institutional impediments (Ali and Byerlee 1991).

Inefficiencies may also result from having fixed factors of production and the issue that comes with economies of scale. Due to imitated education farmer may fail to maximize on the available opportunities that work toward towards profit maximization. However, this may also be explained by the limited availability of arable land for cultivation (Ali and Byerlee 1991).Despite the interaction on the moderating variables, education has been proved to reduce risk aversion and works to eliminate credit constraints and increase agricultural productivity though greater scale efficiency. As a matter of fact education may in the short run affect the quantities of inputs used by a farmers and in the long run have an influence in achieving optimal scale of operation (Wu 1977).

There are four stages of production according to (Psacharopoulos et al 1985).In this regard he developed a framework to outline the four stages involved in the adoption of agricultural technology. The first step is characterized by information transfer from parents to children and as such little or no formal education is required. The second step is when a farmer moves to adopt at least one input e.g. improved seeds (single input adoption).At this second step basic numeracy and literacy is useful to enable farmers understand instructions and applying the right quantities of inputs. The third step according to the framework was adoption of multiple inputs simultaneously at this level some basic science knowledge is important. The last step in this framework was the adoption of irrigation based farming and since the farmer must make

analytical calculations regarding the effects of changes in climate change more advanced education is needed for ensuring efficiency in production.

Education can be useful in various ways including in the process of adopting new technologies an also in determining whether a farmer decides to adopt or to wait for others. There are three main reason which can be attributed to this; firstly, those with education are more affluent and less vulnerable to danger of food insecurity if any prospective innovation was unsuccessful. Secondly, education farmers may have better chances of being contacted by extension officers in the process of piloting new innovations and raising model farmers and thirdly educated farmers are in better position of accessing information about new innovations, new input products and make rational decisions of the risks involved in implementing new inputs, technology or methods (Chaudhri 1979).

Other studies suggest that farmers are able to produce cost efficiently through conventional agriculture system which are tradition based other than in conditions of modernization and that education may help farmers mitigate any inequalities and if this was the case more education was needed in a dynamic environment. It is assumed that formal education play a great role in an innovative environment where famers are faced with a rapid changes in technology and must move with the pace otherwise they would be disadvantaged.in order to continue to maximize profits (Rosenzweig 1995).

In the process of establishing the influence of education to input choice Appleton and Balihuta (1996) took education as the dependent variable and other independent variables in their study on agricultural productivity in Uganda. The findings of this study established that indeed education and strong positive effect upon the access and use of capital to purchase farm inputs. In addition this, it is expected that literate farmers would engage in input commercialization that the illiterate ones. In this regard it is easy to conclude that the literacy level increased the likelihood of the farmer participating in the purchase of farm inputs by 14.3% and significant at 10% probability level.

In the process of adoption of technology and by extension modern farm input, education plays a role in enabling the farmers to understand the package of information associated with it.

2.5 Gender of the farmer and the access to farm inputs.

A recent book produced by (World Bank and IFAD 2009) warns against the failure to appreciate and factor in the differences and gender inequities that may exist and this poses a threat in the sustainability of agricultural development programmes. This is not the first time for this to be highlighted for since 1960s development practioners and policy makers had highlighted the significance of gender in the implementation, monitoring and evaluation of the effectiveness of programmes across a range of sectors. As pointed out by (IFAD 2011), female farmers have been underestimated and overlooked in the implementation of agricultural programmes despite being the primary contributors to food production and food security worldwide. There is consensus that perpetuating gender inequalities and lack of focus to gender on agricultural development is answerable to low agricultural productivity, low returns, and poverty and under nutrition. This realisation has renewed the interest in the relationship between gender and agriculture and this has produces new commitments and initiatives from the international development organizations since 2005.

Many studies have been published regarding the issue of gender differences in the access to inputs especially technologies and access to inorganic fertilizer and this continues to demonstrate the role played by fertilizer with the debate of agricultural systems aimed at poverty reduction in developing countries. From the study findings it has emerged that female farmers may adopt access to farm inputs at the same rate as male farmers given equal access to the farm inputs that is holding other factors constant. These findings reinforce the theory that for a female farmer it is the propensity to use inputs and not the accessibility is the issue. Doss and Morris's (2001),in his study of small holder farmers in Ghana established that when controlling of the access to supplementary inputs such as education, land and labour there was found no significant difference in the rates of adoption between female and male farmers.

Similarly other studies for instance by (Thapa, 2009), after an experimental evaluation process which controlled the access to inorganic fertilizer and other farm inputs found limited relationship between gender differences in the quantity of farm input accessed in a survey targeting 2360 households in Nepal. In contrast an analysis on cropping system survey conducted by Gilbert, Sakala, and Benson (2002) in Malawi found a positive and significant difference in the access to fertilizer by both genders in a study which involved 1335 farmers who participated in the pilot. In other studies farmers were give inorganic fertilizer and other inputs in a treatment trial and the researcher found no significant gender differences in maize production. Against the conventional expectation of marginalization of the female farmer in Africa, Jagger and Pender (2006) studied the possible impact of the Organizations that were promoting improved access to technology in the rural areas of Uganda established that female headed households were adopting the technologies and other inputs such as inorganic fertilizer faster than their male counterparts.

In Nigeria a study in Kaduna state was conducted by J.O. Owolabi (2011) focusing to examine the level of access by female farmers to the common types of farm inputs including; improved seeds, fertilizer and modern technology. It was established that female farmers were engaged in both crop and livestock production where traditional technology was being practiced. The sampled women with majority of them being small holder farmers with low income complained during interviews conducted that they had limited access to farm inputs, less contact with extension officers and limited access to credits facilities. One of the key recommendations was for female farmers to be given incentives to improve their access to the common inputs (improved seeds, credit facilities and fertilizer).

Findings from other additional studies for instance in Kenya, Zimbabwe and Malawi contradict the conventional expectation that there existed inequality in the level of access between female and male farmers in terms of the adoption rates. Freeman and Omiti (2003) and Bourdillon et al. (2002) established that there was significant difference in the adoption and use of in inorganic fertilizer for households in Kenya and households in Zimbabwe. Similarly, in study conducted by Chirwa (2005) in Malawi established that there was no significant difference between men and women farmers with respect to the adoption of fertilizer in an analysis which used the head of

the household as an indicator. Horrell and Krishnan (2007) in a study conducted in Zimbabwe found no significance difference in maize production per unit area compared with fertilizer usage per unit area by female headed households. However, it was established that their existed inequalities for female headed households in the market prices for their products and they lacked access to selling consortiums.

A recent study conducted by Davis et al., (2009) in Kenya, Uganda and Tanzania examined the Farmer Field Schools (FFS) using longitudinal quasi-experimental impact evaluation design. The findings suggested that both women and male farmers had equal access to the FSS in Kenya and Tanzania while in Uganda there was some level of inequality in the access by female famers. In other studies by the same researchers it was found that women farmers who participated in FFS had higher chances of adopting nearly all the major inputs and technologies including soil fertility management, improved seed varieties and pest control techniques.

All other studies reported similar findings in African countries by Gilbert, Sakala, and Benson, 2002).The only study with mixed findings was that conducted by (Moore et al., 2001) in Senegal which looked at husband-wife pairs. It was established that the knowledge on various agricultural technologies was less for women farmers compared to men with the exception on nursery technologies in which there were at par with men.

There is an interesting and yet unexplored area of research specifically focusing in the gender based differences access to information of agriculture via extension services provide to farmers. One potential factor which may influence the access to information is the issue of the gender of the extension agents for crop production and veterinary agents on the rural areas. According to a study conducted by the World Bank and IPFRI (2010) t was established that extension agents for crop production and livestock officers in Ethiopia, Ghana and India were predominantly male. It is important to note that gender imbalances in staffing of the extension agents contributes towards sustained challenges in the dissemination of information and especially in area where retrogressive cultural belief and practices prohibit interaction between people of the opposite gender. A good case is Ethiopia where researchers noted that male extension officers were inhibited from interacting with farmers of the

female gender due to the strict cultural taboos. Male extension officer may also fall in the trap of misconception held in many years that women are not famers and thus tend to overlook them in the dissemination of information. However, it was found that female extension officer in Senegal could have a positive effect in the transfer of knowledge for both genders (Moore et al., 2001).

Another factor of interest and related to the modern way of learning is the access to information by female farmers and especially ICT related facilities such as computers and internet use especially in the rural areas. A recent study conducted in Africa found that women had limited access to ICT compared to male counterparts for example when it comes of the ownership of phones which is a key tool of communication (GSMA Development Fund, 2010).This is despite the fact that access to ICT has become so vital in agricultural production in this era of digital revolution.

Despite the fact that women play vital roles in farm work including selecting the food taken by their families yet compared to their male counterparts, women are less productive. This situation is more pronounced in Sub-Saharan Africa, and South Asia. As a results farm production for female household has been rated around 20 percent to 40 percent less than men's production capacity and this in effect puts many households at risk of starvation and food insecurity. The attributable factor for this gender gap is that women have relatively lower access to farm inputs and especially the access to fertilizer, improved seeds and technology. The net effect of this gap is that new innovations and approaches aimed at increasing farm productivity may not be adopted and therefore women and children in the poor households will be undernourished. Bill and Melinda Gates Foundation (2011).

In conclusion, despite the advancements and more pronounced interest by policy makers on issues of gender and agriculture, there is yet consensus on the level and extend of gender differences in the access to agricultural farm inputs. Though information may be available, it is generally biased towards the access to access to and ownership of land or based region-specific research which cannot extrapolated in other contexts.

2.6 Access to credit and its influence on the access to farm inputs

Access to credit has been defined in many ways depending in the context. Access to credit happens when there is no credit rationing and thus giving all people equal access to institutions and organizations offering credit facilities (Perversion & Khitarishvili, 1997). Credit rationing refers to the restriction of credit availability even when those interested in borrowing are willing to pay. The percentage of small holder farmers accessing credit in the world in difficult to estimate though in terms of demand for agriculture finance services it has been estimated to range between $ 225 billion to$ 450 billion according to Dalberg Development Advisors (2012). There are however promising approaches towards the expansion of financial services to the smallholders mainly characterised by value chain financing which is reaching around 10 percent of the small holder in the well-established and those engaged in production of high value crops.

It is evident that over three quarters of the low income earners who may be regarding to be living under the poverty line are living in the rural areas most of them found in the developing countries whereby 80 percent of these population rely on farming as their main source of livelihood. The small holder farmers in these areas play an important role in the food security by supplying food to those who do not practice crop production and also supply the much needed food stuff in the urban centers. Despite their significant role small holder farmers are characterised by limited access to formal credit and hence they are limited in terms of finance which could enable them to invest in the purchase of farm inputs for improved farm productivity (IFC,2 011).

Access to credit by small holder farmers have been reported to be a tall order due to the inhibiting requirement and conditions set which put the small holder at a disadvantaged position. The hurdles before small holders include the collateral security requirements in application process. This has the implication that only the well-off in the society are able to access credit from financial institutions like banks despite the fact a sustainable system of input credit provision targeting smallholder farmers can produce outcome including poverty reduction in many developing countries. According to a study conducted by Yehuala (2008) in Ethiopia aimed at establishing the determinants of small holder farmer’s aces to credit found out that

many farmers in the rural areas do not access to credit from the credit institutions which were formal. The small holder end up depending on informal credit providers with the implication that they can only access small amount of loans for short period and especially for consumption and not for investment in agricultural production.

The challenges are not limited to the potential borrowers in this case the small holder farmers but also the financial institutions interested in serving this market face several challenges and risks .Some of the challenges they face include; the seasonality of demand for credit, irregular cash flows from farmers, system risks and vulnerability of production to natural disasters and high transaction costs. While these challenges are common for all categories of farmers they are more pronounced in small holder lending due to the higher transaction costs involved and their limited ability to mitigate and manage risks compared to large scale farmers according to Assist the Poor (CGAP) 2013).

The improved access to credit for small holder farmers is one of the effective ways of cushioning them against income shocks which are common in rain fed agriculture where majority of the smallholder farmers are found. It is therefore important to enable farmers in general to take advantage of the profitable investment opportunities as well as to facilitate the fulfilment of the social function of enhancing their lives and welfare (Manganhele, 1999; CGAP, 2005).In addition even though the other services relevant for small holder farmers are equally important such as deposits and insurance services access to credit in the rural areas plays a vital role in promoting sustainable rural development in many developing countries (Besley, 1994).

Among the various types of inputs for agricultural production it is in the access innovation and technology where the access to credit are closely related. Such access to credit goes a long way in increasing the output from farm production and improved rural income distribution (Klein et al. 1999; Lapenu, 2000).However, in some countries such as Mozambique, the credit sector is still underdeveloped since majority of the banks are based and operate in the urban areas with no formal credit providers in the rural areas. Most banks are not so interested in lending to the small holder farmers due to the perceived high risks involved (MRFSP, 2003).

It has been argued that the availability of credit service to farmers to enable framer tap financial resources beyond their own means is of prime importance in facilitating small business opportunities. Access to credit also can play an instrumental role for small holder farmers in the establishment of other non-farm enterprises and thus raising their economic status. Furthermore the improved access to credit services and savings may help those with limited assets to invest in agricultural farm inputs. The consumption of basic commodities can be facilitated though the short term savings and borrowing especially when smallholder farmers experience temporary income shortages between agricultural seasons, or after a bad harvest. Therefore access to credit becomes an essential tool of pulling the smallholders out of extreme poverty trap by making additional investments (Zeller and Sharma, 1998).

In some cases the access to credit has been found to contribute towards low returns in investment for smallholder who own small plots of land and depending on rain fed agriculture. This compounded by high level of illiteracy, poor health and lack of experience in the use of modern farm inputs works against the small holder farmers. A good case is the one of Freedom from Hunger in Ghana, BRAC and the Green Bank in Bangladesh where financial services are offered together with other complementary services including; basic literacy programs, training in basic entrepreneurial skills, dissemination of information on nutrition, health, and reproductive health issues that are likely to increase the return on investment on the loans provided (Zeller & Sharma, 1998).

In the East African context a study by conducted by Krain (2011) found out that though formal credit services were available in Tanzania, it only benefited a small segment of the population of the total demand in the agricultural sector. In Zanzibar it was established that formal financial sources only accounted for only 9.9 percent of all the credit accessible in the agricultural sector with the remaining percentage (90.1) being from the informal financial sources. The situation in Kenya was not different whereby it was found in a study in Maragua, that only 16 percent of the smallholder farmers' accessed credit which was attributable to the fact majority of the small holder farmers lack the necessary collateral security to secure loans (Nguthi, 2007).In comparative terms smallholder farmers in Zambia were found to have the lowest access to credit from formal credit service provider, averaging less than 20 percent.

2.7 Conceptual Framework

A Conceptual framework is a set of interrelated concepts, explicit or implicit, underlying a particular study and it forms the essence of study. The independent variables for this include income level, education level, gender of the farmer and access to credit. The dependent variable was the access to agricultural farm inputs by small holder farmers while the extraneous variable was farmer's attitude and preference in regards to the use of agricultural farm inputs and the intervening variable included; the government policy, climate change and input market environment. The conceptual framework is depicted in figure 1.

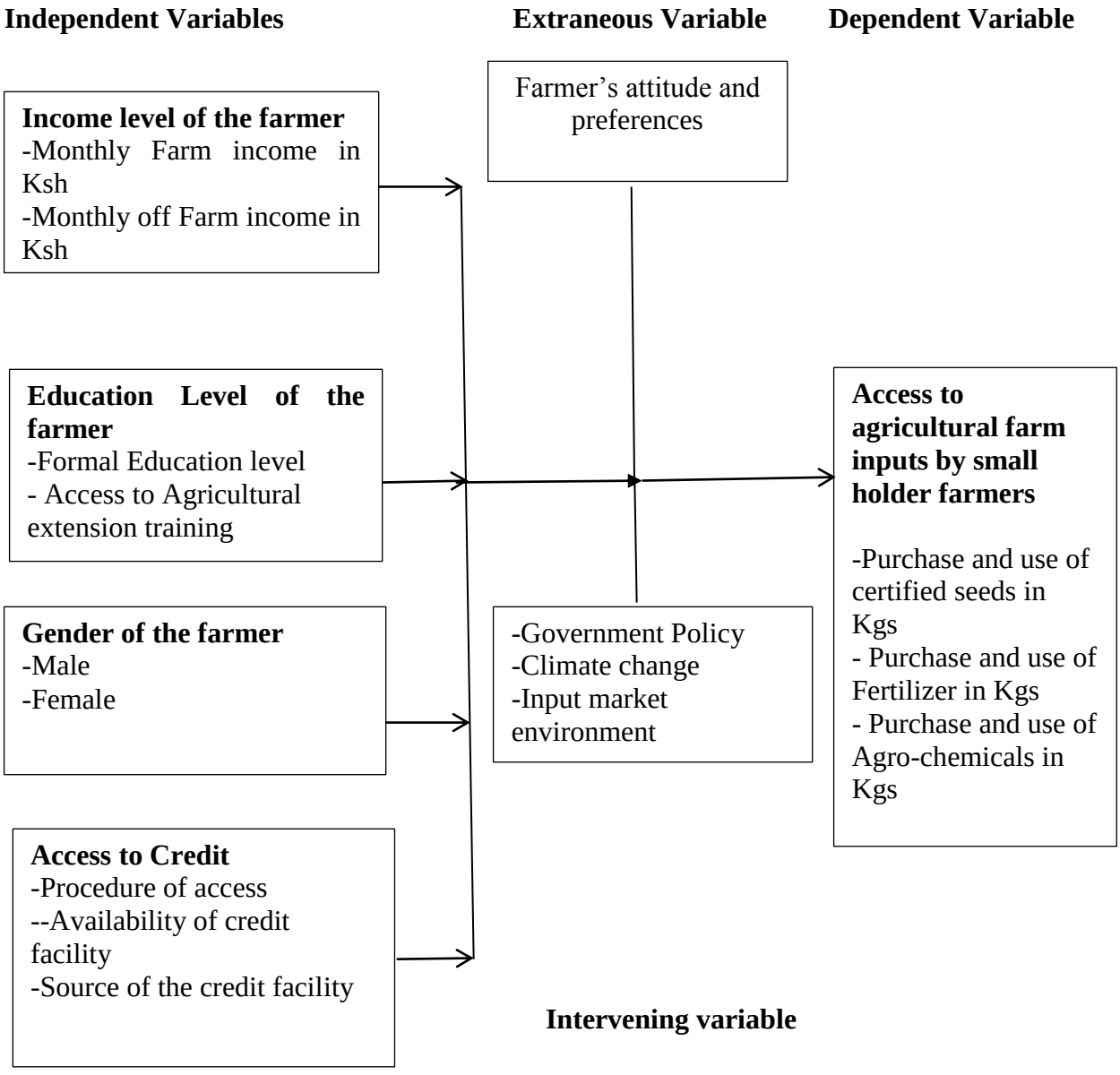


Figure 1: Conceptual Framework

2.8 Variables in conceptual framework

In social research the independent variable is the variable that is manipulated by the researcher to determine its relationship to an observed phenomenon, called the dependent variable. More generally, the independent variable is the cause while dependent variable is the effect of the independent variable. In the context of this study the independent variables (cause) which include the income level of the small holder farmer, education level of the small holder farmer and the gender of the small holder farmer. It is assumed that these socio-economic variables are key determinants in other words they influence how and the extent at which small holder farmer's access farm inputs and this is the dependent variable (effect).

An intervening variable is one that comes in between the time of the independent variables start operating to influence the dependent variable and the time their effect is felt on it. The intervening variables in the conceptual frame work attempt to portray that the identified factors affecting access to farm inputs by small holder farmers and may not be the end in themselves. The model considers government policy especially that touches on agriculture and production in rural areas, climate change issues and the input market environment.

The moderating variable is one that has a strong contingent effect on the independent variable and dependent variable relationship. That is the presence of a third variable modifies the original relationship between the independent and the dependent variables. In this case farmers preferences and attitude toward use of farm inputs was factored

2.9 Gaps in Literature Review

In the literature reviewed though it is adequate in supporting the research objectives which are under the scope of this study, there is a gap in the literature reviewed when it comes to the influence of the knowledge acquired through informal methods of education such as the access to agricultural extension services which is essentially offered through Government and non-governmental agencies in rural areas of developing countries.

Age of the farmer is also an area that lacked adequate literature as it may influence the access to farm inputs in the rural areas where majority of the farmer are found .There is also a gap in the literature when it comes to the issue of how other economic factors such as the size of land influences the access to farm inputs especially in the developing countries. Coupled with this the lack of adequate literature on the role played by government policy and regulations in influencing how, who and when regarding the issue of access to farm inputs.

2.10 Summary of Literature Review

The literature reviewed showed that small holder farmer faced challenges in access to farm inputs especially in adopting scientific methods of cultivation and application of the High Yielding Variety seeds. The major challenges for small holder farmers in Africa has been the limited access to inputs such as improved seeds and fertilizer .This problem is compounded by lack of adequate output market which are accessible by small holder farmer and unconducive regulatory environment by the respective countries.

In many African countries including Kenya large scale input subsidy programs have been implemented with the aim of improving the access by all farmers. However, they have turned to be expensive and mainly benefited the well-off and better connected farmers which indicated that economic factors such as income level is a key influencing factor in the access to farm inputs.

Findings from various literature reviewed regarding the how education level influences the access to farm inputs by small holder farmer show a strong positive correlation between the access to farm inputs and the level of education of the farmer as it influences the ability of the farmer to acquire, understand the information and use the farm inputs. In addition to this, education level plays a role in enabling the farmer make rational decision especially on deciding whether to be the first to adopt or wait for others to start when it comes to innovations and technologies.

Gender and agriculture has been a subjected of discussion and policy makers as it affects the implementation, evaluation and effectiveness of programs .However, majority of the studies conducted regarding the gender issued in agriculture and

difference that may exist has focused more on the gender inequalities in access to fertilizer and not all other farm inputs despite the fact that they are many.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the research design that was used in the study, the target population, sample size and sampling procedures, data collection instruments together with how their validity and reliability were determined, data collection procedures, data analysis techniques and ethical considerations in the research process.

3.2 Research design

A research design is defined as the plan, strategy and the structure of conducting the research project. A design is used to structure the study to illustrate how the other major parts of the study including the sampling and methods of the study work together to try to address the key research questions under study. In regards to this study the undertaking of the research design was non-experimental design and it was descriptive in nature rather than an exploratory study.

A descriptive research was designed to obtain data regarding the current situation and through the proper analysis and inferential statistics draw valid conclusion from the facts discussed. Descriptive survey attempts to describe or define a subject often by creating a profile of the targeted population or issues through the collection of data and tabulation of the frequencies, percentages and variance form the mean. According to Pauline (2007), a descriptive study is based on some prior understating of the nature of the research problem established through literature review. For this study a descriptive study design was considered best design to achieve the objectives of the study. In terms of the approach a mixed method approach was applied which included both quantitative and qualitative data collection methods to gather a broad range of information from various sources and for triangulation purposes.

3.3 Target population

The target population for this study was the small holder farmers found in Yatta Sub-County. The sampled farmers were of both gender (male and female) and of all age groups. The farm size was a key criteria used in selecting the farmers to be respondents in the sample selected. The sample was drawn from three location which

included; Matuu, Ikombe and Kithimani out of the eight administrative locations within the Yatta sub-county namely; Mavoloni, Ndalani, Matuu, Kithimani, Kinyaata. Ikombe, Katangi and Kyua.

3.4 Sample size and sampling procedure

3.4.1 Sample size

The sample size for the study was determined using the formula described by Magnani (1997) as shown:

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

Description:

n = required sample size

t = confidence level at 95% (standard value of 1.96)

p = estimated percentage of farmers accessing farm inputs in study area= 48% (Tengemeo Institute/Egerton university household surveys 1997,2000,2004,2007)

m = margin of error at 5% (standard value of 0.05)

$$\text{Sample size} = \frac{1.96^2}{0.0025} * 0.48(1-0.48)$$

$$\frac{3.8416*0.48*0.52}{0.0025}$$

$$=383$$

Based on the above formula described by Magnani (1997) the sample size was expected to have a total of 383 respondents. The sample was increases to 384 for easy apportioning of the sample in the 3 locations.

3.4.2 Sampling Procedure

Sampling means selecting using a technique a number of subject in a given population to be a representative of the entire population. In sampling it is assumed that the selected sample has got characteristics that are also found in the entire population (Orodho and Kombo, 2002).

The study adopted a stratified random and purposive sampling techniques to ensure the different small holder farmers in the 3 administrative locations of Yatta sub-county namely; Matuu, Kithimani and Ikombe. The purposive sampling was to ensure that only the farmers under the category of small holder farmers were selected within the stratas. In addition to this purposive sampling was applied to selected households headed by male and female who fell under the category of small holders so that biasness and prejudice in the target respondents would be minimised.

Table 3.1: Sample size distribution per location

Location	Frequency	Percentage
Ikombe	121	31.5
Kithimani	132	34.4
Matuu	131	34.1
Total	**384**	**100.0**

3.5 Data Collection Instruments

A mixed method approach was used in the data collection process. In this regards there were two data collection instruments that were employed in this study. The first one was the use of a structured questionnaire which contained close ended questions. The questionnaire was divided into sections each covering the various variables of the study. This was to ensure that all the necessary information required to answer the research questions were obtained. The questionnaire as a data collection instrument was to facilitate easy to capture quantitative data within a limited time and it was appropriate for the study because it produced descriptive data that was used to describe the current status of the population under study in relation to the study objectives.

The second data collection instrument used was the Key Informant Interview guide. The instrument made it possible to gather qualitative data that enriched the quantitative data and for purposes of triangulation of the information collected using the questionnaire. The target respondent for the key informant interviews was the Ministry of Agriculture officials at Sub-County and County level. The administering of the Key Informant interview guide was done only by the lead researcher.

3.5.1 Pilot testing of the instrument

A pilot testing of the questionnaires was carried on a small sample of farmers before the actual data collection process was conducted. This pre-test sample consisted of 20 farmers who were selected randomly from the locations which were targeted in the actual sample within the Yatta Sub-County. The selection of 20 farmers as respondents in the pilot study was informed by the suggestion of Isaac and Michael (1995) and Hill (1998) who suggested that 10 to 30 participants for pilots in survey research. The results of the pre-test were not included in the final raw data for the total sample size of 384.

3.5.2 Validity of the instrument

Validity in research is defined as the degree to which results obtained from the analysis of the data accurately represents the phenomenon under study. It is about the degree of accuracy of the data obtained in the study represents the variables of the study (Mugenda, and Mugenda, 1999).Validity in this study was determined using content validity which is defined as the measure of degree to which data collected using a particular instrument represents a specific domain of indicators or content of a particular concept. To ensure that the instrument was valid, all the possible indicators that could be used to measure the variables were identified and a representative sample of the domain of indicators were selected and then the questionnaire was developed to measure the selected indicators appropriately.

3.5.3 Reliability of the instrument

Reliability in research is defined as the measure of the degree to which a research tool produces consistent results or data after repeated trials (Mugenda. and Mugenda, 1999). To determine the reliability of the research instrument a Cronbach's alpha coefficient was computed using SPSS whereby a score of above 0.7 was considered acceptable and so it was concluded that the instrument was sufficient in measuring the required constructs. As mentioned earlier a pilot study (pre-test) was carried out to determine reliability of the questionnaires using 20 respondents who were not included in the actual data collection exercise. Reliability analysis was subsequently run using Cronbach's Alpha which measured the internal consistency by establishing if a certain item within a defined scale measures the same construct. The findings are presented below.

Table 3.2: Reliability of instrument

	Cronbach's Alpha	Number of Items	Comment
Income level	0.746	8	Reliable
Education	0.748	8	Reliable
Gender	0.856	8	Reliable
Credit Access	0.715	8	Reliable

Higher the value of Cronbach's Alpha implies higher reliability with recommended threshold being Cronbach's Alpha of 0.7 or higher. Based on the findings, all the independent variables, including; income level, education level, gender and credit access, had Cronbach's Alpha values of 0.746, 0.748, 0.856 and 0.715 respectively. The results indicate that the research tool used was reliable as all the Cronbach's Alpha values exceeded the prescribed threshold of 0.7.

3.6 Data collection procedures

A research permit was obtained from the National Commission for Science Technology and Innovation and transmittal letter from the University. Then the researcher proceeded to the study area and met the local administrators to inform them of the study. The recruitment of the research assistants was done at the local level and training was done before the actual data collection in the field.

The structured questionnaire was administered to the sampled farmers by the trained research assistants and also the lead researcher. The questions were asked in the local language (Kikamba) since the recruited assistants were drawn locally and ability to speak the local language fluently was a key consideration. The lead researcher was supervising the exercise and also reviewed the data collected on daily basis by organising briefing meetings with research assistants to ensure what they were collecting and recording were in accordance with the expectations.

3.7 Methods of data analysis

After the field work the researcher reviewed all the questionnaires and counter checked the completion and consistency in order to identify items which were not appropriately responded to. The quantitative analysis was done after the actual data collection whereby the raw quantitative data was cleaned, coded and entered into a database using the SPSS software version 24.The analysis was done based on the key

variables as outlined in the objectives of the research. The outputs of analysis were presented in tabular form and percentages to bring out the analysis more meaningfully. It was considered that tables represents research analysis outputs more clearly and economically than text presentations (Kasomo, 2006).

Multiple regression analysis was done to generate inferential statistics in the establishment of the relationship between the independent and the dependent variable. It is assumed that that more that often when data are collected there might be variables which are dependent on others. The exact relation between those variables can only be established by the regression methods. Determining this relationship helps to understand and predict the behaviour of one variable to the other. In this regards multiple regression analysis was done using SPPS to determine the level of influence the independent on the dependent variables. The regression model for this study was as follows:

$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 3X4 + e$

Where;

Y= Access to farm inputs by small holder farmers in Yatta Sub-County (Dependent Variable)

β0== Constant Term

β1, β2, β3, β4= Beta coefficients

X1=Income level

X2=Education Level

X3=Gender

X4:Credit Access

e= Error Term

3.8 Ethical Considerations

The study was conducted in an ethical manner. The respondents were first informed of the purpose of the study before and their consent sought before administering the questionnaire and in cases where the respondent did not give consent the researcher moved to the next respondent. An assurance was made to the effect that the information given was to be treated as confidential and their names were not be

shared with the other parties. Informed consent was also sought from all the key informants who agreed to participate.

The questions were designed in such a way that sensitive questions which may have touched on culturally unacceptable issues were avoided altogether. The confidential information was only accessed by the researcher and the supervisor. The respondents were not required to provide any identifying details and as such recorded transcripts and the final report did not reflect the subjects identifying information such as their names.

3.9 Operationalization of Variables

The operational of variables describes the independent and dependent variables measurement indicators of the study as shown in diagram below:

Table 3.3 Operationalization of Variables

Objective	Independent Variable	Measurement of Indicator	Scale	Data collection method	Data Analysis
To establish how income level influences the access to farm inputs by small holder farmers in Yatta Sub-County?	Income level	Average income per years from farm and off- farm sources	Ordinal	Survey questionnaire, Key informant interviews	Mean, frequencies mode, Standard Deviation, regression analysis
To establish how education level influences the access to farm inputs by small holder farmers in Yatta Sub-County?	Level of education of the farmer	-Attainment of formal education -Knowledge acquired through agricultural extension services	Ordinal	Survey questionnaire, Key informant interviews	Mean, frequencies mode, Standard deviation, regression analysis
To establish how gender of the farmer influences the access to agricultural farm inputs by small holder farmers in Yatta Sub-County?	Gender of the farmer	The biological sex the farmer(Male or Female)	Ordinal	Survey questionnaire, Key informant interviews	Mean, frequencies mode, Standard deviation, regression analysis
To establish how access to formal credit influences the access to agricultural farm inputs by small holder farmers in Yatta Sub-County?	Access to Credit	-Procedure of access -Availability of credit facility -Source of the credit facility	Ordinal	Survey questionnaire, Key informant interviews	Mean, frequencies mode, Standard deviation, regression analysis
The main objective was to establish how socio economic factors influence the access to farm inputs in Yatta Sub-County	Access to farm inputs	Access to certified seeds, fertilize and agro chemicals	Ordinal	Survey questionnaire, Key informant interviews	Mean, frequencies mode, Standard deviation, regression analysis

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND INTERPRETATION

4.1 Introduction

This chapter includes data analysis, presentation and interpretation of both the quantitative and qualitative data which was collected using the questionnaire and key informant interview instruments respectively. Data analysis was done using descriptive method of analysis and is presented in tables with the respective statistical frequency and percentages of the findings. The presentation is starts with the analysis of data on the questionnaire response rate, characteristics of the respondents and the analysis of key findings per research objective. Inferential statistics was done using regression analysis and is presented at the end of this chapter.

4.2 Questionnaire Return Rate

The questionnaire response rate refers to the complete rate or return rate. It was calculated using the actual number of respondents divided by the targeted sample of respondent. In the context of this study the questionnaire response rate was 94.5% whereby 21 questionnaires had not completed fully and the researcher had to conduct additional interviews with other respondents within the sampled location to top up to 384 and therefore the researcher proceeded for analysis. According to Mugenda and Mugenda (1999), a questionnaire return rate of above 50% is considered good for analysis.

4.3 Demographic and Characteristics of the Respondents

The researcher sought to establish the socio economic and demographic characteristics of the respondents using variables of the gender, age, education, income level and average acreage of farm land as presented in the section below.

4.3.1 Gender of Respondents

The respondents were not asked directly their gender since it was considered insensitive to ask them their gender rather the response was based on observation of the physical characteristics of the respondents by looking at the key feature that differentiate each gender such as the dressing code and biological make up. The findings are presented table 4.1.

Table: 4.1: Distribution of Respondents by Gender

Gender	Frequency	Percentage
Male	224	58.3
Female	160	41.7
Total	**384**	100

The findings indicate that 224(58.3%) of the respondents were male and 160(41.7%) were female with a percentage difference of 16.6.This was occasioned by the fact that majority of the famers are men who have ownership and control over land and resources.

4.3.2 Age of Respondents

The respondents were asked to state their age and the responses were recorded accordingly the right age bracket as per the questionnaire which had been developed. The age categories included; 35years and below, between 36 years and 45yrs and 46 years and above. The findings on age are presented in the table 4.2.

Table 4.2: Distribution of Respondents by Age Category

Age category	Frequency	Percentage
35 years and below	114	29.7
Between 36 years and 45years	115	29.9
46 years and above	155	40.4
Total	**384**	**100**

The findings indicate that the age bracket with the majority of the respondents was the category of "46 years and above" at 155(40.4%) of all sampled respondents. There was a slight difference in the percentage of respondents within the age category of 35 years and below and the category of between 36 years and 45years with 114(29.7%) and 115(29.9%) respectively. This indicates that majority of the respondents in this study were adults and above the youth bracket of 35 years and below as defined in the Kenyan Constitution.

4.3.3 Household Head

The question on the house head was asked to the respondents to establish households which were headed by male, female and child headed households. Table 4.3 presents the findings on house hold in terms of frequency and percentages.

Table 4.3: Distribution of Respondents by Household Head

Household Head	Frequency	Percentage
Male Headed Households	324	84.4
Female Headed Households	60	15.6
Child Headed Households	0	0
Total	**384**	**100**

The findings reveal that majority of the households among the sampled respondents were headed by males as they were 324(84.4%) followed by female headed households who were 60(15.6%) and there were no child headed household among the respondents.

4.3.4 Education Level of Respondents

A question was asked about the education level of the respondents which was one of the independent variables in the study. The findings are presented in table 4.4.

Table 4.4: Distribution of Respondents per Education Level

Education Level	Frequency	Percentage
No education at all	36	9.4
Agricultural extension training	9	2.3
Primary education	176	45.8
Secondary education	125	32.6
College Certificate/Diploma	32	8.3
University Degree	6	1.6
Master Degree	0	0.0
PhD	0	0.0
Total	**384**	**100**

As per the findings presented there were varied education levels ranging from "no education at all" to the highest level of education in the Kenyan context which is a Philosophy Doctorate (PhD) level. It was revealed that majority at 176(45.8%) of the respondents had attained primary school education. This was followed by those with secondary education at 125(32.6),those without education at all were 36(9.4%),those with college certificates/diplomas were 32(8.3%) and those with university degrees were 6(1.6%).It is worth noting that there was none among the respondents who had attained a Master Degree or PhD. Some of those without formal education indicated other forms of education with majority of the education types falling under the Technical Education and Vocational Training (TVET).In this regards, the common trainings reported by majority of the respondents included; carpentry ,masonry, dress making, tailoring, automotive mechanics, welding and plant operation. In general terms what the finding indicate is that majority of the respondents had some form of formal education with majority attaining primary and secondary education levels since both percentages combined was 301(78.4%) which is over three quarters of the sampled respondents.

4.3.5 Average Acreage of Farm Land per Respondent

A question was posed to the respondent with the aim of establishing the size of land under cultivation/farm land. The findings are presented in table 4.5.

Table 4.5: Distribution of Average Acreage of by Respondent

Average Acreage		Statistic
Mean		2.30
95% Confidence Interval for Mean	Lower Bound	2.18
	Upper Bound	2.42
5% Trimmed Mean		2.24
Median		2
Variance		1.5
Std. Deviation		1.23
Minimum		0.1
Maximum		5
Range		4.9

The average acreage per respondent was found to be 2.30 acres however after subjecting the data to further analysis to exclude the outliers, the trimmed mean was 2.42 acres per farmer. It is important to note that this was the average acreage for the

sampled respondents who were purposely selected since they were falling under the category of small holder farmers (≤ 5 acres). The general average acreage under cultivation in Yatta Sub-County from the information obtained from the Sub-County Crops Officer during the study was reported to be 3.5 acres which includes both small holder and large scale famers.

4.3.6 Crops Grown by Farmers

A question was asked to the respondent to state the crops which they were growing ranging from food crops, cash crops, fruits and horticultural crops. The findings are presented in table 4.6.

Table 4.6: Distribution of Crops Grown

Crop Type	Responses		Percent of Cases
	n	Percent	
Maize	378	20.4%	98.7%
Pigeon Peas	302	16.3%	78.9%
Vegetables	98	5.3%	25.6%
Beans	353	19.0%	92.2%
Fruits	152	8.2%	39.7%
Cotton	5	0.3%	1.3%
Cowpeas	317	17.1%	82.8%
Green grams	249	13.4%	65.0%
Total	**1854**	**100.0%**	**484.1%**

There were various crops grown whereby the crop grown by majority of the respondent was Maize with 378 (98.7%) reporting to grow this particular crop. The other crops were grown included, beans by 353(92.2%), cowpeas by 317(82.85), pigeon peas by 302(78.9%), green grams by 249(65.0%), fruits by 152(39.7%), vegetables by 98(25.6%) and Cotton by 5 (1.3%).This findings show that majority of the farmers were engaged in growing food crops as opposed to cash crops and by extension it implies they were engaged in subsistence crop production with limited commercial oriented crop production.

4.3.7 Overall Level of Access to Agricultural Farm Inputs

A question was posed to the respondents to establish if they had used any farm input on their farm in the previous years (three 3 years). The findings are presented the table 4.7.

Table 4.7: Distribution of Responses on Access to Agricultural Farm Inputs

Response	Frequency	Percentage
Yes	122	31.8
No	262	68.2
Total	**384**	**100.0**

It as was revealed that only 122(31.8%) of the respondents had used farm inputs on their farms on their farms while a bigger percentage 262(68.2%) had never used farms. Further analysis to establish the types of farm inputs that was accessed revealed that majority had accessed agro-chemicals at 94.2% followed by those who had accessed certified seeds/hybrid at 79.8% and fertilizer was the least accessed farm input by 39.0% of the respondents. The sources of the farm inputs were varied with the main source being the Agro-vet shops which was reported by 95%) of the respondents followed by those who used the inputs from the previous season at 27.2% and 10.3% others reported to have been given by other farmers.

4.3.8 Challenges Faced in the Access to Agricultural Farm Inputs

A question was asked to the respondents to establish the challenges faced in the access to farm inputs. The findings are presented in table 4.8.

Table 4.8: Challenges in the Access to Farm Inputs

Challenge	Responses		Percent of Cases
	n	Percent	
High cost of the inputs	376	43.3%	98.4%
Distance to the input market)	59	6.8%	15.4%
Lack of knowledge on where to get them	11	1.3%	2.9%
Lack of information of how to use/apply them	52	6.0%	13.6%
Lack of quality farm inputs	205	23.6%	53.7%
Inadequacy of the farm inputs	166	19.1%	43.5%
Total	**869**	**100.0%**	**227.5%**

It emerged that high costs of inputs was mentioned by majority of the respondents as a challenge by 376 (98.4%) followed by those who mentioned lack of quality

inputs as the second major challenge with 205(53.7%).The other challenges mentioned included; inadequacy of farm inputs with 166(43.5%), distance to the input market with 59(15.4%), lack of information of how to use/apply them with 52(13.6%) which was the majority of the respondents who indicated this to be a major challenge in the access to farm inputs. This was followed by those who mention lack of quality farm inputs as a challenge by 91(23.6%), inadequacy of the farm inputs was reported by 73(19.1%), distance to the input market by 26(6.8%),lack of information on how to use/apply the inputs by 23(6.0%) and lastly the challenge of lack of knowledge on where to get the inputs was reported by 5(1.3%).This findings indicate that the major challenge faced in the access to farm inputs was the high cost associated with modern agricultural inputs that may not accessible by the small holder farmers. The findings reveal that high cost and lack of quality farm inputs is a major challenge for the small holder farmers in the area under study.

4.4 Factors Influencing the Access to Agricultural Farm Inputs

The findings of the study are presented below as per each of the research objectives touching on how income, education, gender and access to credit influences the access to farm inputs.

4.4.1 How Income Level Influences Access to Agricultural Farm Inputs

The analysis was done to establish the average income per respondent, the relative level of access to farm inputs per income category and the analysis of the perceptions by respondents regarding how income influences the access to farm inputs.

4.4.1.1 Average Income by Respondent

In order to establish the average income per respondent, further analysis was done by computing the incomes excluding the outliers which could skew the results. The findings are presented in the table 4.9.

Table 4.9: Average income by Respondent

Average income		Statistic
Mean		8392.53
95% Confidence Interval for Mean	Lower Bound	7505.46
	Upper Bound	9279.59
5% Trimmed Mean		7139.81
Median		6250.00
Variance		78162544.739
Std. Deviation		8840.958
Minimum		1200
Maximum		80000
Range		78800

As per the findings the overall mean/average of income per respondent was found to be Ksh 8,392.53 per month. However, the trimmed mean after exclusion of the outliers the mean/average income per month per respondent was Ksh 7,139.81 per month. This findings indicate that the majority of respondents were living below the Kenya per Capita Income threshold which is Ksh 10,694 per month (World Bank, 2014).

4.4.1.2 Access to Farm input Per Income Category

In the efforts of establishing the relative level of access per income level of the respondents the researcher went further to analyse the percentages of respondents within each category of income level who had used farm input in the past. The findings are presented in the table 4.10.

Table 4.10: Distribution of Access to Farm Inputs per Income Category

Income Category	Frequency	Percentage Within Category
Below Ksh 5,000 p. m	46	26.7%
Ksh 5001 to Ksh 10,000 p. m	40	28.6%
Ksh 10001 to Ksh 20,000 p. m	22	43.1%
Ksh 20,001 to Ksh 30,000 p. m	6	60.0%
Above Ksh 30,001 p. m	8	72.7%

N=122

The finding show that 46 (26.7%) earning below Ksh 5,000 p. m had used farm inputs before 40(28.6%) within the income range of Ksh 5001 to Ksh 10,000 p. m,

22(43.1%) within the income range of Ksh 10001 to Ksh 20,000 p. m, 6(60.0%) within the income range of Ksh 20,001 to Ksh 30,000 p. m and 8(72.7%) earning above Ksh 30,001 p.m. The findings indicate that as the level of income increased the proportionate level of access to farm inputs increased.

4.4.2 Perception on How Income Influences the Access to Farm Inputs

In the process of establishing how income level influences the access to farm inputs, the respondents were asked to indicate their level of agreement or disagreement with a list of statements read to them A scale of 1 to 5 was provided where 1= strongly disagree, 2=disagree, 3= neutral, 4= agree and 5= strongly agree. The findings are presented in table 4.11.

Table 4.11: Influence of Income in Access to Agricultural Farm Inputs

Statements	n	Percentage	Mean	Std. Deviation
My income is adequate to purchase farm inputs	384	100.0	2.45	1.238
I spend less proportion of my income on farm inputs	379	98.7	3.35	1.189
Farm inputs are expensive therefore I can't afford to use them	381	99.2	3.95	1.299
Farm inputs are for the well-off farmers in our locality	380	99.0	3.83	1.438
My ability to use farm input in determined by farm income	382	99.5	4.16	1.223
My ability to use farm input is determined by off farm income	380	99.0	4.02	1.319
I have to sell livestock in order to buy farm inputs	378	98.4	2.47	1.303
I can only purchase subsidized farm inputs	373	97.1	2.56	1.227

The findings as presented show that respondents strongly agreed with the following statements; the ability to use farm input was determined by farm income with a mean

score of 4.16, their ability to use farm input was determined by off farm income with a means core of 4.02, less proportion of expenditure of their income on farm inputs with a mean score of 3.35, farm inputs were expensive and therefore they couldn't afford was agreed upon by majority of the respondents with a mean score of 3.95, farm inputs were for the well-off farmers in their locality with a mean score of 3.83.On the other hand the statements which the respondents disagreed with included; their income being adequate to purchase farm inputs with a mean score of 2.45,they had to sell livestock in order to buy farm inputs with a mean score of 2.47 and lastly they disagreed with the statement which stated that they could only purchase subsidized farm inputs with a mean score of 2.56.This findings show that majority of the respondents were of the view that they did not have sufficient income from both farm and off-farm sources to access farm inputs since they considered the farm inputs to be expensive and only accessible by the well-off in the area.

4.4.3 How Education Level Influences the access to Agricultural Farm Inputs

The analysis was done to establish the relative level of access to farm inputs per education level and the analysis of the perceptions by respondents regarding how education influences the access to farm inputs.

4.4.3.1 Use of Agricultural Farm Inputs per Education Level

The researcher did an analysis to establish the relative level of access to farm inputs per education level. The findings area presented in the table 4.12.

Table 4.12: Distribution on the use of Agricultural Farm inputs per Education Level

Level of Education	Frequency	Percentage Within Category
No education at all	1	2.7
Agricultural extension training	1	11.1
Primary education	40	22.7
Secondary education	45	36.0
College Certificate/Diploma	30	93.7
University Degree	5	83.3

N=122

The findings show that only 1(2.7%) of those who had no education at all had used farm inputs before,1(11.1%) for those with agricultural extension training, 40(22.7%)

primary education,45(36.0%) for those with Secondary education,30(93.7%) for those with College Certificate/Diploma,5(83.3%) for those with University Degree .These findings indicate that there was relative increase in the use of farm inputs as education level increased as demonstrated by the increase in percentage within each category as the education level went higher.

4.4.3.2 Perception on How Education Influences the Access to Agricultural Farm Inputs

This was the second objective under the study which was to establish how education level influences that access to farm inputs by small holder farmers in Yatta Sub-County. In the process of establishing how education level influences the access to farm inputs, the respondents were asked to indicate their level of agreement or disagreement with a list of statements. A scale of 1 to 5 was provided where 1= strongly disagree, 2=disagree, 3= neutral, 4= agree and 5= strongly agree. The findings are presented in table 4.13.

Table 4.13: Influence of Education Level in the Access to Agricultural Farm Inputs

Statements	n	Percentage	Mean	Std. Deviation
My education helps me to acquire farm inputs	383	99.7	3.54	1.195
My education helps me to apply the farm inputs as required	382	99.5	3.63	1.128
My education level has contributed towards improved access to farm inputs	382	99.5	3.39	1.167
I feel with the education I have, I am better than those without education in terms of accessing farm inputs	382	99.5	3.54	1.266
The education I have has enabled me to access information on farm inputs	380	99.0	3.37	1.136
The education I have enables me to apply for credit facilities in order to purchase farm inputs	380	99.0	2.76	1.236
Education has helped me to adopt quickly new varieties of farm inputs introduced	381	99.2	3.35	1.159
My education has enabled me to view farming as a business and thus I do invest to access farm inputs	382	99.5	3.23	1.300

From the findings the majority of the respondents agreed with the statements led by those who strongly agreed that their education helped them to apply farm inputs as required with a mean score of 3.63, those who agreed with the statement that their education helps them to acquire farm inputs tied with those who agreed that that they were better off than those without education in terms of accessing farms inputs with a mean score of 3.54 each, those who agreed with the statement that their education level had contributed towards improved access to farm inputs had a mean score of 3.39, those who agreeing to the statement that education had enabled them to access information on farm inputs had mean score of 3.37, those agreeing to the statement that education had helped them to adopt quickly new varieties of farm inputs introduced had a mean score of 3.35 and those who agreed with the statement that education had enabled them to view farming as a business and thus investing to access farm inputs with had a mean score of 3.23 . The only statement on which the respondents were indifferent was the statement stating that education helped to apply for credit facilities in order to purchase farm inputs which recorded an average score of 2.76.These findings indicate that majority of the respondents were agreeing to the statement regarding the influence of education in the access to farm inputs and especially on the influence of education in the acquisition of farm inputs, access to information regarding farm inputs and the application of the farm inputs as required.

4.4.4 How Gender Influences the Access to Agricultural farm inputs

The analysis was done to establish the relative level of access to farm inputs based on gender of the respondent and the analysis of the perceptions by respondents regarding how gender influences the access to farm inputs.

4.4.4.1 Access to Agricultural Farm Inputs by Gender

In terms of the access to farm inputs based on the gender of the farmer, an analysis using cross tabulation method was done to establish the relative level of access. The findings are presented in the table 4.14.

Table 4.14 Distribution on the Access to Farm Inputs by Gender

Gender	Frequency	Percentage Within Category
Male	64	52.3%
Female	58	47.7%

N=122

As per the findings it was established that in terms of use of farm inputs per gender, the male respondents 64(52.3%) had used farm inputs while female respondents were 58(47.7%).This findings indicate that there is no major discrepancy between male and female farmers in the access to farmers since there was only a 4.6 percentage gap.

4.4.4.2 Perception on how Gender Influences the Access to Agricultural Farm Inputs

The third objective of this study was to establish how gender influences the access farm inputs by small holder farmers in Yatta Sub-county. In the process of establishing how gender influences the access to farm inputs, the respondents were asked to indicate their level of agreement or disagreement with a list of statements. A scale of 1 to 5 was provided where 1= strongly disagree, 2=disagree, 3= neutral, 4= agree and 5= strongly agree. The findings are presented in table 4.15.

Table 4.15: How Gender Influences the Access to Agricultural Farm Inputs

Statements	n	Percentage	Mean	Std. Deviation
I feel my gender has given me an equal opportunity in the access to farm inputs as my opposite gender	384	100.0	3.42	1.221
Due to my gender I able to adopt modern inputs faster than my opposite gender	383	99.7	2.57	1.162
I feel that information regarding farm inputs does not favour my gender	383	99.7	2.48	1.155
Due to my gender I am only able to access some farm inputs and not all	379	98.7	2.29	1.074
I feel that farmers of my gender are disadvantaged in the access to farm inputs	381	99.2	2.11	0.963
The extension agents do not interact with farmers of my gender to disseminate information regarding farm inputs	381	99.2	2.01	0.897
In my community people of my gender are not considered farmers hence no need to use farm inputs	381	99.2	1.79	0.744
It only farmers of the opposite gender who access modern farm inputs	371	96.6	1.81	0.711

It emerged that all the sampled respondents (384) agreed with the statement which stated that their respective gender had given them an equal opportunity in the access to farm inputs as the opposite gender with a mean score of 3.42.It is worth noting that the respondents strongly disagreed with the rest of the statements whereby for the statements such as; their respective gender had enabled them to adopt modern inputs faster than the opposite gender with a mean of 2.57, feeling that the information regarding farm inputs did not favour my gender with the mean score of 2.48, by virtue of their gender they were only able to access some farm inputs and not all with a mean score of 2.29, a feeling that farmers of their respective gender were disadvantaged in the access to farm inputs with a mean score of 2.11, extension agents did not interact with farmers of the respective gender to disseminate information regarding farm inputs with a mean score of 2.01, in the community people of their respective gender were not considered farmers hence no need to use farm inputs with a mean score of 1.79 and lastly regarding the statement of only

farmers of the opposite gender being the ones who access modern farm inputs was strongly disagreed by respondents with a mean score of 1.81.The findings reveal that the access to farm inputs by both genders was balanced and no gender would claim to be disadvantaged in the process of accessing farm inputs.

4.4.5 How the Access to Credit Influences the Access to Agricultural Farm Inputs

The analysis was done to establish the relative level of access to farm inputs based on the access to credit by the respondent and the analysis of the perceptions by respondents regarding how gender influences the access to farm inputs.

4.4.5.1 Access to Farm Inputs based on Access to Credit Response

The researcher was interested in the establishment of the relative access to farm input based on the response given by the respondents on whether they had access credit or not. Table 4.16 presents the findings.

Table 4.16: Access to Farm Inputs based on Access to Credit Response

		Response on use of farm inputs	
		Frequency	**Percentage**
Response on Access to Credit	Yes	118	96.7
	No	4	3.3
	Total	**122**	**100.0**

As per the findings , it was revealed that 118(96.7%) of those who had responded in the affirmative(Yes) for having accessed credit had used farm inputs before while a minority of 4(3.3%) had not used farm inputs even though they had accessed credit. These findings that the access to credit increased the chances of accessing farm inputs since the percentage was relative high for those who had indicated to have used farm inputs before.

4.4.5.2 Sources of Credit

After establishing the percentage of respondents who had accessed credit before, the respondents were asked to state the sources of the credit facilities they had received. The finding are presented in the table 4.17.

Table: 4.17: Sources of Credit

Source of Credit	Responses		Percent of Cases
	N	Percent	
Banking Institution	16	15.8%	16.3%
Microfinance Institution	4	4.0%	4.1%
Farmer Group	3	3.0%	3.1%
Table Banking	78	77.2%	79.6%
Total	**101**	**100.0%**	**103.1%**

The major source of credit for the farmers was found to be table banking cited by 79.6 % of the respondents followed by banking institution as source of credit by 16.3% of the respondents. The other sources cited by respondents included; microfinance institutions and farmer groups by 4.1% and 3.1% of the respondent respectively.

4.4.5.3 Perception of How Access to Credit Influences the Access to Agricultural Farm Inputs

The fourth objective was to establish how the access to credit influences the access to farm inputs by small holder farmers in Yatta Sub-County. In the process of establishing how access to credit influences the access to farm inputs, the respondents were asked to indicate their level of agreement or disagreement with a list of statements. A scale of 1 to 5 was provided where 1= strongly disagree, 2=disagree, 3= neutral, 4= agree and 5= strongly agree. The findings are presented in table 4.18.

Table 4.18: Perception of How Access to Credit Influences the Access to Agricultural Farm Inputs

Statements	n	Percentage	Mean	Std. Deviation
It matter a lot whether there are credit facilities in regards to the access of farm inputs	380	99.0	3.11	1.321
There is availability of credit facilities in the area	382	99.5	3.54	1.237
The credit facilities available in this area adequate, timely and low cost to enable small holder farmer access farm inputs	382	99.5	2.46	1.178
I believe the access to credit contributes to the ability to access farm inputs	382	99.5	3.30	1.212
The existence of institutions giving credit to farmers has helped them in access in farm inputs	380	99.0	3.33	1.161
Only the well-off are able to access credit facilities to purchase farm inputs	383	99.7	3.02	1.462
The institutions offering financial credit are only found in the urban centers hence I can access to purchase farm inputs	383	99.7	2.77	1.350
I feel that I cannot qualify to access credit to purchase farm inputs	382	99.5	2.45	1.344

The respondents as per findings presented agreed with the most of the statements that were read to them except for two statements which they disagreed with. The first statement the respondents agreed with was the one which stated that it matters a lot whether there are credit facilities in regards to the access of farm inputs with a mean score of 3.11, there was availability of credit facilities in the area with a mean score of 3.54, the believe that the access to credit contributes to the ability to access farm inputs with a mean score of 3.30,the existence of institutions giving credit to farmers has helped them in access in farm inputs with a mean score of 3.33 and only the well-off were able to access credit facilities to purchase farm inputs with a mean score of 3.02.The statements which were disagreed upon by the respondents included; the credit facilities being available in this area being adequate, being timely and low cost to enable small holder farmer access farm inputs with a mean score of 2.46, the

institutions offering financial credit being only found in the urban centers hence they could not access to purchase farm inputs with a mean score of 2.77 and lastly the statement about the feeling that they could not qualify to access credit to purchase farm inputs with a mean score of 2.45. This findings indicate that there were credit facilities in the areas under study and that the access to credit contributed towards the access to farm inputs. However, the well-off in the community had an advantage over those with limited financial resources.

4.4.6 How Access to Agricultural Farm Inputs is influenced by Various Factors

A list of questions similar to the questions regarding the independent variables were designed also for the dependent variable (access to farm inputs) capture the views of the respondent. The respondents were asked to indicate their level of agreement or disagreement with a list of statements. A scale of 1 to 5 was provided where 1= strongly disagree, 2=disagree, 3= neutral, 4= agree and 5= strongly agree. The findings are presented in table 4.19.

Table 4.19: Access to agricultural farm inputs influencing factors

Statements	n	Sum	Mean	Std. Deviation
Access to farm inputs in a challenged to me as a small holder farmer	383	1494	3.90	1.090
Access to farm inputs is influenced by economic factors	382	1674	4.38	.725
Access to farm inputs is influenced by social factors	379	1321	3.49	1.231
Access to farm inputs Is influenced by government policy on agriculture	380	1101	2.90	1.181
Access to farm inputs ins influenced by culture and traditional beliefs	379	853	2.25	1.038
Access to farm inputs is influenced by climatic issues	380	1576	4.15	.853
Access to farm inputs is influenced by the input market	383	1482	3.87	.962
Access to farm inputs is influenced by size of farm land	383	1605	4.19	2.111

It is evident from the findings that majority of the respondents strongly agreed to the statement that access to farm inputs was influenced by economic factors with the highest mean score of 4.38.The other statements which were strongly agreed upon included; that the access to farm inputs was influenced by the size of farm land with a mean score of 4.19 , that the access to farm inputs was influenced by climatic conditions with a mean score of 4.15, that the access to farm inputs was a challenge to the small holder farmer ,that the access to farm input was influenced by the input market, that the access to farm input was influenced by social factors. The only statement which majority of the respondents were indifferent included; that the access to farm input was influenced by government policy and the statement that access to farm inputs was influenced by the culture and traditional beliefs. This findings indicate that socio-economic factors influence significantly the access to farm inputs coupled with the land size.

4.5 Multiple Regression Analysis

Multiple Regression analysis was done to establish the linear relationship between access to farm inputs and the independent variables which included; income level, gender, education and access to credit. Prior to establishing the coefficients of the model, the variation in access to farm inputs, explained jointly by the independent variable was established using coefficient of multiple determination (R^2). By definition, R^2 explains the variance in dependent variable explained jointly or uniquely by the predictor variables. The model summary in table 4.20 presents the findings.

Table 4.20: Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.876[a]	.767	.764	.43124

a. Predictors: (Constant), Income level, Gender, Education, Credit Access

According to the findings, R^2 of 0.767 was obtained, an implication that 76.7% of the variation in access to farm inputs was explained jointly by credit access, income level, gender and education. About 23.3% of the variation is explained by other factors not

covered by the study. Further, the study sought to determine whether the model predicting the relationship between access to farm inputs and the independent variables was significant and the findings are presented in the Analysis of Variance (ANOVA) as presented in table 4.21.

Table 4.21: Analysis of Variance (ANOVA)

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	231.657	4	57.914	311.420	.000[b]
	Residual	70.482	379	.186		
	Total	302.139	383			

a. Dependent Variable: Access to Farm Inputs
b. Predictors: (Constant), Income level, Gender, Education, Credit Access

The results showed that multiple regression model predicting the relationship between access to farm inputs and independent variables was significant as the probability-value obtained was 0.000 which was less than α=0.05, the significance level of the study. Same results were affirmed by Fishers Value whereby the F calculated at 5% level of significance was 311.420 which was higher than F(4,379,5%) critical = 2.40.

Finally, the coefficients obtained are presented in table below. The t-statistics and their associated p-values were used in testing whether a given coefficient was significant. If the significant value obtained was greater than 0.05 then there was statistically no significant relationship between the variables. This means, increases or decreases in one variable do not significantly relate to increases or decreases in the other variables. If the Sig (2-Tailed) value is less than or equal to 0.05 then statistically there was a significant relationship between the variables. This means, change, increases or decreases in one variable do significantly relate to change, increases or decreases in the other variables. The findings are presented in table 4.22.

Table: 4.22: Regression Coefficient

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	-.967	.237		-4.080	.000
	Income level	.807	.024	.938	33.599	.000
	Education	.306	.065	.151	4.705	.000
	Gender	-.051	.023	-.065	-2.253	.025
	Credit Access	.253	.030	.268	8.499	.000

a. Dependent Variable: Access to Farm Inputs

From the coefficient results, the model obtained was:

$$\mathbf{Y = -0.967 + 0.807X_1 + 0.306X_2 - 0.051X_3 + 0.253X_4}$$

These finding implied that, holding all the other factors constant, access to farm inputs would be - 0.967 units. A unit change in income level holding the other factors constant would lead to change in access to farm inputs by 0.807 units; a unit change in education holding the other factors constant would change access to farm inputs by 0.306 units. A unit change in gender holding the other factors constant would change access to farm inputs by - 0.051 units. However, given that the coefficient obtained was not significant, it implies that increases or decreases in gender do not significantly relate to increases or decreases in access to farm inputs. Finally, a unit changes in credit access holding the other factors constant would change access to farm inputs by 0.253 units. These findings implied that the independent variables positively influence access to farm inputs, with an exception of gender. Using the criteria for testing for significance, at 5% level of significance, all the independent variables, except gender, were significant in the model since their corresponding probability values were less than significance level of the study (α=0.05).

CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This is the last chapter of this report which presents the summary of the finding per objectives of study, the discussion of the findings, conclusion of the study, recommendations and suggested areas of further research.

5.2 Summary of Findings

The study was about the establishment of the influence of socio-economic factors in the access to farm inputs by small holder farmer in Yatta-Sub County.

5.2.1 Income in the Access to Agricultural Farm Inputs

The first objective was to establish how income level influences the access to farm inputs by small holder farmer farmers in Yatta Sub-County. Income as an independent variable recorded the highest mean scores regarding the statements on the direct influence income such as; the ability to use farm input being determined by farm income and off-farm income recording the highest mean scores of 4.16 and 4.02 respectively was a clear indication of the high level of influence. In addition to this, a the level of agreement by the respondent with the statement that farm inputs were expensive and therefore they couldn't afford was agreed upon by majority of the respondents with a mean score of 3.95 coupled with the agreement with the statement that farm inputs were for the well-off farmers in their locality with a mean score of 3.83.This is also corroborated by the key informants who were interviewed in this study stating income as a major factor influencing the access of farm inputs. As per the multiple regression analysis output a unit change in income level holding the other factors constant would lead to change in access to farm inputs by 0.807 units .This implies that income level had positive significant influence in the access to farm inputs at $P< 0.000$ which is statistically significant.

5.2.2 Education in the Access to Agricultural Farm Inputs

The second objective for this study was to establish how education influences the access to farm inputs by small holder farmers in Yatta Sub-County. Education was found to be factor influencing the access to farm inputs. The influence of education

was more reflected in the area of helping farmers to apply farm inputs as required with a mean score of 3.63, the role of education as an enabler in the process of accessing information with a mean score of 3.37 and the general agreement that the attainment of education had contributed towards improved access to farm inputs had a mean score of 3.39.The regression coefficient result indicated a unit change in education holding the other factors constant would change access to farm inputs by 0.306 units which is significant. This implies that education level had positive significant influence in the access to farm inputs at P< 0.000 which is statistically significant.

5.2.3 Gender in the Access to Agricultural Farm Inputs

The third objective of this study was to establish how gender influences the access farm inputs by small holder farmers in Yatta Sub-county. All the sample respondents agreed to the statement which stated that their respective gender had given them an equal opportunity in the access to farm inputs as the opposite gender with a mean score of 3.42.On the other hand respondents strongly disagreed with statements which were designed to get the view of the respondents regarding any feeling and perception in inequality in the access to farm input by small holder farmers and in this regards the means score were indicating that their existed inequalities. For instance the score regarding statements such as; their respective gender had enabled them to adopt modern inputs faster than the opposite gender had a mean of 2.57 indicating a disagreement and therefore the opposite would be the case whereby both and women and men would adopt modern inputs as the opposite gender. As per the multiple regression analysis output it was revealed that, a unit change in gender holding the other factors constant would change access to farm inputs by - 0.051 units. However, given that the coefficient obtained was not significant, it implies that increases or decreases in gender do not significantly relate to increases or decreases in access to farm inputs.

5.2.4 Access to Credit in the Access to Agricultural Farm Inputs

As per the finding of this study majority of the respondents indicated the availability of credit facilities in the area with the major ones being the table banking, banks and micro finance institutions. The influence of the access credit in the access to farm inputs was supported by the relatively high means recorded in statements such as it

matters a lot whether there are credit facilities in regards to the access of farm inputs with a mean score of 3.11, there was availability of credit facilities in the area with a mean score of 3.54, the believe that the access to credit contributes to the ability to access farm inputs with a mean score of 3.30.However,from the findings it emerged that even though there were opportunities for accessing credit there was disagreement with the statement that the credit facilities available in this area were adequate, timely and low cost to enable small holder farmer access farm inputs as supported by a mean score of 2.46. The regression coefficient result indicated a unit change in access to credit holding the other factors constant would change access to farm inputs by 0.253 units which is significant. This implies that access to credit had a positive significant influence in the access to farm inputs at $P< 0.000$ which is statistically significant.

5.3 Discussion of the Findings

The findings reveal that income as an independent variable has a positive influence in the access to farm inputs as demonstrated by the high significant statistical level These findings are also consistent with the information gathered from the agricultural officer interviewed regarding the factors influencing the access to farm inputs whereby socio economic factors which include income was cited as having a direct and positive influence in the access to farm inputs by small holder famers. In addition, the findings in the influence of income were also consistent with the findings of Barret (2003) and Binder (2006) in a study in the major rice producing area in Tanzania focusing in the analysis of the socio-economic influencing factors for the utilization of farm inputs which revealed that the regression coefficient for income had a positive influence for the utilization of modern agricultural inputs indicating that the higher the gross income the higher the chances there was in the access to farm inputs for small holder farmers.

In terms of the influence that education has on the access to farm inputs, it has been revealed that it had a strong positive significance. As per the analysis it came out that the higher the education level the higher the chances of a farmer accessing farm inputs and consequently the level of farm productivity. Education was useful in the process of enabling a farmer to make the right decision and especially in the adoption of new technology and inputs. These findings are consistent with the findings of Lockheed,

Jamison and Lau (1980) who found that was significant positive effect of education on agricultural output in the Asian countries even though the findings were mixed. The greatest effect was reported to have significant effect in areas where farmers were adopting modernized agricultural farm inputs which was characterized by use of modern technology.

The findings on the influence of gender and the access to farm inputs have indicated that gender was not a significant factor when compared to the other variables under this study. These findings were also consistent with the information gathered from the interviews held with the Key Informants who were of the view that there was no prevalent gender inequity in the access to farm inputs in the study area as both male and female famers had equal opportunity in the access to farm inputs. The findings of Doss and Morris's (2001) support the findings of this study regarding the issue of gender since it was revealed in their study on the gender differences in the access to inorganic fertilizer whereby from the study findings it has emerged that female farmers may adopt access to farm inputs at the same rate as male farmers given equal access to the farm inputs while holding other factors constant.

Regarding the access to credit and its influence in the access to farm inputs, the findings show that it is a major factor for small holder farmers. The availability and affordability of the credit facilities of prime importance for the small holder farmer and especially in the rural areas. As the findings of this study it was established that the major source of credit was table banking which was reported by majority of the respondent at 79.6% and in addition to this a greater percentage of those who accessed credit had accessed farm inputs. These findings are consistent with the finding of Zeller and Sharma (1998) who reported that access to credit can play an instrumental role for small holder farmers in the establishment of other non-farm enterprises and thus raising their economic status which would lead to improved access to farm inputs.

5.4 Conclusion of the Study

In terms of the influencing factors the findings have revealed that income as a factor has a significant influence to the level of access to farm inputs by small holder farmers. The regression coefficient result indicates that a unit change in income level

holding the other factors constant would lead to change in access to farm inputs by 0.807 units.

Education also positively influences the access to farm inputs by small holder farmers. It therefore follows that increase in education would have an upward effect in the level of access to farm inputs by small holder farmers as reflected in the regression coefficient whereby a unit change in education holding the other factors constant would change access to farm inputs by 0.306 units.

Regarding the influence of gender in the access to farm inputs it emerged that there gender of the farmer had no influence in the relative level of access between men and women in the study area. Men and Women had equal opportunity in the access to farm inputs. According to the result of the regression coefficient, a unit change in gender holding the other factors constant would change access to farm inputs by -0.051 units meaning That increases or decreases in gender do not significantly relate to increases or decreases in access to farm inputs.

Access to credit as an influencing factor in the access credit was significant though at a lower level as compared to income and education as socio-economic factors. The credit opportunities especially in the local area accessible by the common man are instrumental in increasing the access to capital which can enable the small holder farmer to invest in the acquisition of modern inputs. According to the regression coefficient analysis on the access to credit, a unit changes in credit access holding the other factors constant would change access to farm inputs by 0.253 units and this implies a positive influence.

5.5 Recommendations of the Study

In line with the findings that a low percentage of farmers were accessing farm inputs, the subsidy program focusing on fertilizer should be expanded to cover other inputs that are essential in production including; certified seeds and agro-chemicals since these inputs go together and are not separable.

There is need to work towards improving the accessibility of the fertilizer and by extension all the other inputs to the local level by making sure that the mini depots

which have been set at sub-county level are decentralised to ward and even village level. This will go a long way a long way in minimising the distance and transport cost incurred by farmers in accessing the mini deports to purchase the farm inputs.

Timely supply of the farm inputs to coincide with planting seasons is important to help farmers in the pre -production preparation and planning. It will also play an important role in improving production since the input will be applied at the right time for improved return on investment.

Since it was established that one of the major challenges facing small holder farmers was the issue of high cost of inputs despite the fact that fertilizer was being sold at subsidized price, it is recommended that the subsided prices be implemented for all the farm inputs and be done at the source so that price may go down and be standardized even for agro vets and other suppliers. Closely connected to this is the recommendation to have packaging and especially for fertilizer to be done in smaller quantities. The current packaging is done in 50 kgs bags and some farmer could not afford to pay for instance Ksh 1800 per bag of CAN but would purchase according to their purchasing power for smaller quantities in the units of 5 kgs, 10, Kgs and 25 Kgs.

In order to improve the farmer's negotiation power and inculcate the advantage of collective bargaining power, farmers are encouraged to organise themselves into groups. This will enable farmers to negotiate with suppliers of farm inputs for lower prices and also join hands to reduce the cost of transport to the mini depots set by the Government and also to agro dealers situated far from the villages where farming actually takes place.

Extension services should be strengthened under the devolved government system through proper allocation of budget for the agricultural sectors and especially in facilitating the extension officer who are at the grassroots level to access the farmers. This facilitation should take the form of transport facilities such as motorbikes, and communication allowances to enable the officer reach even the remote areas .This should be coupled with deliberate establishment of demonstration farms at village

level and frequent implementation of farmer field days, exposure tours and sponsoring the best farmer to the agricultural shows at county and national level.

5.6 Suggested Areas of Further Research

The study recommends further research on other influencing factors in the access to farm inputs. Some of these areas include; how climatic and weather conditions influence the access to farm inputs in arid and semi- arid lands.

The other area suggested for further research is the area of how age of the farmer influences their access to farm inputs. The studies on this subject may focus on how the age of the farmer by categorising the youth, adults and the aged and their relative access to farm inputs.

The size of land owned by the farmers as a factor determining the access to farm inputs is also suggested as an area of further research. This is an area which is closely related to the resource capacity of farmers which enables them to participate in economic activities which improve their socio-economic status which has a direct effect in the access to farm inputs.

REFERENCES

Adesina, A.A., Mbila, D., Nkamleu, G.B. and Endamana, D. (2000). *Econometric analysis of the determinants of adoption of alley farming by farmers in the forest zone of southwest Cameroon.*

Admassie, Assefa, and Asfaw, A. (1997). *The impact of education on allocative and technical efficiency of farmers: the case of Ethiopian small holders.*

Afriat, S. N. (1972) *Efficiency estimation of production functions. International Economic Review, 13, 568-98.*

Agrawal, A. and Chhatre, A. (2006). *Explaining success on the commons: Community forest governance in the Indian Himalaya*. *World Development, Vol. 34 (1): 149–166.*

Agrawal, A., Yadama,. G., Andrade, R. and Bhattacharya, A. (2006). *Decentralization and environmental conservation: Gender effects from participation in joint forest management. CAPRI Working Paper 53.*

Aigner, D. J., Lovell, C. A. K. and Schmidt, P. (1977). *Formulation and estimation of stochastic frontier production function models. Journal of Econometrics.*

Allendorf, K. (2007). *Do women's land rights promote empowerment and child health in Nepal? World Development, Vol. 35 (11): 1975–1988.*

Appleton, Simon and Balihuta, A. (1996).*Education and agricultural productivity: evidence from Uganda. Journal of International Development, 8, 415-444.*

Ashby, J. and Gomez, S. Cali (1985). Women and agricultural technology in Latin America and the Caribbean.

Atreya, K. (2007). Pesticide use knowledge and practices*: A gender differences in Nepal. Environmental Research, Vol. 104: 305–311.*

Babatunde, R.O., Omotesho, O.A., Olorunsanya, E.O. and Owotoki, G.M. (2008). Gender differences in resources allocation among rural households in Nigeria: Implications for food security and living standard. *European Journal of Social Sciences, Vol. 5 (4): 160–172.*

Baksh, M., C.G. Neumann, M. Paolisso, R.M. Trostle, and A.A.J. Jansen (1994). *The influence of reproductive status on rural Kenyan women's time use. Social Science and Medicine, Vol. 39 (3): 345–354.*

Barrientos, S., A. Bee, A. Matear, and I. Vogel (1999) *Women and agribusiness: Working miracles in the Chilean fruit export sector.*

Barrientos, S., McClenaghan, S. and Orton, L. (2001). *Stakeholder participation, gender, and codes of conduct in South Africa. Development in Practice, Vol. 11.*

Beard, V.A. (2005). *Individual determinants of participation in community development in Indonesia.*

Bihari, A. (2012). *Dukhabandhu Farmers' educational level and agriculture productivity: a study of tribals of KBK districts of Odisha*

Bill and Melinda Gates Foundation (2011). *Agricultural development strategy overview.*

Boserup, E. (1970). *Womans Role in Economic Development*. *New York, U.S.A.: St Martin's Press.*

Bourdillon, M., P. Hebinck, J. Hoddinott, B. Kinsey, J. Marondo, N. Mudege, and T. Owens(2002). *Assessing the impact of HYV maize in resettlement areas of Zimbabwe. Summary report. International Food Policy Research Institute, Washington, D.C.*

CAPRi Working Paper 81. *Washington, D.C.: International Food Policy Research Institute.*

Chirwa, E.W. (2005). *Adoption of fertilizer and hybrid seeds by smallholder maize farmers in southern Malawi.* Development Southern Africa, *Vol. 22 (1): 1–12.*

Davis, K., and Negash, M. (2007). *Gender, wealth and participation in community groups in Meru Central District, Kenya. CAPRi Working Paper Series 65. Consultative Group on International Agricultural Research, Washington, D.C.*

Davis, K., Ekboir, J., Mekasha, W., Ochieng, C.M.O., Spielman, D.J. and Zerfu, E. (2007). *Strengthening agricultural education and training in Sub-Saharan Africa from an innovation systems perspective: Case studies of Ethiopia and Mozambique.*

Davis, K., Nkonya, E., Ayalew, D., Kato, E., Odendo, M., Miiro, R. and Nkuba, J. (2009). *Impact of Farmer Field Schools on agricultural productivity, poverty and farmer empowerment in East Africa. IFPRI Discussion Paper. Washington, D.C.: International Food Policy Research Institute, forthcoming.*

De Brauw, A., Q. Li, C. Liu, S. Rozelle, and L. Zhang (2008) *Feminization of agriculture in China? Myths surrounding women's participation in farming. China Quarterly, Vol. 194: 327–348.*

Deere, C.D., Alvarado, G. E. and Twyman, J. (2009). *Poverty, headship and gender inequality in asset ownership in Latin America. University of Massachusetts,*

Deere, C.D., and Leon, M. (1987). *Introduction to Rural women and state policy: Feminist perspectives on Latin American agricultural development, ed. C.D. Deere and M. Leon. Boulder, Colo., U.S.A.: Westview*

Deere, C.D., Duran, R.L. Mardon, M., and Masterson, T. (2004) *Female land rights and rural household incomes in Brazil, Paraguay and Peru. University of Massachusetts.*

Dolan, C.S. and Sorby, K. (2003). *Gender and employment in high-value agriculture industries.*

Doss, C.R. (1999). *Twenty-five years of research on women farmers in Africa: Lessons and implications for agricultural research institutions; with an annotated bibliography. Economics Program Paper 99-02.Mexico City, Mexico: Centro Internacional de Mejoramiento de Maiz y Trigo.*

Doss, C.R., and Morris, M.L. (2001). *How does gender affect the adoption of agricultural innovations? The case of improved maize technology in Ghana. Agricultural Economics, Vol. 25: 27–39.*

El-Eshmawiy, K.H., El-Shiraif, L.M. and El-Khafif, A.I. (2007). *Socioeconomic and environmental aspects of women labour in the Egyptian agricultural sector: Case study of sugar crops. American-Eurasian Journal of Agriculture and Environmental Science, Vol. 2 (3): 255–260.*

Enete, A.A., Nweke, F.I. and Tollens, E. (2004). Gender and cassava processing in Africa. *Quarterly Journal of International Agriculture*, Vol. 43 (1): 57–69.

Enete, A.A., Nweke, F.I., Achike, A. I. and Tollens, E. (2001). *Differentiated gender ownership of cassava fields and implications for root yield variations in small holder agriculture of south Nigeria. Tropicultura, Vol. 19 (3): 105–109.*

FAO. (2010-11).*Women in Agriculture: Closing the gender gap.*

Farm Radio Weekly (2009) *Burkina Faso: Women live better thanks to cooperative's fair trade certification. African Farm News in Review, no. 68.*

Grekon, A.K. (2004). *The impact of market access on input use and agricultural productivity:* Evidence from Machakos District, Kenya. 43(2).

Hailu, C. and Fanal, C. (2012). *Lecturers at Department of Agribusiness and Value Chain Management College of Agriculture and Veterinary Science.* Ambo University, Ethiopia.

International Finance Corporation (2014), *Access to Finance for Smallholder Farmers*

International Food Policy Discussion Paper (00736). *Washington, D.C.: International Food Policy Research Institute.*

Kenya Vision 2030, *popular version(2007). Learning from the Experiences of Microfinance Institutions in Latin America*

Mburu, B. K., Kung'u, J. B. and Muriuki, J. N (2015).*Climate change adaptation strategies by small-scale farmers in Yatta District, Kenya*

Mubarak, A., and Byerlee, D. (1991). Economic efficiency of small farmers in a changing world: a survey of recent evidence. *Journal of International Development, 3, 1-27.*

Nobeji S. B. (2015). *An analysis of smallholder farmers' socio-economic determinants for inputs use: a case of major rice producing regions in Tanzania.*

Odhiambo, W. and Nyangito, H.O. (2003*), Measuring and Analysing Agricultural Productivity in Kenya: a Review of Approaches in Kenya.*

Ogang, C. (2014).*President of UNFFE presentation on the access to inputs for smallholders in Africa:*

Ouma, J.O, De Groote, H. & Owuor, G. *(2006).Determinants of Improved Maize Seed and Fertilizer use In Kenya: Policy Implications.*

Owolabi, J.O. Abubakar, B.Z. and Amodu, M.Y. (2011).*Assessment of Farmers (Women)' Access to Agricultural Extension, Inputs and Credit Facility in Sabon-Gari Local Government Area of Kaduna State.*

Peterman, A., Behrman, J. and Quisumbing, A.(2010). *A review of empirical evidence on gender differences in non-land agricultural inputs, technology, and services in developing countries.*

Tegemeo Institute of Agricultural of policy development (2008).*Development trends in kenyan agricultural productivity.*

APPENDICES

Appendix I: Letter of Transmittal

Jay Musyoka

P.O BOX 13241-00200

Nairobi, Kenya

Registration No: L50/70555/2011

28th September, 2017

Dear respondent,

Re: INFLUENCE OF SOCIO ECONOMIC STATUS ON THE ACCESS TO AGRICULTURAL FARM INPUTS BY SMALL HOLDER FARMERS: A CASE OF YATTA SUB-COUNTY OF MACHAKOS COUNTY, KENYA

My name is Jay Musyoka, a student from Nairobi University pursuing a Master of Arts in Project Planning and Management. I am undertaking a research project on socio-economic factors influencing access to farm inputs by small holder farmers in Yatta sub-county which is part of the partial fulfilment for the award. Your participation in this exercise will be in the provision of the responses as per the questionnaire and interview guides and I would like to request for your consent to be interviewed with a list of questions that would assist in gathering the necessary data. I promise that the information gathered on yourself will not be used unlawfully in any that may hurt or compromise your standing in society

Thanks in advance for your cooperation during the exercise.

Yours Sincerely,

Jay Musyoka

Appendix II: Letter of Introduction (from university)

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

Your Ref:

Our Ref:

Telephone: 318262 Ext. 120

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

14th November, 2017

REF: UON/ODeL/NLC/27/487

RE: HUSSEIN JAY MUSYOKA - REG NO.L50/70555/2011

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

He is proceeding for research entitled **"Influence of Socio-Economic Status on the Access to Agricultural Farm Inputs by Small Holders Farmers: A Case of Yatta Sub-County of Machakos County, Kenya."**

Any assistance given to him will be appreciated.

UNIVERSITY OF NAIROBI O.E.D.L.
P.O. Box 30197
14 NOV 2017
NAIROBI
NAIROBI EXTRA MURAL CENTRE

CAREN AWILLY
CENTRE ORGANIZER
NAIROBI LEARNING CENTRE

Appendix III: Research Questionnaire

Introductory remarks to the respondent

Greetings, my name is_____ and I am working on a research project to assess the socio economic factors influencing the access to farm inputs in Yatta sub-county. This study is part of the partial fulfilment for the award of Masters of Arts Degree in Project Planning to be awarded by University of Nairobi. I would like to ask you a few questions related to the issue. Our conversation was remain confidential and you can stop the interview at any time you wish. No one in the neighbourhood or the authorities will hear what you tell me.

Do you give your consent to be interviewed for this survey?

- □ If "Yes" , continue the interview
- □ If "No" the interview and move to the next farmer

Part 1: Background information

Name of Research Assistant_____	Start Time_____
Date of interview: dd_____/mm_____yyyy_____ __	End Time:_____

Respondent Details

Name of respondent:

First Name	Middle Name	Last Name

Gender (*Tick one)* □ Male □ Female Household Head □ Man □ Woman □ Child	Village:_____ Ward:_____ Sub County/Constituency:_____ County:_____ Telephone number*(Optional*_____

Part 2:Study Questions

1. Please tell me your Age (circle one)? □ 35yrs and Below □ Between 36yrs And 45yrs □ 46yrs and Above	2. How many acres of land do you cultivate for crop production? _____

3. Please tell your Highest Education level?

□ No education at all	□ College Certificate/Diploma
□ Agricultural extension training	□ University Degree
	□ Master Degree
□ Primary education	□ PhD
□ Secondary education	□ Other specify_____

4. Please tell me your average income per month from both farm and off farm sources?

Farm income	Off-farm income
□ Below Ksh 5,000 P.M	□ Below Ksh 5,000 P.M
□ Ksh 5001 to Ksh 10,000 P.M	□ Ksh 5001 to Ksh 10,000 P.M
□ Ksh 10001 to Ksh 20,000 P.M	□ Ksh 10001 to Ksh 20,000 P.M
□ Ksh 20,001 to Ksh 30,000 P.M	□ Ksh 20,001 to Ksh 30,000 P.M
□ Above Ksh 30,001 P.M	□ Above Ksh 30,001 P.M

Average Income per Month(Farm income + off farm income /2)
Ksh_____

5. Have you engage in crop farming in the last 3 years?(Ref 2013 to date)
□ Yes
□ No
*If response is No, please terminate the interview

6. Which crops ,fruits, vegetables have you grown in your farm in the last 3 years(Ref 2013 to date).(*You can tick more than one option)*

□ Maize(mbemba)	□ Beans(Mboso)	□ Cowpeas(nthooko)
□ Pigeon peas(Nzuu)	□ Fruits (matunda,)	□ Green grams (ndengu)
□ Vegetables (Mboka)	□ Cotton(vamba)	□ Others specify_____

7. Have you ever used farm inputs (fertilizer, certified seeds, pesticides/insecticides) in your crop farming in the last 3 years?
□ Yes
□ No
*(if response is No, skip to Question 11)

8. If yes, please state the ones you have used in your crop production among the three types(*tick against each option)*

Type of Farm Input	Response(*tick only one option)*	
	Yes	No
Fertilizer		
Agro-chemicals(Pesticides, insecticides)		
Certified/hybris Seeds		

9.A.Have you ever received any credit facility
□ Yes
□ No

9.B If yes please state the source of the credit that you received
□ Banking institution
□ Micro finance
□ Farmer group
□ Table banking
□ Other specify_____

10.Please state the source of the farm inputs accessed

- □ Use from previous season
- □ Buy from the Agro vet/market
- □ Given for free by an NGO
- □ Given at subsidized price by NGO
- □ Given on credit by an NGO
- □ Given free by Government
- □ Given at subsidized price by Government
- □ Given by another farmer
- □ Other specify_____

11. Using a Likert 1-5 scale, with 1 being " Strongly Disagree", 2 being "Disagree" 3 being " Neutral" 4 being "Agree '' and 5 being "Strongly Agree" , please rate the statement which I will read for you as to what extend you feel your access to farm inputs as a small holder farmer.

Statement	Likert Scale				
	Strongly Disagree =1	Disagree =2	Neutral=3	Agree =4	Strongly Agree =5
1.Income level and the influence on access to farm inputs					
a) My income is adequate to purchase farm inputs					
b) I spend less proportion of my income on farm inputs					
c) Farm inputs are expensive therefore I can't afford to use them					
d) Farm inputs are for the well-off farmers in our locality					
e) My ability to use farm input in determined by farm income					
f) My ability to use farm input is determined by off farm income					
g) I have to sell livestock in order to buy farm inputs					
h) I can only purchase subsidised farm inputs					
2. Education level and the influence on access to farm inputs					
a) My education helps me to acquire farm inputs					
b) My education helps me to apply the farm inputs as required					
c) My education level has contributed towards improved access to farm inputs					
d) I feel with the education I have I am better than those without education					

in terms of accessing farm inputs					
e) The education I have has enabled me to access information on farm inputs					
f) The education I have enables me to apply for credit facilities in order to purchase farm inputs					
g) Education has helped me to adopt quickly new varieties of farm inputs introduced					
h) My education has enabled me to view farming as a business and thus I do invest to access farm inputs					
3.Gender of the farmer and the influence on access to farm inputs					
a) I feel my gender has given me an equal opportunity in the access to farm inputs as my opposite gender					
b) Due to my gender I able to adopt modern inputs faster than my opposite gender					
c) I feel that information regarding farm inputs does not favour my gender					
d) Due to my gender I am only able to access some farm inputs and not all					
e) I feel that farmers of my gender are disadvantaged in the access to farm inputs					
f) The extension agents do not interact with farmers of my gender to disseminate information regarding farm inputs					
g) In my community people of my gender are not considered farmers hence no need to use farm inputs					

h) It only farmers of the opposite gender who access modern farm inputs					
4. Access to credit and the influence on access to farm inputs					
a) It matter a lot whether there are credit facilities in regards to the access of farm inputs					
b) There is ailability of credit facilities in the area					
c) The credit facilities available area adequate, timely and low cost to enable small holder farmer access farm inputs					
d) I believe the access to credit contributes to the ability to access farm inputs					
e) The existence of institutions giving credit to farmer has helped them in access in farm inputs					
f) Only the well-off are able to access credit facilities to purchase farm inputs					
g) The institutions offering financial credit are only found in the urban centres hence I can access to purchase farm inputs					
h) I feel that I cannot qualify to access credit to purchase farm inputs					
5. Access to farm Inputs					
a) Access to farm inputs in a challenged to me as a small holder farmer					
b) Access to farm inputs is influenced by economic factors					
c) Access to farm inputs is influenced by social factors					
d) Access to farm inputs Is influence by government policy on agriculture					
e) Access to farm inputs ins					

influenced by culture and traditional beliefs					
f) Access to farm inputs is influenced by climatic issues					
g) Access to farm inputs is influenced by the input market					
h) Access to farm inputs is influenced by size of farm land					

12.Please the challenges you have faced in the past in accessing the farm inputs

- □ High Cost of the inputs
- □ Distance to the input market
- □ Lack of knowledge on where to get them
- □ Lack of information of how to use/apply them
- □ Lack of quality farm inputs
- □ Inadequacy of the farm inputs
- □ Other specify_____

13. Could you be having additional comments/remarks relevant to the questions I posed to you that may be useful in this study?

……
……

Appendix IV: Key Informant Interview Guide

Name of key informant_____

Title/position_____

Institution/organization_____

Interviewer_____

Date_____

Location_____

Sub-county_____

1) What is the average land ownership in this locality in term of acreage?

   ……

2) How do small holder famers in this locality access farm inputs?

   ……

3) Is the National Accelerated Access to farm inputs implemented in this area of Yatta Sub-County

4) Accordingly to you view what are the factors that influence the access to farm inputs?

   ……

5) What are the main challenges faced by small holder farmers in accessing farm inputs

   ……

6) How are agricultural extension services if any offered to the small holder farmers?

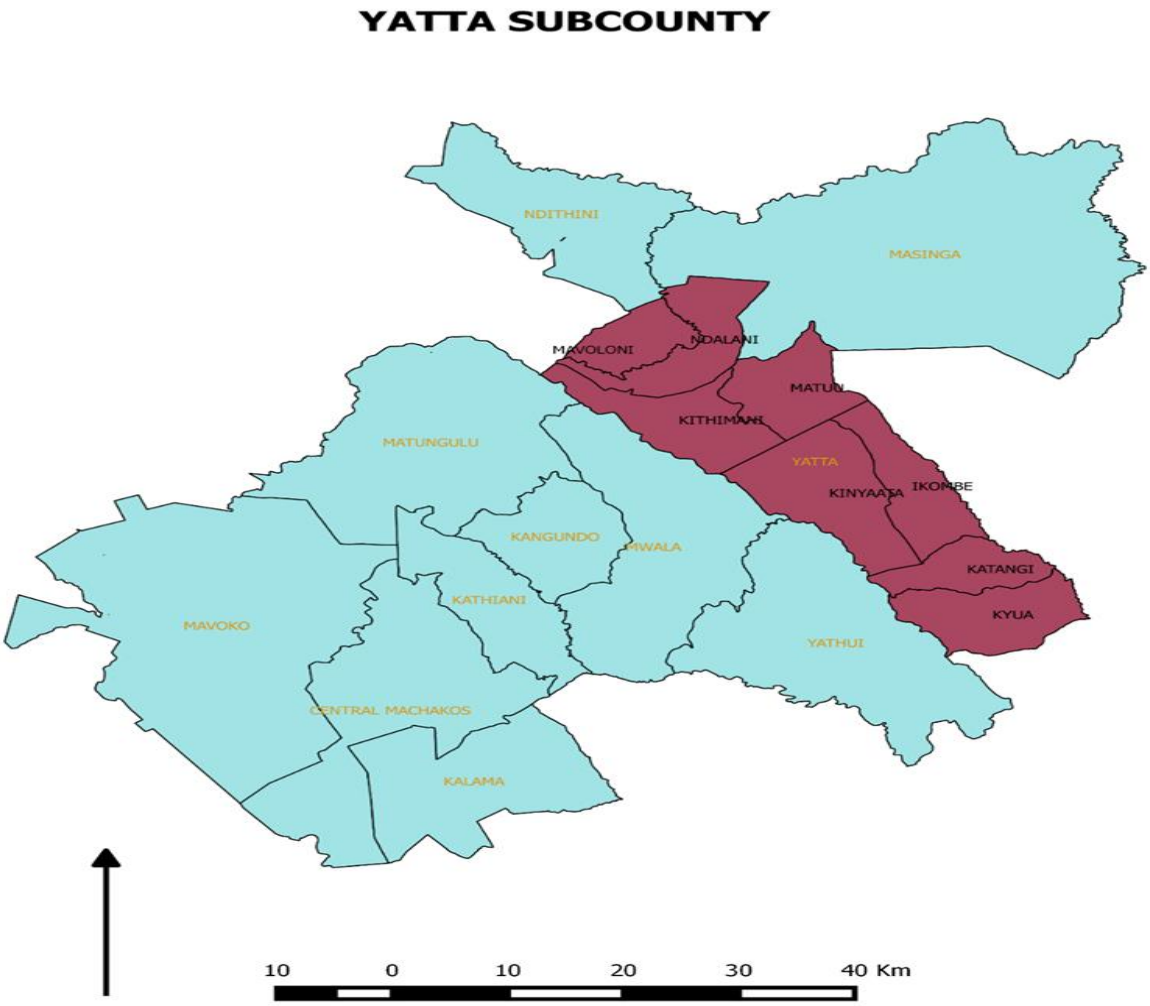
   ……

7) What are your suggestions or recommendations that can work to improve the access to farm input by small farmers in this area.

   ……

Appendix V: Map of Study Area

Figure 2: Map of Yatta Sub-County within Machakos County



Map Source: Machakos County Government (2017)